

**ahi**

**COLLABORATORS**

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# Chapter 1

## ahi

### 1.1 ahi.guide

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```

## 1.2 ahi.device/--background--

```
ahi.device/--background--
```

### PURPOSE

The 'ahi.device' was first created because the lack of standards when it comes to sound cards on the Amiga. Another reason was to make it easier to write multi-channel music programs.

This device is by no means the final and perfect solution. But hopefully, it can evolve into something useful until AT brings you The Real Thing (TM).

### OVERVIEW

Please see the document "AHI Developer's Guide" for more information.

- \* Driver based

Each supported sound card is controlled by a library-based audio driver. For a 'dumb' sound card, a new driver could be written in a few hours. For a 'smart' sound card, it is possible to utilize an on-board DSP, for example, to maximize performance and sound quality. For sound cards with own DSP but little or no memory, it is possible to use the main CPU to mix channels and do the post-processing with the DSP. Drivers are available for most popular sound cards, as well as an 8SVX (mono) and AIFF/AIFC (mono & stereo) sample render driver.

- \* Fast, powerful mixing routines (yeah, right... haha)

---

The device's mixing routines mix 8- or 16-bit signed samples, both mono and stereo, located in Fast-RAM and outputs 16-bit mono or stereo (with stereo panning if desired) data, using any number of channels (as long as 'any' means less than 128). Tables can be used speed the mixing up (especially when using 8-bit samples). The samples can have any length (including odd) and can have any number of loops. There are also so-called HiFi mixing routines that can be used, that use linear interpolation and gives 32 bit output.

\* Support for non-realtime mixing

By providing a timing feature, it is possible to create high-quality output even if the processing power is lacking, by saving the output to disk, for example as an IFF AIFF or 8SXV file.

\* Audio database

Uses ID codes, much like Screenmode IDs, to select the many parameters that can be set. The functions to access the audio database are not too different from those in 'graphics.library'. The device also features a requester to get an ID code from the user.

\* Both high- and low-level protocol

By acting both like a device and a library, AHI gives the programmer a choice between full control and simplicity. The device API allows several programs to use the audio hardware at the same time, and the AUDIO: dos-device driver makes playing and recording sound very simple for both the programmer and user.

\* Future Compatible

When AmigaOS gets device-independent audio worth it's name, it should not be too difficult to write a driver for AHI, allowing applications using 'ahi.device' to automatically use the new OS interface. At least I hope it wont.

## 1.3 ahi.device/AHI\_AllocAudioA

ahi.device/AHI\_AllocAudioA

### NAME

AHI\_AllocAudioA -- allocates and initializes the audio hardware  
 AHI\_AllocAudio -- varargs stub for AHI\_AllocAudioA()

### SYNOPSIS

```
audioctrl = AHI_AllocAudioA( tags );
D0                      A1

struct AHIAudioCtrl *AHI_AllocAudioA( struct TagItem * );
```

```
audioctrl = AHI_AllocAudio( tag1, ... );  
  
struct AHIAudioCtrl *AHI_AllocAudio( Tag, ... );
```

#### FUNCTION

Allocates and initializes the audio hardware, selects the best mixing routine (if necessary) according to the supplied tags. To start playing you first need to call `AHI_ControlAudioA()`.

#### INPUTS

tags - A pointer to a tag list.

#### TAGS

`AHIA_AudioID` (ULONG) - The audio mode to use. Default is `AHI_DEFAULT_ID`. (`AHI_DEFAULT_ID` is the ID the user has selected in the preferences program. It's a good value to use the first time she starts your application.)

`AHIA_MixFreq` (ULONG) - Desired mixing frequency. The actual mixing rate may or may not be exactly what you asked for. Default is `AHI_DEFAULT_FREQ`. (`AHI_DEFAULT_FREQ` is the user's preferred frequency.)

`AHIA_Channels` (UWORD) - Number of channel to use. The actual number of channels used will be equal or grater than the requested. If too many channels were requested, this function will fail. This tag must be supplied.

`AHIA_Sounds` (UWORD) - Number of sounds to use. This tag must be supplied.

`AHIA_SoundFunc` (struct Hook \*) - A function to call each time when a sound has been started. The function receives the following parameters:  
A0 - (struct Hook \*)  
A2 - (struct AHIAudioCtrl \*)  
A1 - (struct AHISoundMessage \*)  
The hook may be called from an interrupt, so normal interrupt restrictions apply.

The called function should follow normal register conventions, which means that d2-d7 and a2-a6 must be preserved.

Default is NULL.

`AHIA_PlayerFunc` (struct Hook \*) - A function to be called at regular intervals. By using this hook there is no need for music players to use other timing, such as VBLANK or CIA timers. But the real reason it's present is that it makes it possible to do non-realtime mixing to disk.

---

Using this interrupt source is currently the only supported way to ensure that no mixing occurs between calls to

```

    AHI_SetVol
    (),

    AHI_SetFreq
    () or
    AHI_SetSound
    ().

```

If the sound playback is done without mixing, 'realtime.library' is used to provide timing. The function receives the following parameters:

```

    A0 - (struct Hook *)
    A2 - (struct AHIAudioCtrl *)
    A1 - Undefined.

```

Do not assume A1 contains any particular value!

The hook may be called from an interrupt, so normal interrupt restrictions apply.

The called function should follow normal register conventions, which means that d2-d7 and a2-a6 must be preserved.

Default is NULL.

AHIA\_PlayerFreq (Fixed) - If non-zero, enables timing and specifies how many times per second PlayerFunc will be called. This must be specified if AHIA\_PlayerFunc is! Do not use any extreme frequencies. The result of MixFreq/PlayerFreq must fit an UWORD, ie it must be less or equal to 65535. It is also suggested that you keep the result over 80. For normal use this should not be a problem. Note that the data type is Fixed, not integer. 50 Hz is  $50 \ll 16$ .

Default is a reasonable value. Don't depend on it.

AHIA\_MinPlayerFreq (Fixed) - The minimum frequency (AHIA\_PlayerFreq) you will use. You MUST supply this if you are using the device's interrupt feature!

AHIA\_MaxPlayerFreq (Fixed) - The maximum frequency (AHIA\_PlayerFreq) you will use. You MUST supply this if you are using the device's interrupt feature!

AHIA\_RecordFunc (struct Hook \*) - This function will be called regularly when sampling is turned on (see AHI\_ControlAudioA ())

with the following parameters:

```

    A0 - (struct Hook *)
    A2 - (struct AHIAudioCtrl *)
    A1 - (struct AHIRecordMessage *)

```

The message (AHIRecordMessage) is filled as follows:

ahirm\_Buffer - Pointer to the samples. The buffer is valid until next time the Hook is called.

ahirm\_Length - Number of sample FRAMES in buffer.

To get the size in bytes, multiply by 4 if ahim\_Type is

AHIST\_S16S.

ahirm\_Type - Always AHIST\_S16S at the moment, but you *\*must\** check this, since it may change in the future!

The hook may be called from an interrupt, so normal interrupt restrictions apply. Signal a process if you wish to save the buffer to disk. The called function should follow normal register conventions, which means that d2-d7 and a2-a6 must be preserved.

NOTE: The function MUST return NULL (in d0). This was previously not documented. Now you know.

Default is NULL.

AHIA\_UserData (APTR) - Can be used to initialize the ahiaac\_UserData field. Default is 0.

#### RESULT

A pointer to an AHIAudioCtrl structure or NULL if an error occurred.

#### EXAMPLE

#### NOTES

SoundFunc will be called in the same manner as Paula interrupts occur; when the device has updated its internal variables and can accept new commands.

#### BUGS

#### SEE ALSO

```
AHI_FreeAudio
(),
AHI_ControlAudioA
()
```

## 1.4 ahi.device/AHI\_AllocAudioRequestA

ahi.device/AHI\_AllocAudioRequestA

#### NAME

AHI\_AllocAudioRequestA -- allocate an audio mode requester.  
AHI\_AllocAudioRequest -- varargs stub for AHI\_AllocAudioRequestA()

#### SYNOPSIS

```
requester = AHI_AllocAudioRequestA( tags );
D0                A0
```

```
struct AHIAudioModeRequester *AHI_AllocAudioRequestA(  
    struct TagItem * );  
  
requester = AHI_AllocAudioRequest( tag1, ... );  
  
struct AHIAudioModeRequester *AHI_AllocAudioRequest( Tag, ... );
```

**FUNCTION**

Allocates an audio mode requester data structure.

