VAG Converter 2 Tools User's Guide

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1 Overview

The VAG Converter 2 is a Windows-based tool that converts 16-bit linear PCM waveform data which has been produced using conventional sound tools, into HE-VAG data.

VAG is an original audio compression format using 4-bit ADPCM that has been developed by Sony Computer Entertainment. HE (High Efficiency)-VAG is a backward-compatible format of VAG that has been improved to maintain the quality of waveforms that contain a lot of high-pass components as much as possible; this was a weak point of VAG. In other words, HE-VAG decoders can decode both HE-VAG and VAG, but VAG decoders cannot decode HE-VAG data.

VAG Converter 2 is provided in two types: the GUI version and the console version. On the GUI version, the user can intuitively carry out onscreen operations including specifications of conversion source files, output directory for conversion target files and the compression mode. On the console version, the user can carry out all specifications of setting items with command line options. Moreover, success/failure of the conversion and the reason of the failure can be obtained so that this version is appropriate for batch processing to convert a large amount of waveform files.

Recommended Operating Environment

OS

Windows 7 (64 bit) / Windows 8 (64 bit)

Screen Resolution

1024 x 768 or above

Input File Specifications

File Format

- File size: maximum 2 GB
- Audio format: 16 bit linear PCM
- Number of channels: maximum 8 channels
- Container format: AIFF (extension aif) or WAV (extension wav)

Waveform Data Loop Region

The loop region of the input file's waveform data must be at least 56 samples, and at most 16,777,208 samples. If the loop region is outside this range, a conversion error will result.

In addition, approximate reference values when converting 16,777,208 samples into seconds are as follows.

If sampling frequency is 44.1 kHz : about 380 seconds
If sampling frequency is 48 kHz : about 349 seconds

2 Using the VAG Converter 2

Compression Mode

The compression mode can be specified upon using the VAG Converter 2 to convert linear PCM data to HE-VAG data.

Given the characteristics of HE-VAG, there is a possibility that audio quality will not be as intended when a standard compression mode is used for compression. In such a case, the audio quality may be improved by changing the compression mode; specify the conversion mode as necessary.

Conversion modes that can be specified with the VAG Converter 2 are as follows.

Standard

This is the standard mode for moderate noise shaping. This mode is set by default.

Hard Noise Shaping

Performs strong noise shaping.

Soft Noise Shaping

Performs weak noise shaping.

No Prediction Filtering

Does not use a prediction filter.

Backwards Compatible

Outputs encoded data that is compatible with conventional VAG decoders.

Automatic Adjustment of the Loop Region

In HE-VAG, 28 samples are treated as one block. Because of this, upon converting waveform data with a loop region that is not an integral multiple of 28 samples, an automatic adjustment will be made to make the loop region an integral multiple of 28 samples. As a result, the sampling frequency of the output HE-VAG waveform data may slightly differ from the sampling frequency of the conversion source waveform data.

Thus, if you want to align the sampling frequency of the output HE-VAG waveform data to the sampling frequency of the conversion source waveform data, it is necessary to ensure that the loop region of the conversion source waveform data is an integral multiple of 28 samples.

Execution Example of the Console Version VAG Converter 2

The following is an example of basic execution of the console version VAG Converter 2.

Conversion to the HE-VAG Format

The command line and screen output result using the Standard mode are as follows.

```
C:¥Work>vagconv2.exe sample.wav
sample.wav -> sample.vag
```

The command line and screen output result using the Soft Noise Shaping mode are as follows.

```
C:¥Work>vagconv2.exe /CS sample.wav
sample.wav -> sample.vag
```

The command line and screen output result when converting .wav files and .aif files together in the current directory using the Standard mode are as follows.

```
C:¥Work>vagconv2.exe *.wav *.aif
sample1.wav -> sample1.vag
sample2.wav -> sample2.vag
sample3.aif -> sample3.vag
sample4.aif -> sample4.vag
```

Confirming Loop Information

The command line and screen output for confirming loop information are as follows.

