

ahi

COLLABORATORS

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REVISION HISTORY

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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 8SVX 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 AHIA_DEFAULT_ID. (AHIA_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 AHIA_DEFAULT_FREQ. (AHIA_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 ahia_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 Fs/Fm, where Fs is the frequency of the sound and Fm 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:
 - ahisi_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).

- ahisi_Address - Address to the sample array.

- ahisi_Length - The size of the array, in samples.

Don't even think of setting ahisi_Address to 0 and

ahisi_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 ahisi_Address is 0 and ahisi_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 player.

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 ahiemv_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 won't 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

io_Device	Preset by the call to OpenDevice().
io_Unit	Preset by the call to OpenDevice().
io_Command	CMD_WRITE
io_Data	Pointer to the buffer of samples to be played.
io_Length	Number of bytes to play, must be a multiple of the sample frame size (see ahir_Type).
io_Offset	Must be 0.
ahir_Type	The desired sample format, see <ahi/devices.h>.
ahir_Frequency	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 AHIRrequest which this AHIRrequest 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 <code>OpenDevice()</code> .
io_Unit	Preset by the call to <code>OpenDevice()</code> .
io_Command	NSCMD_DEVICEQUERY
io_Data	Pointer to the <code>NSDeviceQueryResult</code> structure, initialized as follows: <ul style="list-style-type: none"> 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 <code>NSDeviceQueryResult</code> structure.

IO REQUEST RESULT

io_Error	0 for success, or an error code as defined in <code><ahi/devices.h></code> and <code><exec/errors.h></code> .
io_Actual	If <code>io_Error</code> is 0, the value in <code>NSDeviceQueryResult.SizeAvailable</code> .

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 AHIRquest *, 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 tooltype. 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>.