**INPUTS**

tags - A pointer to an optional tag list specifying how to initialize the data structure returned by this function. See the documentation for `AHI_AudioRequestA()` for an explanation of how to use the currently defined tags.

**RESULT**

requester - An initialized requester data structure, or NULL on failure.

**EXAMPLE****NOTES**

The requester data structure is READ-ONLY and can only be modified by using tags!

**BUGS****SEE ALSO**

```
AHI_AudioRequestA  
( ),  
AHI_FreeAudioRequest  
( )
```

## 1.5 ahi.device/AHI\_AudioRequestA

ahi.device/AHI\_AudioRequestA

**NAME**

AHI\_AudioRequestA -- get an audio mode from user using an requester.  
AHI\_AudioRequest -- varargs stub for AHI\_AudioRequestA()

---

## SYNOPSIS

```

success = AHI_AudioRequestA( requester, tags );
D0                      A0          A1

BOOL AHI_AudioRequestA( struct AHIAudioModeRequester *,
    struct TagItem * );

result = AHI_AudioRequest( requester, tag1, ... );

BOOL AHI_AudioRequest( struct AHIAudioModeRequester *, Tag, ... );

```

## FUNCTION

Prompts the user for an audio mode, based on the modifying tags. If the user cancels or the system aborts the request, FALSE is returned, otherwise the requester's data structure reflects the user input.

Note that tag values stay in effect for each use of the requester until they are cleared or modified by passing the same tag with a new value.

## INPUTS

requester - Requester structure allocated with

AHI\_AllocAudioRequestA

(). If this parameter is NULL, this function will always return FALSE with a dos.library/IOErr() result of ERROR\_NO\_FREE\_STORE.

tags - Pointer to an optional tag list which may be used to control features of the requester.

## TAGS

Tags used for the requester (they look remarkable similar to the screen mode requester in ASL, don't they? ;-)

AHIR\_Window (struct Window \*) - Parent window of requester. If no AHIR\_Screen tag is specified, the window structure is used to determine on which screen to open the requesting window.

AHIR\_PubScreenName (STRPTR) - Name of a public screen to open on. This overrides the screen used by AHIR\_Window.

AHIR\_Screen (struct Screen \*) - Screen on which to open the requester. This overrides the screen used by AHIR\_Window or by AHIR\_PubScreenName.

AHIR\_PrivateIDCMP (BOOL) - When set to TRUE, this tells AHI to allocate a new IDCMP port for the requesting window. If not specified or set to FALSE, and if AHIR\_Window is provided, the requesting window will share AHIR\_Window's IDCMP port.

AHIR\_IntuiMsgFunc (struct Hook \*) - A function to call whenever an unknown Intuition message arrives at the message port being used by the requesting window. The function receives the following

parameters:

- A0 - (struct Hook \*)
- A1 - (struct IntuiMessage \*)
- A2 - (struct AHIAudioModeRequester \*)

AHIR\_SleepWindow (BOOL) - When set to TRUE, this tag will cause the window specified by AHIR\_Window to be "put to sleep". That is, a busy pointer will be displayed in the parent window, and no gadget or menu activity will be allowed. This is done by opening an invisible Intuition Requester in the parent window.

AHIR\_UserData (APTR) - A 32-bit value that is simply copied in the ahiam\_UserData field of the requester structure.

AHIR\_TextAttr (struct TextAttr \*) - Font to be used for the requesting window's gadgets and menus. If this tag is not provided or its value is NULL, the default font of the screen on which the requesting window opens will be used. This font must already be in memory as AHI calls OpenFont() and not OpenDiskFont().

AHIR\_Locale (struct Locale \*) - Locale to use for the requesting window. This determines the language used for the requester's gadgets and menus. If this tag is not provided or its value is NULL, the system's current default locale will be used.

AHIR\_TitleText (STRPTR) - Title to use for the requesting window. Default is no title.

AHIR\_PositiveText (STRPTR) - Label of the positive gadget in the requester. English default is "OK".

AHIR\_NegativeText (STRPTR) - Label of the negative gadget in the requester. English default is "Cancel".

AHIR\_InitialLeftEdge (WORD) - Suggested left edge of requesting window.

AHIR\_InitialTopEdge (WORD) - Suggested top edge of requesting window.

AHIR\_InitialWidth (WORD) - Suggested width of requesting window.

AHIR\_InitialHeight (WORD) - Suggested height of requesting window.

AHIR\_InitialAudioID (ULONG) - Initial setting of the Mode list view gadget (ahiam\_AudioID). Default is ~0 (AHI\_INVALID\_ID), which means that no mode will be selected.

AHIR\_InitialMixFreq (ULONG) - Initial setting of the frequency slider. Default is the lowest frequency supported.

AHIR\_InitialInfoOpened (BOOL) - Whether to open the property information window automatically. Default is FALSE.

AHIR\_InitialInfoLeftEdge (WORD) - Initial left edge of information window.

---

AHIR\_InitialInfoTopEdge (WORD) - Initial top edge of information window.

AHIR\_DoMixFreq (BOOL) - Set this tag to TRUE to cause the requester to display the frequency slider gadget. Default is FALSE.

AHIR\_DoDefaultMode (BOOL) - Set this tag to TRUE to let the user select the mode she has set in the preferences program. If she selects this mode, ahiam\_AudioID will be AHI\_DEFAULT\_ID and ahiam\_MixFreq will be AHI\_DEFAULT\_FREQ. Note that if you filter the mode list (see below), you must also check the mode (with

AHI\_BestAudioIDA  
( )) before you use it since the user may change the meaning of AHI\_DEFAULT\_MODE anytime, without your knowledge. Default is FALSE. (V4)

AHIR\_FilterFunc (struct Hook \*) - A function to call for each mode encountered. If the function returns TRUE, the mode is included in the file list, otherwise it is rejected and not displayed. The function receives the following parameters:

A0 - (struct Hook \*)  
A1 - (ULONG) mode id  
A2 - (struct AHIAudioModeRequester \*)

AHIR\_FilterTags (struct TagItem \*) - A pointer to a tag list used to filter modes away, like AHIR\_FilterFunc does. The tags are the same as

AHI\_BestAudioIDA  
( ) takes as arguments. See that function for an explanation of each tag.

#### RESULT

result - FALSE if the user cancelled the requester or if something prevented the requester from opening. If TRUE, values in the requester structure will be set.

If the return value is FALSE, you can look at the result from the dos.library/IOErr() function to determine whether the requester was cancelled or simply failed to open. If dos.library/IOErr() returns 0, then the requester was cancelled, any other value indicates a failure to open. Current possible failure codes are ERROR\_NO\_FREE\_STORE which indicates there was not enough memory, and ERROR\_NO\_MORE\_ENTRIES which indicates no modes were available (usually because the application filter hook filtered them all away).

#### EXAMPLE

#### NOTES

The requester data structure is READ-ONLY and can only be modified by using tags!

The mixing/recording frequencies that are presented to the user may not be the only ones a driver supports, but just a selection.

BUGS

SEE ALSO

```

    AHI_AllocAudioRequestA
    (),
    AHI_FreeAudioRequest
    ()

```

## 1.6 ahi.device/AHI\_BestAudioIDA

ahi.device/AHI\_BestAudioIDA

NAME

```

AHI_BestAudioIDA -- calculate the best ModeID with given parameters
AHI_BestAudioID -- varargs stub for AHI_BestAudioIDA()

```

SYNOPSIS

```

ID = AHI_BestAudioIDA( tags );
D0          A1

ULONG AHI_BestAudioIDA( struct TagItem * );

ID = AHI_BestAudioID( tag1, ... );

ULONG AHI_BestAudioID( Tag, ... );

```

FUNCTION

Determines the best AudioID to fit the parameters set in the tag list.