In this example, sample1.wav is a waveform file with loop information and sample2.wav is a waveform file without loop information.

```
C:¥Work>vagconv2.exe /L? sample1.wav
sample.wav: TotalSample 44100 LoopStart 2800, LoopEnd 44099

C:¥Work>vagconv2.exe /L? sample2.wav
sample.wav: TotalSample 44100 (no loop-information)
```

Basic Operational Procedure of the GUI Version VAG Converter 2

The GUI version VAG Converter 2 has two screen modes according to the different methods for setting loop information: the Auto Adjust Mode and Manual Adjust Mode. These screen modes can be switched by selecting the ""Auto Adjust Mode" tab or "Manual Adjust Mode" tab at the upper section of the screen.

The basic operational procedures in each Auto Adjust Mode and Manual Adjust Mode are indicated below.

Note that upon startup of the VAG Converter 2, the Auto Adjust Mode is set by default.

Conversion in the Auto Adjust Mode

The Auto Adjust Mode automatically reflects loop information to the output result when a loop is included in the conversion source waveform data. If the number of samples of the loop region in the waveform data is not an integral multiple of the minimum HE-VAG unit of 28 samples, an automatic adjustment is made to make the value an integral multiple of 28 samples. If the number of samples of the loop region in the waveform data is an integral multiple of 28 samples, a conversion is made as is without any adjustments.

Moreover, multiple files can be converted in a batch in this mode.

(1) Register the conversion source files to the conversion target list

Either select the conversion source files by pressing the "Select Sample..." button or drag-and-drop the conversion source files into the conversion target list view. When conversion source files are collected within one directory, the files within that directory can be registered all together by pressing the "Select Directory..." button and selecting the directory.

The files that can be converted will be registered to the conversion target list onscreen and the file type, sampling frequency, file size, lack/existence of loop setting, file path, etc., will be displayed for each file. Files without loop setting will be displayed in black characters and files with loop setting will be displayed in blue characters.

(2) Convert waveform data

When converting files in the conversion target list all together, press the "Convert All" button. To convert files separately, select the file(s) to convert and press the "Convert" button.

By default, the converted files will be created in the same directory as the conversion source files. To change the file output destination, unmark "The same directory as the Sample" checkbox in the "Save Option" area and press the "change..." button. A dialog to specify the output destination will be displayed - specify the output destination directory.

Conversion in the Manual Adjust Mode

In the Manual Adjust Mode, the loop setting of the conversion source waveform data can be added, changed, or canceled regardless of the loop setting made to the conversion source waveform data.

(1) Register the conversion source files

Either select the conversion source files by pressing the "Select Sample..." button or drag-and-drop the conversion source files into the "File Name" edit box. If the selected files can be converted, the file name, sampling frequency, file size, lack/existence of loop setting, etc., will be displayed for each file onscreen.

(2) Set Loop

Waveform files without loop setting will not have a mark in the "Loop Setting" checkbox; if you want to add loop setting, mark the "Loop Setting" checkbox and input values for "Loop Start" and "Convert".

Waveform files with loop setting will have the "Loop Setting" checkbox marked, and automatic setting of the Loop Start value, for example, will be made.

To adjust the set region of the loop, change the values of the "Loop Start" and "Convert" items while the "Loop Setting" checkbox is marked. The loop region can only be set as an integral multiple of 28 samples.

(3) Convert the waveform files

Press the "Convert" button to convert waveform files. By default, the converted files are created in the same directory as the conversion source files. To change the file output destination, unmark "The same directory as the Sample" checkbox in the "Save Option" area and press the "change" button. A dialog to specify the output destination will be displayed - specify the output destination directory.

3 Command Line Reference

Command Line Format

```
vagconv2.exe [options] <file...>
```

Multiple input files can be specified. Moreover, it is possible to use the wild card.

Options

Options consist of either a slash (/) or a hyphen (-), followed by a string. Depending on the type of option, additional information such as a filename may also follow.

Note that there is no distinction for upper-case/lower-case for each option.

Option	Description
/T <directory>	Sets the output destination of HE-VAG files as <directory>. If this option is not specified, the HE-VAG files will be written out to the same directory as that of the original files. A space must be placed between /T and <directoryname>.
/CH	Sets compression mode to Hard Noise Shaping.
/CS	Sets compression mode to Soft Noise Shaping.
/CN	Sets compression mode to No Prediction Filtering.
/CB	Sets compression mode to Backwards Compatible.
/1	Forcibly outputs as a one-shot HE-VAG.
/L	Forcibly outputs as a full-loop HE-VAG.
/L<start> <end>	Outputs an HE-VAG file with loop from the sample at the <start> position to the sample at the <end> position. There can be no space between /L and <start>, and a space is required between <start> and <end>.
/L?	Displays loop information for specified file. (Conversion is not performed.)
/V	If a file exists with the same name as the converted file, confirm before overwriting the file.
/H	Display usage method.
/?	Display usage method (same as /H).

- If neither /CH, /CS, /CN, nor /CB is specified, then compression mode is set to Standard.
- When the loop region is explicitly set by /L, an automatic adjustment will be made to the loop region so that it becomes an integral multiple of 28 samples if it is not.
- If the loop end position is specified to be larger than the data sample count, processing will be carried out with the loop end position as the data end position. Note that an error will not be generated in this case.
- If /1 or /L is not specified, the loop information of the conversion source waveform data will be used. At this time, an automatic adjustment will be made to the loop region so that it becomes an integral multiple of 28 samples if it is not.