INPUTS

tags - A pointer to a tag list. Only the tags present matter.

TAGS

Many combinations are probably stupid to ask for, like not supporting panning or recording.

AHIDB\_AudioID (ULONG) - The mode must use the same audio hardware as this mode does.

AHIDB\_Volume (BOOL) - If TRUE: mode must support volume changes. If FALSE: mode must not support volume changes.

AHIDB\_Stereo (BOOL) - If TRUE: mode must have stereo output.  
If FALSE: mode must not have stereo output (=mono).

AHIDB\_Panning (BOOL) - If TRUE: mode must support volume panning.  
If FALSE: mode must not support volume panning.

AHIDB\_HiFi (BOOL) - If TRUE: mode must have HiFi output.  
If FALSE: mode must not have HiFi output.

AHIDB\_PingPong (BOOL) - If TRUE: mode must support playing samples backwards. If FALSE: mode must not support playing samples backwards.

AHIDB\_Record (BOOL) - If TRUE: mode must support recording. If FALSE: mode must not support recording.

AHIDB\_Realtime (BOOL) - If TRUE: mode must be realtime. If FALSE: take a wild guess.

AHIDB\_FullDuplex (BOOL) - If TRUE: mode must be able to record and play at the same time.

AHIDB\_Bits (UBYTE) - Mode must have greater or equal number of bits.

AHIDB\_MaxChannels (UWORD) - Mode must have greater or equal number of channels.

AHIDB\_MinMixFreq (ULONG) - Lowest mixing frequency supported must be less or equal.

AHIDB\_MaxMixFreq (ULONG) - Highest mixing frequency must be greater or equal.

AHIB\_Dizzy (struct TagItem \*) - This tag points to a second tag list. After all other tags has been tested, the mode that matches these tags best is returned, i.e. the one that has most of the features you ask for, and least of the ones you don't want. Without this second tag list, this function hardly does what its name suggests. (V4)

#### RESULT

ID - The best AudioID to use or AHI\_INVALID\_ID if none of the modes in the audio database could meet the requirements.

#### EXAMPLE

#### NOTES

#### BUGS

Due to a bug in the code that compared the boolean tag values in version 4.158 and earlier, TRUE must be equal to 1. The bug is not present in later revisions.

---

SEE ALSO

```
AHI_NextAudioID
(),
AHI_GetAudioAttrsA
()
```

## 1.7 ahi.device/AHI\_ControlAudioA

ahi.device/AHI\_ControlAudioA

NAME

```
AHI_ControlAudioA -- change audio attributes
AHI_ControlAudio -- varargs stub for AHI_ControlAudioA()
```

SYNOPSIS

```
error = AHI_ControlAudioA( audioctrl, tags );
D0                                A2          A1

ULONG AHI_ControlAudioA( struct AHIAudioCtrl *, struct TagItem * );

error = AHI_ControlAudio( AudioCtrl, tag1, ...);

ULONG AHI_ControlAudio( struct AHIAudioCtrl *, Tag, ... );
```

FUNCTION

This function should be used to change attributes for a given AHIAudioCtrl structure. It is also used to start and stop playback, and to control special hardware found on some sound cards.

INPUTS

```
audioctrl - A pointer to an AHIAudioCtrl structure.
tags - A pointer to a tag list.
```

TAGS

```
AHIC_Play (BOOL) - Starts (TRUE) and stops (FALSE) playback and
  PlayerFunc. NOTE: If the audio hardware cannot play at the same
  time as recording samples, the recording will be stopped.

AHIC_Record (BOOL) - Starts (TRUE) and stops (FALSE) sampling and
  RecordFunc. NOTE: If the audio hardware cannot record at the same
  time as playing samples, the playback will be stopped.

AHIC_MonitorVolume (Fixed) - Sets the input monitor volume, i.e. how
  much of the input signal is mixed with the output signal while
  recording. Use
  AHI_GetAudioAttrsA
```

() to find the available range.

AHIC\_MonitorVolume\_Query (Fixed \*) - Get the current input monitor volume. ti\_Data is a pointer to a Fixed variable, where the result will be stored.

AHIC\_MixFreq\_Query (ULONG \*) - Get the current mixing frequency. ti\_Data is a pointer to an ULONG variable, where the result will be stored.

AHIC\_InputGain (Fixed) - Set the input gain. Use  
 AHI\_GetAudioAttrSA  
 ()  
 to find the available range. (V2)

AHIC\_InputGain\_Query (Fixed \*) - Get current input gain. (V2)

AHIC\_OutputVolume (Fixed) - Set the output volume. Use  
 AHI\_GetAudioAttrSA  
 () to find the available range. (V2)

AHIC\_OutputVolume\_Query (Fixed \*) - Get current output volume. (V2)

AHIC\_Input (ULONG) - Select input source. See  
 AHI\_GetAudioAttrSA  
 ().  
 (V2)

AHIC\_Input\_Query (ULONG \*) - Get current input source. (V2)

AHIC\_Output (ULONG) - Select destination for output. See  
 AHI\_GetAudioAttrSA  
 (). (V2)

AHIC\_Output\_Query (ULONG \*) - Get destination for output. (V2)

The following tags are also recognized by AHI\_ControlAudioA(). See

AHI\_AllocAudioA  
 () for what they do. They may be used from interrupts.

AHIA\_SoundFunc (struct Hook \*)  
 AHIA\_PlayerFunc (struct Hook \*)  
 AHIA\_PlayerFreq (Fixed)  
 AHIA\_RecordFunc (struct Hook \*)  
 AHIA\_UserData (APTR)

Note that AHIA\_PlayerFreq must never be outside the limits specified with AHIA\_MinPlayerFreq and AHIA\_MaxPlayerFreq! Also note that the timing feature is designed to be used for music. When you change the frequency, be reasonable. Using 50 Hz one moment and 5 the other is to ask for trouble.

RESULT

---

An error code, defined in <devices/ahi.h>.

#### EXAMPLE

#### NOTES

The AHIC\_Play and AHIC\_Record tags *\*must not\** be used from interrupts.

#### BUGS

#### SEE ALSO

```

    AHI_AllocAudioA
    (),
    AHI_GetAudioAttrsA
    (), <devices/ahi.h>

```

## 1.8 ahi.device/AHI\_FreeAudio

ahi.device/AHI\_FreeAudio

#### NAME

AHI\_FreeAudio -- deallocates the audio hardware

#### SYNOPSIS

```

    AHI_FreeAudio( audioctrl );
                A2

    void AHI_FreeAudio( struct AHIAudioCtrl * );

```

#### FUNCTION

Deallocates the AHIAudioCtrl structure and any other resources allocated by

```

    AHI_AllocAudioA
    (). After this call it must not be used
    by any other functions anymore.
    AHI_UnloadSound
    () is automatically
    called for every sound.

```

#### INPUTS

audioctrl - A pointer to an AHIAudioCtrl structure obtained from

```

    AHI_AllocAudioA
    (). If NULL, this function does nothing.