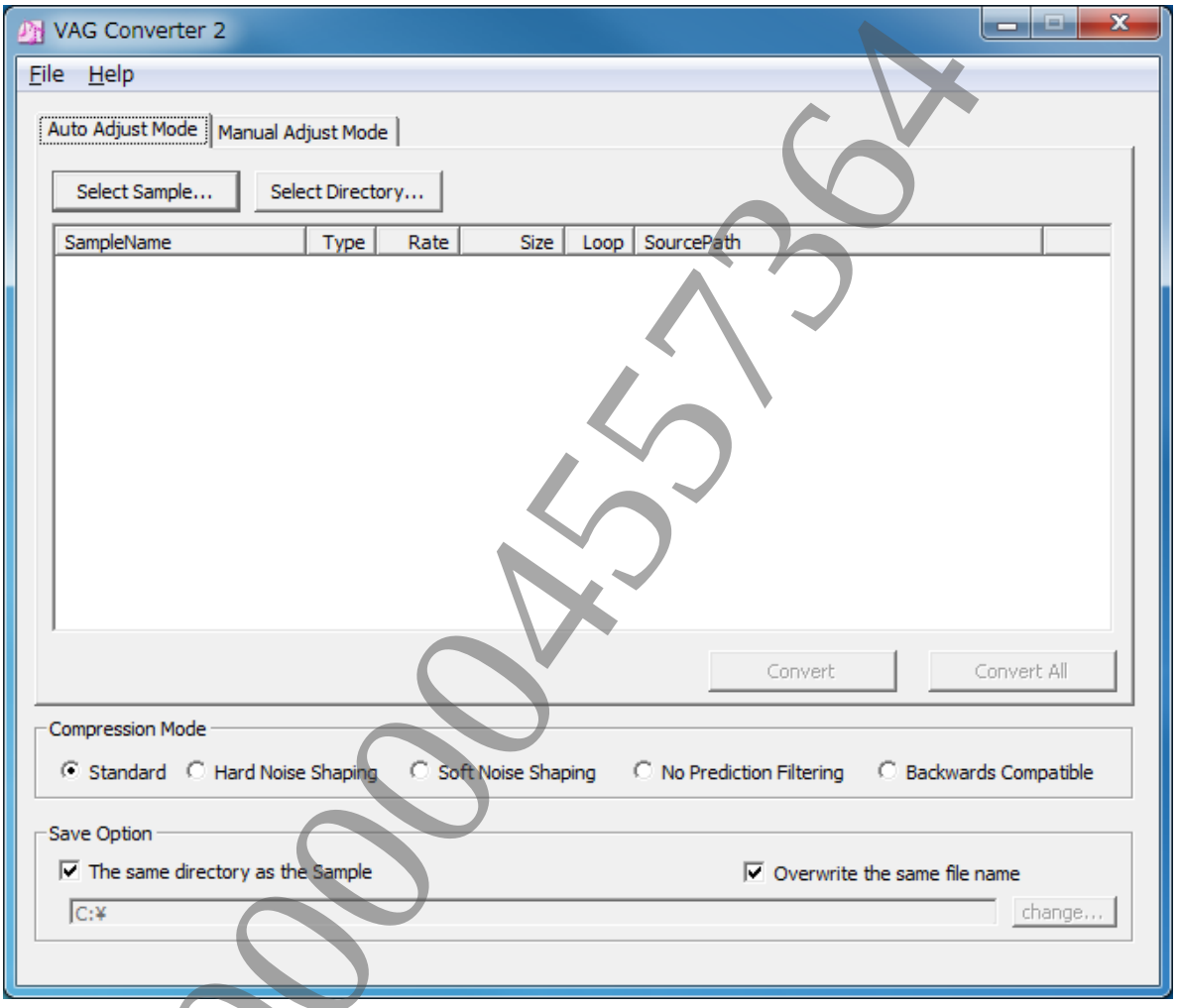
4 Screen Section Reference

This chapter explains operations of the screen sections on the GUI version VAG Converter 2. For details of each feature, refer to "Using the VAG Converter 2" chapter.

Auto Adjust Mode Screen

This section explains screen sections in the Auto Adjust Mode.

Figure 1: Auto Adjust Mode Screen



"Select Sample..." Button

Displays a dialog for registering waveform files to the conversion target list.

"Select Directory..." Button

Displays a dialog to register all files in a directory to the conversion target list. Only waveform files which are directly under the selected directory will be added to the target list.

Conversion Target List View

This displays the waveform files which have been added to the conversion target list.

Listed files can be removed from the conversion target list from the right-click menu or by using the Delete key.

SampleName

The name of each waveform file is displayed here.

It will be displayed in blue characters if it has a loop setting, or in black characters if there is no loop setting.

Type

The type (AIFF or WAV) of each waveform file is displayed here.

Rate

The sampling frequency (in Hz) of each waveform file is displayed here.

Size

The size (in bytes) of each waveform file is displayed here.

Loop

The loop setting of each waveform file is displayed here.

If the waveform has a loop setting, then "true" is displayed, and if there is no loop setting then "false" is displayed.

SourcePath

The file path of each waveform file is displayed here.

"Convert" Button

This converts the waveform files which have been currently selected in the conversion target list.

"Convert All" Button

This converts all waveform files which have been added to the conversion target list.

"Compression Mode" Radio Button Group

This specifies the compression mode to be used when converting to HE-VAG.

"Standard" is selected upon VAG Converter 2 startup.

"Save Option" Area

The features related to outputting HE-VAG files are collected together here.

"The same directory as the Sample" Checkbox

When this checkbox is marked, HE-VAG files will be output to the same file as the conversion source files. In this case, specification of the output destination directory will be invalid.

This checkbox is marked upon VAG Converter 2 startup.

"change..." Button

Displays a dialog to change the output destination directory for HE-VAG files.

When the "The same directory as the Sample" checkbox is marked, this button is disabled. To change the output directory, unmark the "The same directory as the Sample" checkbox.