```

EXAMPLE

NOTES

BUGS

SEE ALSO

```
AHI_AllocAudioA
(),
AHI_UnloadSound
()
```

## 1.9 ahi.device/AHI\_FreeAudioRequest

```
ahi.device/AHI_FreeAudioRequest
```

NAME

```
AHI_FreeAudioRequest -- frees requester resources
```

SYNOPSIS

```
AHI_FreeAudioRequest( requester );
A0
```

```
void AHI_FreeAudioRequest( struct AHIAudioModeRequester * );
```

FUNCTION

Frees any resources allocated by  
AHI\_AllocAudioRequestA  
(). Once a  
requester has been freed, it can no longer be used with other calls to

```
AHI_AudioRequestA
() .
```

INPUTS

```
requester - Requester obtained from
AHI_AllocAudioRequestA
(), or NULL
in which case this function does nothing.
```

RESULT

EXAMPLE

---

NOTES

BUGS

SEE ALSO

```
AHI_AllocAudioRequestA
()
```

## 1.10 ahi.device/AHI\_GetAudioAttrsA

```
ahi.device/AHI_GetAudioAttrsA
```

NAME

```
AHI_GetAudioAttrsA -- examine an audio mode via a tag list
AHI_GetAudioAttrs -- varargs stub for AHI_GetAudioAttrsA()
```

SYNOPSIS

```
success = AHI_GetAudioAttrsA( ID, [audioctrl], tags );
D0                                     D0 A2                                     A1

BOOL AHI_GetAudioAttrsA( ULONG, struct AHIAudioCtrl *,
                        struct TagItem * );

success = AHI_GetAudioAttrs( ID, [audioctrl], attr1, &result1, ...);

BOOL AHI_GetAudioAttrs( ULONG, struct AHIAudioCtrl *, Tag, ... );
```

FUNCTION

Retrieve information about an audio mode specified by ID or audioctrl according to the tags in the tag list. For each entry in the tag list, ti\_Tag identifies the attribute, and ti\_Data is mostly a pointer to a LONG (4 bytes) variable where you wish the result to be stored.

INPUTS

ID - An audio mode identifier, AHI\_DEFAULT\_ID (V4) or AHI\_INVALID\_ID.  
audioctrl - A pointer to an AHIAudioCtrl structure, only used if ID equals AHI\_INVALID\_ID. Set to NULL if not used. If set to NULL when used, this function returns immediately. Always set ID to AHI\_INVALID\_ID and use audioctrl if you have allocated a valid AHIAudioCtrl structure. Some of the tags return incorrect values otherwise.  
tags - A pointer to a tag list.

## TAGS

- AHIDB\_Volume (ULONG \*) - TRUE if this mode supports volume changes.
- AHIDB\_Stereo (ULONG \*) - TRUE if output is in stereo. Unless AHIDB\_Panning (see below) is TRUE, all even channels are played to the left and all odd to the right.
- AHIDB\_Panning (ULONG \*) - TRUE if this mode supports stereo panning.
- AHIDB\_HiFi (ULONG \*) - TRUE if no shortcuts, like pre-division, is used by the mixing routines.
- AHIDB\_PingPong (ULONG \*) - TRUE if this mode can play samples backwards.
- AHIDB\_Record (ULONG \*) - TRUE if this mode can record samples.
- AHIDB\_FullDuplex (ULONG \*) - TRUE if this mode can record and play at the same time.
- AHIDB\_Realtime (ULONG \*) - Modes which return TRUE for this fulfills two criteria:  
1) Calls to  
    AHI\_SetVol  
    (),  
    AHI\_SetFreq  
    () or  
    AHI\_SetSound  
    () will be performed within (about) 10 ms if called from a PlayFunc Hook.  
2) The PlayFunc Hook will be called at the specified frequency. If you don't use AHI's PlayFunc Hook, you must not use modes that are not realtime. (Criterion 2 is not that obvious if you consider a mode that renders the output to disk as a sample.)
- AHIDB\_Bits (ULONG \*) - The number of output bits (8, 12, 14, 16 etc).
- AHIDB\_MaxChannels (ULONG \*) - The maximum number of channels this mode can handle.
- AHIDB\_MinMixFreq (ULONG \*) - The minimum mixing frequency supported.
- AHIDB\_MaxMixFreq (ULONG \*) - The maximum mixing frequency supported.
- AHIDB\_Frequencies (ULONG \*) - The number of different sample rates available.
- AHIDB\_FrequencyArg (ULONG) - Specifies which frequency AHIDB\_Frequency should return (see below). Range is 0 to AHIDB\_Frequencies-1 (including).  
NOTE: ti\_Data is NOT a pointer, but an ULONG.
- AHIDB\_Frequency (ULONG \*) - Return the frequency associated with the index number specified with AHIDB\_FrequencyArg (see above).
- AHIDB\_IndexArg (ULONG) - AHIDB\_Index will return the index which gives the closest frequency to AHIDB\_IndexArg  
NOTE: ti\_Data is NOT a pointer, but an ULONG.
-

AHIDB\_Index (ULONG \*) - Return the index associated with the frequency specified with AHIDB\_IndexArg (see above).

AHIDB\_MaxPlaySamples (ULONG \*) - Return the lowest number of sample frames that must be present in memory when AHIST\_DYNAMICSAMPLE sounds are used. This number must then be scaled by  $F_s/F_m$ , where  $F_s$  is the frequency of the sound and  $F_m$  is the mixing frequency.

AHIDB\_MaxRecordSamples (ULONG \*) - Return the number of sample frames you will receive each time the RecordFunc is called.

AHIDB\_BufferLen (ULONG) - Specifies how many characters will be copied when requesting text attributes. Default is 0, which means that AHIDB\_Driver, AHIDB\_Name, AHIDB\_Author, AHIDB\_Copyright, AHIDB\_Version and AHIDB\_Annotation, AHIDB\_Input and AHIDB\_Output will do nothing.

AHIDB\_Driver (STRPTR) - Name of driver (excluding path and extension).

NOTE: ti\_Data is a pointer to an UBYTE array where the name will be stored. See AHIDB\_BufferLen.

AHIDB\_Name (STRPTR) - Human readable name of this mode.

NOTE: ti\_Data is a pointer to an UBYTE array where the name will be stored. See AHIDB\_BufferLen.

AHIDB\_Author (STRPTR) - Name of driver author.

NOTE: ti\_Data is a pointer to an UBYTE array where the name will be stored. See AHIDB\_BufferLen.

AHIDB\_Copyright (STRPTR) - Driver copyright notice.

NOTE: ti\_Data is a pointer to an UBYTE array where the name will be stored. See AHIDB\_BufferLen.

AHIDB\_Version (STRPTR) - Driver version string.

NOTE: ti\_Data is a pointer to an UBYTE array where the name will be stored. See AHIDB\_BufferLen.

AHIDB\_Annotation (STRPTR) - Annotation by driver author.

NOTE: ti\_Data is a pointer to an UBYTE array where the name will be stored. See AHIDB\_BufferLen.

AHIDB\_MinMonitorVolume (Fixed \*)

AHIDB\_MaxMonitorVolume (Fixed \*) - Lower/upper limit for input monitor volume, see

AHI\_ControlAudioA

(). If both are 0.0,

the sound hardware does not have an input monitor feature.

If both are same, but not 0.0, the hardware always sends the recorded sound to the outputs (at the given volume). (V2)

AHIDB\_MinInputGain (Fixed \*)

AHIDB\_MaxInputGain (Fixed \*) - Lower/upper limit for input gain, see

AHI\_ControlAudioA

(). If both are same, there is no input

gain hardware. (V2)

AHIDB\_MinOutputVolume (Fixed \*)

AHIDB\_MaxOutputVolume (Fixed \*) - Lower/upper limit for output volume, see

AHI\_ControlAudioA

( ). If both are same, the sound card does not have volume control. (V2)

AHIDB\_Inputs (ULONG \*) - The number of inputs the sound card has. (V2)

AHIDB\_InputArg (ULONG) - Specifies what AHIDB\_Input should return (see below). Range is 0 to AHIDB\_Inputs-1 (including).

NOTE: ti\_Data is NOT a pointer, but an ULONG. (V2)

AHIDB\_Input (STRPTR) - Gives a human readable string describing the input associated with the index specified with AHIDB\_InputArg (see above). See

AHI\_ControlAudioA

( ) for how to select one.

NOTE: ti\_Data is a pointer to an UBYTE array where the name will be stored. See AHIDB\_BufferLen. (V2)

AHIDB\_Outputs (ULONG \*) - The number of outputs the sound card has. (V2)

AHIDB\_OutputArg (ULONG) - Specifies what AHIDB\_Output should return (see below). Range is 0 to AHIDB\_Outputs-1 (including)

NOTE: ti\_Data is NOT a pointer, but an ULONG. (V2)

AHIDB\_Output (STRPTR) - Gives a human readable string describing the output associated with the index specified with AHIDB\_OutputArg (see above). See

AHI\_ControlAudioA

( ) for how to select one.

NOTE: ti\_Data is a pointer to an UBYTE array where the name will be stored. See AHIDB\_BufferLen. (V2)

AHIDB\_AudioID (ULONG \*) - The ID for this mode. (V4)

If the requested information cannot be found, the variable will be not be touched.

#### RESULT

TRUE if everything went well.

#### EXAMPLE

#### NOTES

#### BUGS

In versions earlier than 3, the tags that filled a string buffer would

not NULL-terminate the string on buffer overflows.

SEE ALSO

```
AHI_NextAudioID
(),
AHI_BestAudioIDA
()
```

## 1.11 ahi.device/AHI\_LoadSound

ahi.device/AHI\_LoadSound

NAME

AHI\_LoadSound -- prepare a sound for playback

SYNOPSIS

```
error = AHI_LoadSound( sound, type, info, audioctrl );
D0                                D0:16 D1    A0    A2

ULONG AHI_LoadSound( UWORD, ULONG, APTR, struct AHIAudioCtrl * );
```

FUNCTION

Defines an ID number for the sound and prepares it for playback.

INPUTS

sound - The numeric ID to be used as a reference to this sound. The ID is a number greater or equal to 0 and less than what you specified with AHIA\_Sounds when you called AHI\_AllocAudioA().

type - The type of the sound. Currently four types are supported:

- AHIST\_SAMPLE - array of 8 or 16 bit samples. Note that the portion of memory where the sample is stored must NOT be altered until AHI\_UnloadSound() has been called! This is because some audio drivers may wish to upload the samples to local RAM. It is OK to read, though.
- AHIST\_DYNAMICSAMPLE - array of 8 or 16 bit samples, which can be updated dynamically. Typically used to play data that is loaded from disk or calculated realtime. Avoid using this sound type as much as possible; it will use much more CPU power than AHIST\_SAMPLE on a DMA/DSP sound card.
- AHIST\_INPUT - The input from your sampler (not fully functional yet).

info - Depends on type:

AHIST\_SAMPLE - A pointer to a struct AHISampleInfo, filled with:  
 ahist\_Type - Format of samples (four formats are supported).  
   AHIST\_M8S: Mono, 8 bit signed (BYTES).  
   AHIST\_S8S: Stereo, 8 bit signed (2 $\times$ BYTES) (V4).  
   AHIST\_M16S: Mono, 16 bit signed (WORDS).  
   AHIST\_S16S: Stereo, 16 bit signed (2 $\times$ WORDS) (V4).  
 ahist\_Address - Address to the sample array.  
 ahist\_Length - The size of the array, in samples.  
 Don't even think of setting ahist\_Address to 0 and  
 ahist\_Length to 0xffffffff as you can do with  
 AHIST\_DYNAMICSAMPLE! Very few DMA/DSP cards have 4 GB onboard  
 RAM...

AHIST\_DYNAMICSAMPLE A pointer to a struct AHISampleInfo, filled  
 as described above (AHIST\_SAMPLE).  
 If ahist\_Address is 0 and ahist\_Length is 0xffffffff

AHI\_SetSound

() can take the real address of an 8 bit sample  
 to be played as offset argument. Unfortunately, this does not  
 work for 16 bit samples.

AHIST\_INPUT - Always set info to NULL.

Note that

AHI\_SetFreq

() may only be called with AHI\_MIXFREQ  
 for this sample type.

audioctrl - A pointer to an AHIAudioCtrl structure.

## RESULT

An error code, defined in <devices/ahi.h>.

## EXAMPLE

## NOTES

There is no need to place a sample array in Chip memory, but it  
 MUST NOT be swapped out! Allocate your sample memory with the  
 MEMF\_PUBLIC flag set.

## BUGS

AHIST\_INPUT does not fully work yet.

## SEE ALSO

AHI\_UnloadSound  
 (),  
 AHI\_SetEffect  
 (),  
 AHI\_SetFreq

```
    ),  
    AHI_SetSound  
    ),  
  
    AHI_SetVol  
    ( ), <devices/ahi.h>
```

## 1.12 ahi.device/AHI\_NextAudioID

ahi.device/AHI\_NextAudioID

### NAME

AHI\_NextAudioID -- iterate current audio mode identifiers

### SYNOPSIS

```
next_ID = AHI_NextAudioID( last_ID );  
D0          D0  
  
ULONG AHI_NextAudioID( ULONG );
```

### FUNCTION

This function is used to iterate through all current AudioIDs in the audio database.

### INPUTS

last\_ID - previous AudioID or AHI\_INVALID\_ID if beginning iteration.

### RESULT

next\_ID - subsequent AudioID or AHI\_INVALID\_ID if no more IDs.

### EXAMPLE

### NOTES

### BUGS

### SEE ALSO

```
AHI_GetAudioAttrsA  
( ),  
AHI_BestAudioIDA  
( )
```

## 1.13 ahi.device/AHI\_PlayA

ahi.device/AHI\_PlayA

### NAME

AHI\_PlayA -- Start multiple sounds in one call (V4)  
 AHI\_Play -- varargs stub for AHI\_PlayA()

### SYNOPSIS

```
AHI_PlayA( audioctrl, tags );
           A2          A1

void AHI_PlayA( struct AHIAudioCtrl *, struct TagItem * );

AHI_Play( AudioCtrl, tag1, ... );

void AHI_Play( struct AHIAudioCtrl *, Tag, ... );
```

### FUNCTION

This function performs the same actions as multiple calls to

```
    AHI_SetFreq
    (),
    AHI_SetSound
    () and
    AHI_SetVol
    (). The advantages
of using only one call is that simple loops can be set without
using a SoundFunc (see
    AHI_AllocAudioA
    (), tag AHIA_SoundFunc) and
that sounds on different channels can be synchronized even when the
sounds are not started from a PlayerFunc (see
    AHI_AllocAudioA
    (), tag
AHIA_PlayerFunc). The disadvantage is that this call has more
overhead than
    AHI_SetFreq
    (),
    AHI_SetSound
    () and
    AHI_SetVol
    (). It is
therefore recommended that you only use this call if you are not
calling from a SoundFunc or PlayerFunc.
```

The supplied tag list works like a 'program'. This means that the order of tags matter.

### INPUTS

audioctrl - A pointer to an AHIAudioCtrl structure.  
 tags - A pointer to a tag list.

## TAGS

AHIP\_BeginChannel (UWORD) - Before you start setting attributes for a sound to play, you have to use this tag to chose a channel to operate on. If AHIP\_BeginChannel is omitted, the result is undefined.

AHIP\_EndChannel (ULONG) - Signals the end of attributes for the current channel. If AHIP\_EndChannel is omitted, the result is undefined. ti\_Data MUST BE NULL!

AHIP\_Freq (ULONG) - The playback frequency in Hertz or AHI\_MIXFREQ.

AHIP\_Vol (Fixed) - The desired volume. If omitted, but AHIP\_Pan is present, AHIP\_Vol defaults to 0.

AHIP\_Pan (sposition) - The desired panning. If omitted, but AHIP\_Vol is present, AHIP\_Pan defaults to 0 (extreme left).

AHIP\_Sound (UWORD) - Sound to be played, or AHI\_NOSOUND.

AHIP\_Offset (ULONG) - Specifies an offset (in samples) into the sound. If this tag is present, AHIP\_Length MUST be present too!

AHIP\_Length (LONG) - Specifies how many samples that should be played.

AHIP\_LoopFreq (ULONG)  
AHIP\_LoopVol (Fixed)  
AHIP\_LoopPan (sposition)  
AHIP\_LoopSound (UWORD)  
AHIP\_LoopOffset (ULONG)  
AHIP\_LoopLength (LONG) - These tags can be used to set simple loop attributes. They default to their sisters. These tags must be after the other tags.