"Overwrite the same file name" Checkbox

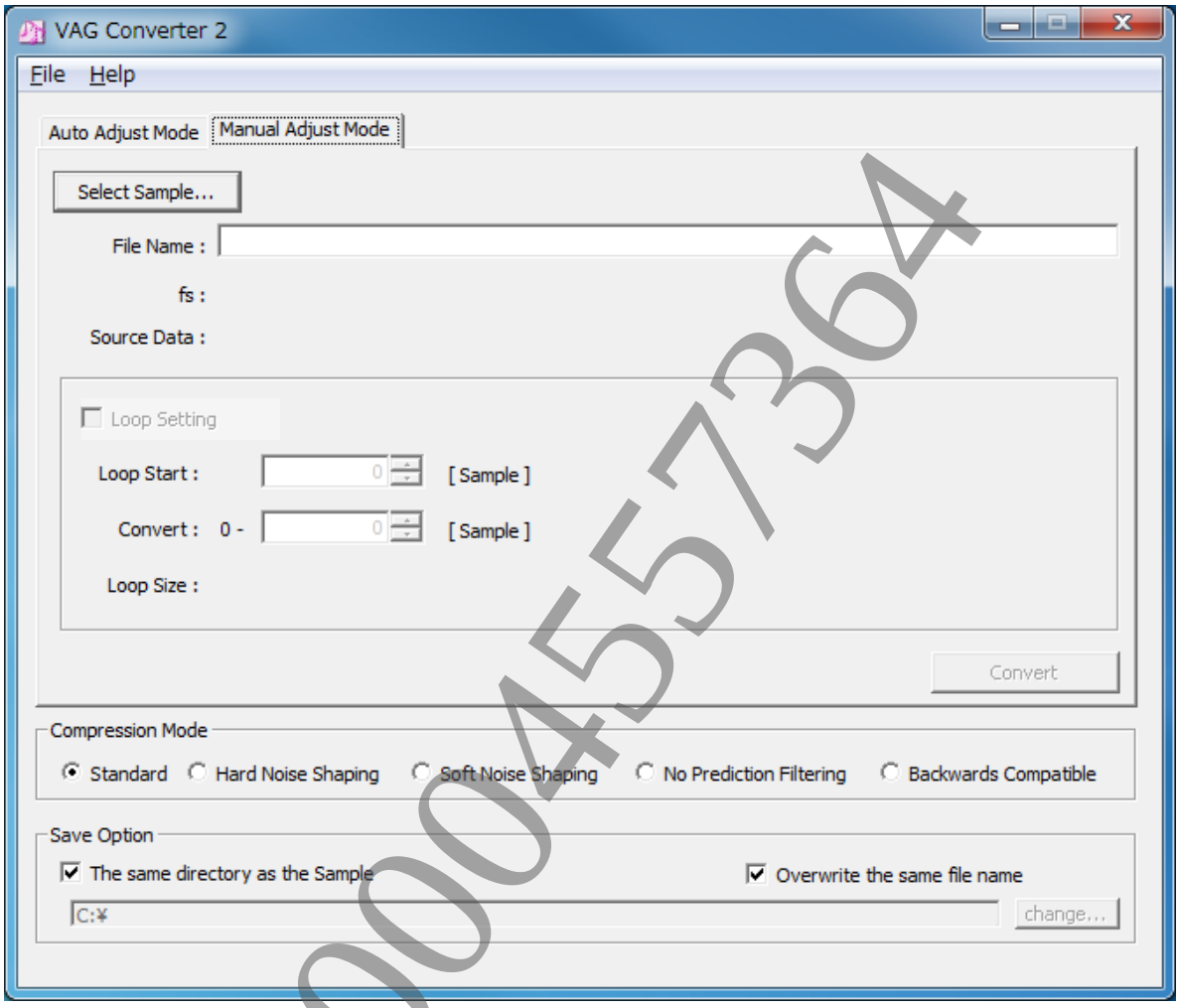
When this checkbox is marked, if there is a HE-VAG file with the same name as the output file in the output directory, then that file will be overwritten. If you wish to change the name of the file, and prevent the file from being overwritten, set this to off. When this checkbox is unmarked, if there is a HE-VAG file with the same name in the output directory, then a dialog for specifying the name of the file will be displayed.

This checkbox is marked upon VAG Converter 2 startup.

Manual Adjust Mode Screen

This section explains screen sections in the Manual Adjust Mode. Operations of the "Select Sample..." button, "Compression Mode" checkbox group, and the "Save Option" area are the same as in the Auto Adjust Mode.

Figure 2: Manual Adjust Mode Screen



"Loop Setting" Checkbox

This sets loop-related information. When this checkbox is marked, the VAG Converter 2 adds loop information to waveform data according to the specifications of Loop Start and Convert, and outputs HE-VAG files.

However, the loop region can only be set so that it is an integral multiple of 28 samples. Moreover, if the loop end position is larger than the data sample count, processing will be carried out with the loop end position as the data end position. Note that in this case, an error will not be generated.