## RESULT

## EXAMPLE

## NOTES

## BUGS

## SEE ALSO

AHI\_SetFreq  
( ),  
AHI\_SetSound  
( ),  
AHI\_SetVol  
( )

## 1.14 ahi.device/AHI\_SampleFrameSize

ahi.device/AHI\_SampleFrameSize

### NAME

AHI\_SampleFrameSize -- get the size of a sample frame (V4)

### SYNOPSIS

```
size = AHI_SampleFrameSize( samplotype );
D0                                D0

ULONG AHI_SampleFrameSize( ULONG );
```

### FUNCTION

Returns the size in bytes of a sample frame for a given sample type.

### INPUTS

samplotype - The sample type to examine. See <devices/ahi.h> for possible types.

### RESULT

### EXAMPLE

### NOTES

### BUGS

### SEE ALSO

<devices/ahi.h>

## 1.15 ahi.device/AHI\_SetEffect

ahi.device/AHI\_SetEffect

### NAME

AHI\_SetEffect -- set effect

### SYNOPSIS

---

```

error = AHI_SetEffect( effect, audioctrl );
d0          A0          A2

ULONG AHI_SetEffect( APTR, struct AHIAudioCtrl * );

```

#### FUNCTION

Selects an effect to be used, described by a structure.

#### INPUTS

effect - A pointer to an effect data structure, as defined in <devices/ahi.h>. The following effects are defined:

- AHIET\_MASTERVOLUME - Changes the volume for all channels. Can also be used to boost volume over 100%.
- AHIET\_OUTPUTBUFFER - Gives READ-ONLY access to the mixed output. Can be used to show nice scopes and VU-meters.
- AHIET\_DSPMASK - Select which channels will be affected by the DSP effects. (V4)
- AHIET\_DSPECHO - A DSP effects that adds (cross-)echo and delay. (V4)
- AHIET\_CHANNELINFO - Get info about all channels. (V4)

audioctrl - A pointer to an AHIAudioCtrl structure.

#### EFFECTS

AHIET\_MASTERVOLUME - Effect is a struct AHIEffMasterVolume, with ahievm\_Volume set to the desired volume. The range is 0 to (channels/hardware channel). Assume you have 4 channels in mono mode. The range is then 0.0 to 4.0. The range is the same if the mode is stereo with panning. However, assume you have 4 channels with a stereo mode *\*without\** panning. Then you have two channels to the left and two to the right => range is 0.0 - 2.0. Setting the volume outside the range will give an unpredictable result!

AHIET\_OUTPUTBUFFER - Effect is a struct AHIEffOutputBuffer, with ahieob\_Func pointing to a hook that will be called with the following parameters:

- A0 - (struct Hook \*)
- A2 - (struct AHIAudioCtrl \*)
- A1 - (struct AHIEffOutputBuffer \*)

The information you are looking for then is in ahieob\_Type, ahieob\_Buffer and ahieob\_Length. Always check ahieob\_Type! ahieob\_Length is neither in bytes nor samples, but sample frames.

AHIET\_DSPMASK - Effect is a struct AHIEffDSPMask, where ahiedm\_Mask is an array with ahiedm\_Channels elements. Each UBYTE in the array can either make the channel 'wet' (affected by the DSP effects), by using the AHIEDM\_WET constant or 'dry' (not affected by the DSP effects) by using the AHIEDM\_DRY constant. The default is all channels wet. If ahiedm\_Channels does not equal the current number of channels allocated, the result of this call is undefined (crash warning!). (V4)

AHIET\_DSPECHO - Effect is a struct AHIEffDSPEcho.  
ahiede\_Delay is the delay in samples (and thus depends on the

mixing rate).

ahiede\_Feedback is a Fixed value between 0 and 1.0, and defines how much of the delayed signal should be feed back to the delay stage. Setting this to 0 gives a delay effect, otherwise echo.

ahiede\_Mix tells how much of the delayed signal should be mixed with the normal signal. Setting this to 0 disables delay/echo, and setting it to 1.0 outputs only the delay/echo signal.

ahiede\_Cross only has effect of the current playback mode is stereo. It tells how the delayed signal should be panned to the other channel. 0 means no cross echo, 1.0 means full cross echo.

If the user has enabled "Fast Echo", AHI may take several short-cuts to increase the performance. This could include rounding the parameters to a power of two, or even to the extremes.

If you set ahiede\_Mix to 0x10000 and ahiede\_Cross to 0x0, much faster mixing routines will be used, and "Fast Echo" will improve that even more.

Otherwise, even with "Fast Echo" turned on, this effect will probably suck some major CPU cycles on most sound hardware. (V4)

AHIET\_CHANNELINFO - Effect is a struct AHIEffChannelInfo, where ahieci\_Func is pointing to a hook that will be called with the following parameters:

A0 - (struct Hook \*)

A2 - (struct AHIAudioCtrl \*)

A1 - (struct AHIEffChannelInfo \*)

ahieci\_Channels must equal the current number of channels used. ahieci\_Offset is an array of ULONGs, which will be filled by AHI before the hook is called (the offset is specified in sample frames). The array must have at least ahieci\_Channels elements.

This "effect" can be used to find out how far each channel has played. You must probably keep track of the other parameters yourself (like which sound is playing, it's volume, balance and frequency etc) in order have meaningful usage of the information. (V4)

NOTE! To turn off an effect, call again with ahie\_Effect OR:ed with AHIET\_CANCEL. For example, it is NOT correct to disable the AHIET\_MASTERVOLUME effect by setting ahie\_mv\_Volume to 1.0!

It is important that you always turn off effects before you deallocate the audio hardware. Otherwise memory may be lost. It is safe to turn off an effect that has never been turned on in the first place.

Never count on that an effect will be available. For example, AHIET\_OUTPUTBUFFER is impossible to implement with some sound cards.

## RESULT

An error code, defined in <devices/ahi.h>.

## EXAMPLE

## NOTES

Unlike the other functions whose names begin with "AHI\_Set", this function may NOT be called from an interrupt (or AHI Hook).

Previous to V4, this call always returned AHIE\_OK.

## BUGS

The idea of updating the source structure instead of allocating a new one that is passed the hook it pretty flawed. The reason is that AHI\_SetEffect() originally could be called from interrupts, and memory allocation is not allowed from within interrupts.

## SEE ALSO

```
AHI_SetFreq
(),
AHI_SetSound
(),
AHI_SetVol
(),
AHI_LoadSound
(),
<devices/ahi.h>
```

## 1.16 ahi.device/AHI\_SetFreq

ahi.device/AHI\_SetFreq

## NAME

AHI\_SetFreq -- set frequency for a channel

## SYNOPSIS

```
AHI_SetFreq( channel, freq, audioctrl, flags );
             D0:16   D1   A2           D2
```

```
void AHI_SetFreq( UWORD, ULONG, struct AHIAudioCtrl *, ULONG );
```

## FUNCTION

Sets the playback frequency for a channel.

---

## INPUTS

channel - The channel to set playback frequency for.

freq - The playback frequency in Hertz. Can also be `AHI_MIXFREQ`, is the current mixing frequency (only usable with `AHIST_INPUT` sounds), or 0 to temporary stop the sound (it will restart at the same point when its frequency changed). Setting the frequency of an `AHIST_INPUT` sound is not supported, and the result is undefined.

audioctrl - A pointer to an `AHIAudioCtrl` structure.

flags - Only one flag is defined

`AHISF_IMM` - Set this flag if this command should take effect immediately. If this bit is not set, the command will not take effect until the current sound is finished. **MUST NOT** be set if called from a `SoundFunc`. See the programming guidelines for more information about this flag.

## RESULT

## EXAMPLE

## NOTES

It is safe to call this function from an interrupt.

## BUGS

## SEE ALSO

```

    AHI_SetEffect
    (),
    AHI_SetSound
    (),
    AHI_SetVol
    (),
    AHI_LoadSound
    ()

```

## 1.17 ahi.device/AHI\_SetSound

```
ahi.device/AHI_SetSound
```

## NAME

`AHI_SetSound` -- set what sound to play for a channel

## SYNOPSIS

```

    AHI_SetSound( channel, sound, offset, length, audioctrl, flags );
                D0:16  D1:16  D2      D3      A2      D4

```

```
void AHI_SetSound( UWORD, UWORD, ULONG, LONG,  
                  struct AHIAudioCtrl *, ULONG );
```

#### FUNCTION

Sets a sound to be played on a channel.