When this checkbox is unmarked, loop information is not added to waveform data and one-shot HE-VAG waveform data is output.

"Loop Start" Value Input Box

This sets the loop start position, in units of samples.

"Convert" Value Input Box

This sets the loop region, in units of samples.

5 Error Message List

The error messages which are output by the VAG Converter 2 are listed below.

On the console version, error messages are written to standard output of the console; an error dialog pops up on the GUI version.

Note
When multiple files are specified as conversion targets, processing will not be aborted even if an error occurs during the processing of a certain file; the tool will proceed to process the next file after an error message is displayed (or on the GUI version, after the user closes the error dialog).

Console Version

OPTION ERROR: illegal option format.

An option specified as a command line argument is invalid.

OPTION ERROR: filename not specified.

The source file has not been specified.

OPTION ERROR: destination directory name.

The specified output directory is invalid.

OPTION ERROR: destination directory not found.

The specified output directory was not found.

OPTION ERROR: invalid destination directory.

The specified output directory is invalid. Specify a valid directory name.

OPTION ERROR: illegal filename <filename>

The specified name of the source file is invalid.

file not found.

The source file was not found.

ERROR: illegal argument specified.

A value which was out of range was specified as an argument.

ERROR: file open error.

The source file could not be opened.

ERROR: filepath is too long.

The file path of the source file is too long.

ERROR: not wave formatted.

The source file is not a valid WAV file.

ERROR: not aiff formatted.

The source file is not a valid AIFF file.

ERROR: not wave/aiff formatted.

The source file is not a valid WAV or AIFF file.

ERROR: not linear PCM data.

The source file is not linear PCM data.

ERROR: wave data has too many channels.

The source file has too many channels.

ERROR: not 16bit data.

The source file is not uncompressed 16-bit data.

ERROR: file write error.

The creation or overwriting of the target file failed.

ERROR: target filepath is too long.

The target file path is too long.

ERROR: target file is read-only.

The target file already exists, and is read-only.

ERROR: target file is being locked.

The target file exists, and is being used by another application.

ERROR: insufficient memory to convert.

The memory necessary for conversion is insufficient.

ERROR: disk full.

There is not enough free space on the disk.

ERROR: invalid loop setting.

The loop setting is invalid. Set the loop region to at least 56 samples and at most 16,777,208 samples.

GUI Version

No wave/aiff file included.

There is no WAV/AIFF file in the specified directory.

File open error (filename).

The source file could not be opened.

File write error (filename).

The creation or overwriting of the target file failed.

Target filepath is too long (filename).

The target file path is too long.

Target file is read-only (filename).

The target file already exists, and is read-only.

Target file is being locked (filename).

The target file exists, and is being used by another application.

Disk Full.

There is not enough free space on the disk.

<filename> is not wave/aiff formatted.

The source file is not a valid WAV or AIFF file.

<filename> is not Linear PCM data.

The source file is not linear PCM data.

<filename> has too many channels.

The source file has too many channels.

<filename> is not 16bit data, so can't be converted to VAG.

The source file is not uncompressed 16-bit data.

invalid loop setting.

The loop setting is invalid. Set the loop region to at least 56 samples and at most 16,777,208 samples.

insufficient memory to convert <filename>.

The memory necessary for conversion is insufficient.

Some of files did not registered, because of too long filepath.

In Auto Adjust Mode, the path of file to be added to the list was too long.

The file did not registered, because of too long filepath.

In Manual Adjust Mode, the path of the source file was too long.

6 Termination Codes

The termination codes returned by the console version VAG Converter 2 upon termination are as follows.

In addition, when multiple files are specified as conversion source files, an error code will return even if a single error occurs. If no error occurs for any file, normal termination (0) will return.

Value	Description
0	Normal termination
1	Overwrite was canceled
2	Failed to open a conversion source file
3	Failed to create a conversion target file
4	Path of the conversion target file is too long
5	A conversion target file already exists with a read-only attribute
6	A conversion target file already exists and is being used by another application
7	Disc space is insufficient for a write
8	Failed to write a conversion target file
16	A conversion source file has an invalid WAV format
17	A conversion source file has an invalid AIFF format
19	A conversion source file has an invalid WAV or AIFF format
20	Waveform data of a conversion source file is not linear PCM
21	Too many number of channels for waveform data of a conversion source file
22	Waveform data of a conversion source file is not 16 bit data
23	Loop specification of a conversion source file is invalid
32	Memory required for conversion is insufficient
33	Invalid argument is specified

Appendix: VAG File Format

VAG File Format

Features of the VAG File Format

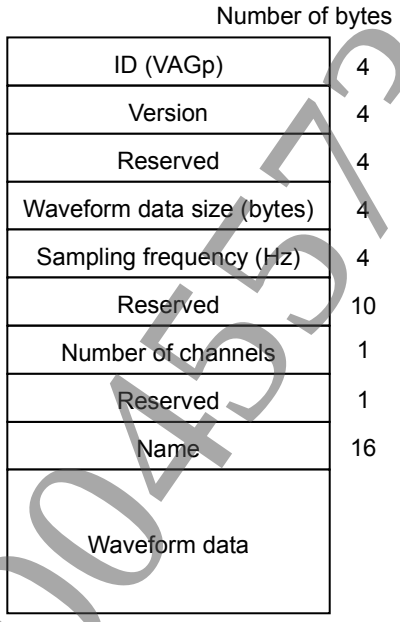
VAG is waveform data that has been compressed using ADPCM. VAG data consists of the waveform data and 48 bytes of information about the waveform data such as the sampling frequency.

A VAG file has a ".vag" extension.

Overall Structure of a VAG File

The following figure shows the format of a VAG file.

Figure 3 VAG File Structure



Field	Type	Description
ID	`unsigned char[4]`	Identification ID ('V','A','G','p' = 0x56,0x41,0x47,0x70)
version	`unsigned int`	Version
reserved	`unsigned char[4]`	Reserved area
data size	`unsigned int`	Waveform data size (bytes)
fs	`unsigned int`	Sampling frequency (Hz)
reserved	`unsigned char[10]`	Reserved area
ch	`unsigned char`	Number of channels (0 - 1 = 1[ch], 2 = 2[ch])
reserved	`unsigned char`	Reserved area
Name	`unsigned char[16]`	Waveform data name

(*) `unsigned int` type field values are all Big Endian.

Waveform Data Format

Waveform data is compressed using ADPCM and stored in its own format.

ADPCM Data Block Format

Waveform data consists of blocks of 16 bytes each. A block consists of a 2-byte header that records the decoding coefficient and loop information followed by 14 bytes of sound data. The sound data is 28 samples worth of compressed voice data.

Figure 4 ADPCM Data Format

Decoding coefficient (1 byte)	Loop information (1 byte)	Sound data (14 bytes)

About Loop Information

The second byte of each block of ADPCM data contains information about loops. By setting appropriate data here, voice data loops can be implemented on a per-block basis.

How this information is used depends on the playback mode that is set for each voice. Valid playback modes are "loop play" and "one-shot play." The meaning of loop information for each mode is described below.

Although the size of phoneme region data is specified when the phoneme region is set, after this amount of data is decoded, voice generation ends and the relevant voice is muted regardless of the loop information value and regardless of whether loop play is enabled or disabled.

When loop play is enabled

Loop information is interpreted as shown in the following table. Values not in the table are ignored.

Loop Information Value	Description
3	Indicates the ending block of the loop. After this block is decoded, decoding returns to the starting block position, which was saved internally. If the ending block is reached without finding the starting block, decoding returns to the phoneme region starting position that was set when the phoneme region was specified.
6	Indicates the starting block of the loop. When the ending block is reached, this becomes the block that is decoded next. If multiple starting blocks are present, the one that was traversed last is valid.
7	Indicates the playback ending position. When this block is reached, vocalization of the relevant voice is stopped and the voice is muted. As a result, this block is not decoded.

When loop play is disabled (one-shot play)

Loop information is interpreted as shown in the following table. Values not in the table are ignored.

Loop Information Value	Description
7	Indicates the playback ending position. When this block is reached, vocalization of the relevant voice is stopped and the voice is muted. As a result, this block is not decoded.