#### INPUTS

channel - The channel to set sound for.  
sound - Sound to be played, or AHI\_NOSOUND to turn the channel off.  
offset - Only available if the sound type is AHIST\_SAMPLE or AHIST\_DYNAMICSAMPLE. Must be 0 otherwise.  
Specifies an offset (in samples) where the playback will begin. If you wish to play the whole sound, set offset to 0.  
length - Only available if the sound type is AHIST\_SAMPLE or AHIST\_DYNAMICSAMPLE. Must be 0 otherwise.  
Specifies how many samples that should be played. If you wish to play the whole sound forwards, set offset to 0 and length to either 0 or the length of the sample array. You may not set length to 0 if offset is not 0! To play a sound backwards, just set length to a negative number.  
audioctrl - A pointer to an AHIAudioCtrl structure.  
flags - Only one flag is defined  
AHISF\_IMM - Set this flag if this command should take effect immediately. If this bit is not set, the command will not take effect until the current sound is finished. MUST NOT be set if called from a SoundFunc. See the programming guidelines for more information about this flag.

#### RESULT

#### EXAMPLE

#### NOTES

It is safe to call this function from an interrupt.

If offset or length is not zero, make sure you do not exceed the sample limits.

#### BUGS

#### SEE ALSO

```
AHI_SetEffect  
( ),  
AHI_SetFreq  
( ),  
AHI_SetVol  
( ),  
AHI_LoadSound  
( )
```

## 1.18 ahi.device/AHI\_SetVol

ahi.device/AHI\_SetVol

### NAME

AHI\_SetVol -- set volume and stereo panning for a channel

### SYNOPSIS

```
AHI_SetVol( channel, volume, pan, audioctrl, flags );
           D0:16   D1       D2   A2         D3

void AHI_SetVol( UWORD, Fixed, sposition, struct AHIAudioCtrl *,
                ULONG );
```

### FUNCTION

Changes the volume and stereo panning for a channel.

### INPUTS

channel - The channel to set volume for.

volume - The desired volume. Fixed is a LONG fixed-point value with 16 bits to the left of the point and 16 to the right (typedef LONG Fixed; from IFF-8SVX docs). Maximum volume is 1.0 (0x10000L) and 0.0 (0x0L) will turn off this channel. Note: The sound will continue to play, but you wont hear it. To stop a sound completely, use AHI\_SetSound ().

Starting with V4 volume can also be negative, which tells AHI to invert the samples before playing. Note that all drivers may not be able to handle negative volume. In that case the absolute volume will be used.

pan - The desired panning. sposition is the same as Fixed (typedef Fixed sposition; from IFF-8SVX.PAN docs). 1.0 (0x10000L) means that the sound is panned all the way to the right, 0.5 (0x8000L) means the sound is centered and 0.0 (0x0L) means that the sound is panned all the way to the left. Try to set Pan to the 'correct' value even if you know it has no effect. For example, if you know you use a mono mode, set pan to 0.5 even if it does not matter.

Starting with V4 pan can also be negative, which tells AHI to use the surround speaker for this channel. Note that all drivers may not be able to handle negative pan. In that case the absolute pan will be used.

audioctrl - A pointer to an AHIAudioCtrl structure.

flags - Only one flag is defined

AHISF\_IMM - Set this flag if this command should take effect immediately. If this bit is not set, the command will not take effect until the current sound is finished. MUST NOT be set if called from a SoundFunc. See the programming

guidelines for more information about this flag.

RESULT

EXAMPLE

NOTES

It is safe to call this function from an interrupt.

Negative volume or negative pan may use more CPU time than positive.

Using both negative volume and negative pan will play the inverted sound on the surround speaker.

BUGS

SEE ALSO

```
AHI_SetEffect
(),
AHI_SetFreq
(),
AHI_SetSound
(),
AHI_LoadSound
()
```

## 1.19 ahi.device/AHI\_UnloadSound

ahi.device/AHI\_UnloadSound

NAME

AHI\_UnloadSound -- discard a sound

SYNOPSIS

```
AHI_UnloadSound( sound, audioctrl );
                D0:16 A2
```

```
void AHI_UnloadSound( UWORD, struct AHIAudioCtrl * );
```

FUNCTION

Tells 'ahi.device' that this sound will not be used anymore.

INPUTS

---

sound - The ID of the sound to unload.  
 audioctrl - A pointer to an AHIAudioCtrl structure.

RESULT

EXAMPLE

NOTES

This call will not break a Forbid() state.

BUGS

SEE ALSO

AHI\_LoadSound  
 ()

## 1.20 ahi.device/CMD\_FLUSH

ahi.device/CMD\_FLUSH

NAME

CMD\_FLUSH -- Cancel all I/O requests (V4)

FUNCTION

Aborts ALL current requests, both active and waiting, even other programs requests!

IO REQUEST INPUT

io\_Device           Preset by the call to  
                   OpenDevice  
                   ().  
 io\_Unit            Preset by the call to  
                   OpenDevice  
                   ().  
 io\_Command         CMD\_FLUSH

IO REQUEST RESULT

io\_Error            0 for success, or an error code as defined in  
                   <ahi/devices.h> and <exec/errors.h>.  
 io\_Actual          If io\_Error is 0, number of requests actually  
                   flushed.

The other fields, except io\_Device, io\_Unit and io\_Command, are trashed.

## EXAMPLE

## NOTES

This command should only be used in very rare cases, like AHI system utilities. Never use this command in an application.

## BUGS

## SEE ALSO

CMD\_RESET  
, <ahi/devices.h>, <exec/errors.h>

## 1.21 ahi.device/CMD\_READ

ahi.device/CMD\_READ

## NAME

CMD\_READ -- Read raw samples from audio input (V4)

## FUNCTION

Reads samples from the users preferred input to memory. The sample format and frequency will be converted on the fly.

## IO REQUEST INPUT

io_Device	Preset by the call to OpenDevice ().
io_Unit	Preset by the call to OpenDevice ().
io_Command	CMD_READ
io_Data	Pointer to the buffer where the data should be put.
io_Length	Number of bytes to read, must be a multiple of the sample frame size (see ahir_Type).
io_Offset	Set to 0 when you use for the first time or after a delay.
ahir_Type	The desired sample format, see <ahi/devices.h>.
ahir_Frequency	The desired sample frequency in Hertz.

## IO REQUEST RESULT

io_Error	0 for success, or an error code as defined in <ahi/devices.h> and <exec/errors.h>.
io_Actual	If io_Error is 0, number of bytes actually transferred.

io\_Offset Updated to be used as input next time.

The other fields, except io\_Device, io\_Unit and io\_Command, are trashed.

EXAMPLE

NOTES

BUGS

SEE ALSO

<ahi/devices.h>, <exec/errors.h>

## 1.22 ahi.device/CMD\_RESET

ahi.device/CMD\_RESET

NAME

CMD\_RESET -- Restore device to a known state (V4)

FUNCTION

Aborts all current requests, even other programs requests  
 (  
     CMD\_FLUSH  
 ), rereads the configuration file and resets the hardware  
 to its initial state

IO REQUEST INPUT

io\_Device Preset by the call to  
     OpenDevice  
     ().  
 io\_Unit Preset by the call to  
     OpenDevice  
     ().  
 io\_Command CMD\_RESET

IO REQUEST RESULT

io\_Error 0 for success, or an error code as defined in  
     <ahi/devices.h> and <exec/errors.h>.

The other fields, except io\_Device, io\_Unit and io\_Command, are trashed.

---

## EXAMPLE

## NOTES

This command should only be used in very rare cases, like AHI system utilities. Never use this command in an application.

## BUGS

## SEE ALSO

CMD\_FLUSH  
 , <ahi/devices.h>, <exec/errors.h>

## 1.23 ahi.device/CMD\_START

ahi.device/CMD\_START

## NAME

CMD\_START -- start device processing (like ^Q) (V4)

## FUNCTION

All

CMD\_WRITE  
 's that has been sent to the device since  
 CMD\_STOP  
 will be started at once, synchronized.

## IO REQUEST INPUT

io\_Device           Preset by the call to  
                   OpenDevice  
                   ().  
 io\_Unit            Preset by the call to  
                   OpenDevice  
                   ().  
 io\_Command         CMD\_START

## IO REQUEST RESULT

io\_Error            0 for success, or an error code as defined in  
                   <ahi/devices.h> and <exec/errors.h>.  
 io\_Actual          If io\_Error is 0, number of requests actually  
                   flushed.

The other fields, except io\_Device, io\_Unit and io\_Command, are trashed.

## EXAMPLE

## NOTES

Unlike most (all?) other devices,  
 CMD\_STOP  
 and CMD\_START do nest in  
 ahi.device.

## BUGS

## SEE ALSO

CMD\_STOP  
 , <ahi/devices.h>, <exec/errors.h>

## 1.24 ahi.device/CMD\_STOP

ahi.device/CMD\_STOP

## NAME

CMD\_STOP -- stop device processing (like ^S) (V4)

## FUNCTION

Stops all  
 CMD\_WRITE  
 processing. All writes will be queued, and  
 are not processed until  
 CMD\_START  
 . This is useful for synchronizing  
 two or more  
 CMD\_WRITE  
 's.

## IO REQUEST INPUT

io\_Device           Preset by the call to  
 OpenDevice  
 ().  
 io\_Unit            Preset by the call to  
 OpenDevice  
 ().  
 io\_Command         CMD\_STOP

## IO REQUEST RESULT

io\_Error            0 for success, or an error code as defined in  
 <ahi/devices.h> and <exec/errors.h>.  
 io\_Actual          If io\_Error is 0, number of requests actually  
 flushed.

The other fields, except `io_Device`, `io_Unit` and `io_Command`, are trashed.

#### EXAMPLE

#### NOTES

This command affects ALL writes, even those sent by other applications. Make sure the code between `CMD_STOP` and `CMD_START` runs as fast as possible!

Unlike most (all?) other devices, `CMD_STOP` and `CMD_START` do nest in `ahi.device`.

#### BUGS

#### SEE ALSO

`CMD_START`, `<ahi/devices.h>`, `<exec/errors.h>`

## 1.25 ahi.device/CMD\_WRITE

`ahi.device/CMD_WRITE`

#### NAME

`CMD_WRITE` -- Write raw samples to audio output (V4)

#### FUNCTION

Plays the samples to the users preferred audio output.

#### IO REQUEST INPUT

<code>io_Device</code>	Preset by the call to <code>OpenDevice()</code> .
<code>io_Unit</code>	Preset by the call to <code>OpenDevice()</code> .
<code>io_Command</code>	<code>CMD_WRITE</code>
<code>io_Data</code>	Pointer to the buffer of samples to be played.
<code>io_Length</code>	Number of bytes to play, must be a multiple of the sample frame size (see <code>ahir_Type</code> ).
<code>io_Offset</code>	Must be 0.
<code>ahir_Type</code>	The desired sample format, see <code>&lt;ahi/devices.h&gt;</code> .
<code>ahir_Frequency</code>	The desired sample frequency in Hertz.

ahir\_Volume      The desired volume. The range is 0 to 0x10000, where 0 means muted and 0x10000 (== 1.0) means full volume.  
 ahir\_Position    Defines the stereo balance. 0 is far left, 0x8000 is center and 0x10000 is far right.  
 ahir\_Link        If non-zero, pointer to a previously sent AHIRequest which this AHIRequest will be linked to. This request will be delayed until the old one is finished (used for double buffering). Must be set to NULL if not used.

#### IO REQUEST RESULT

io\_Error        0 for success, or an error code as defined in <ahi/devices.h> and <exec/errors.h>.  
 io\_Actual       If io\_Error is 0, number of bytes actually played.

The other fields, except io\_Device, io\_Unit and io\_Command, are trashed.

#### EXAMPLE

#### NOTES

#### BUGS

32 bit samples are not allowed yet.

#### SEE ALSO

<ahi/devices.h>, <exec/errors.h>

## 1.26 ahi.device/CloseDevice

ahi.device/CloseDevice

#### NAME

CloseDevice -- Close the device

#### SYNOPSIS

```
CloseDevice(ioRequest)
           A1
```

```
void CloseDevice(struct IORequest *);
```

#### FUNCTION

This is an exec call that closes the device. Every  
 OpenDevice  
 ()

must be matched with a call to `CloseDevice()`.

The user must ensure that all outstanding IO Requests have been returned before closing the device.

#### INPUTS

`ioRequest` - a pointer to the same struct `AHIRequest` that was used to open the device.

#### RESULT

#### EXAMPLE

#### NOTES

#### BUGS

#### SEE ALSO

`OpenDevice`  
`()`, `exec.library/CloseDevice()`

## 1.27 ahi.device/NSCMD\_DEVICEQUERY

`ahi.device/NSCMD_DEVICEQUERY`

#### NAME

`NSCMD_DEVICEQUERY` -- Query the device for its capabilities (V4)

#### FUNCTION

Fills an initialized `NSDeviceQueryResult` structure with information about the device.

#### IO REQUEST INPUT

`io_Device`           Preset by the call to  
                       `OpenDevice`  
                       `()`.

`io_Unit`             Preset by the call to  
                       `OpenDevice`  
                       `()`.

`io_Command`         `NSCMD_DEVICEQUERY`

`io_Data`            Pointer to the `NSDeviceQueryResult` structure,  
                       initialized as follows:  
                       `DevQueryFormat` - Set to 0  
                       `SizeAvailable` - Must be cleared.

It is probably good manners to clear all other fields as well.

`io_Length` Size of the `NSDeviceQueryResult` structure.

#### IO REQUEST RESULT

`io_Error` 0 for success, or an error code as defined in `<ahi/devices.h>` and `<exec/errors.h>`.

`io_Actual` If `io_Error` is 0, the value in `NSDeviceQueryResult.SizeAvailable`.

The `NSDeviceQueryResult` structure now contains valid information.

The other fields, except `io_Device`, `io_Unit` and `io_Command`, are trashed.

#### EXAMPLE

#### NOTES

#### BUGS

#### SEE ALSO

`<ahi/devices.h>`, `<exec/errors.h>`

## 1.28 ahi.device/OpenDevice

`ahi.device/OpenDevice`

#### NAME

`OpenDevice` -- Open the device

#### SYNOPSIS

```
error = OpenDevice(AHINAME, unit, ioRequest, flags)
D0                A0        D0    A1        D1
```

```
BYTE OpenDevice(STRPTR, ULONG, struct AHIRequest *, ULONG);
```

#### FUNCTION

This is an `exec` call. `Exec` will search for the `ahi.device`, and if found, will pass this call on to the device.

#### INPUTS

`AHINAME` - pointer to the string "ahi.device".

`unit` - Either `AHI_DEFAULT_UNIT` (0), `AHI_NO_UNIT` (255) or any other unit the user has requested, for example with a `UNIT` tootype.

AHI\_NO\_UNIT should be used when you're using the low-level API.

ioRequest - a pointer to a struct AHIREquest, initialized by `exec.library/CreateIORequest()`. `ahir_Version` \*must\* be preset to the version you need!

flags - There is only one flag defined, `AHIDF_NOMODESCAN`, which asks `ahi.device` not to build the audio mode database if not already initialized. It should not be used by applications without good reasons (`AddAudioModes` uses this flag).

#### RESULT

error - Same as `io_Error`.

`io_Error` - If the call succeeded, `io_Error` will be 0, else an error code as defined in `<exec/errors.h>` and `<devices/ahi.h>`.

`io_Device` - A pointer to the device base, which can be used to call the functions the device provides.

#### EXAMPLE

#### NOTES

#### BUGS

#### SEE ALSO

`CloseDevice`  
`()`, `exec.library/OpenDevice()`, `<exec/errors.h>`,  
`<devices/ahi.h>`.