

## 1 WAV Audio

WAV files inside compressed PAKs cannot be opened with conventional audio players because they are missing header:

(source: <http://soundfile.sapp.org/doc/WaveFormat/>)

struct sWAVHeader

```
{
    ulong RiffSignature;    // "RIFF" (LE: 0x46464952) chunk signature
    ulong RiffSize;         // Riff chunk size (File size - 8)
    ulong WaveSignature;    // "WAVE" (LE: 0x45564157) chunk signature
    ulong FmtSignature;     // "fmt " (LE: 0x20746d66) subchunk signature
    ulong FmtSize;          // Fmt subchunk size (16 for PCM)
    ushort Format;          // Audio format (1 for PCM)
    ushort Channels;        // Number of channels (1 for mono, 2 for stereo)
    ulong SamplingFreq;     // Sampling frequency
    ulong ByteRate;         // Byte rate (SamplingF * Channels * BitsPerSample / 8)
    ushort BytesPerSample;  // Bytes per sample for all channels (Channels * BitsPerSample / 8)
    ushort BitsPerSample;   // Bits per sample for each channel (8, 16, etc)
    ulong DataSignature;    // "data" (LE: 0x61746164) subchunk signature
    ulong DataSize;         // Data subchunk size
                           // (SamplesNum = DataSize / (Channels * (BitsPerSample / 8)))
}
```

You can fix those WAV's by adding this header in hex editor (write file size minus 4 (in little endian hex) instead of red bytes):

```
52 49 46 46 78 56 34 12 57 41 56 45 66 6D 74 20
10 00 00 00 01 00 01 00 11 2B 00 00 22 56 00 00
02 00 10 00 64 61 74 61
```

I found out that those WAVs are played well with those parameters: BitsPerSample = 16, Channels = 1, SamplingFreq = 11025 Hz. However, I am still not sure if those parameters are right because in game playback is better.

## 2 VAG music

File extension of PS2 HL music and GUI sounds is \*.VAG.

Files with \*.VAG extension are usually represent Sony PlayStation audio format (widely used in PS1 and PS2 games). VAG files can be converted with Awave Studio or Video Game Sound Converter programs.

GUI sounds (confirm.vag, cancel.vag, select.vag) are perfectly compatible with listed programs. However, PS2 HL music files are missing header:

(source: [http://www.psdevwiki.com/ps3/Multimedia\\_Formats\\_and\\_Tools](http://www.psdevwiki.com/ps3/Multimedia_Formats_and_Tools))  
(variables inside file are in big endian format)

```
struct sVAGHeader
{
    char Signature[4];    // "VAGp" signature
    ulong Version;        // Should be 0x20 for PS2 HL
    ulong Magic1;         // = 0
    ulong DataSize;       // Size of file without header
    ulong SamplingF;      // Sampling frequency. Should be 44100 (0xAC44) for PS2 Half-life
    uchar Magic2[10];     // Filled with zeroes
    uchar Channels;       // 0-1 - one channel (mono), 2 - two channels (stereo)
                        // PS2 HL supports mono only
    uchar Magic3;         // = 0
    char Name[16];        // Internal file mane
}
```

Thus, those programs cannot recognize PS2 HL music files. However, you can fix it by adding missing header in HEX editor (write VAG file size (in big endian hex) instead of red bytes):

```
56 41 47 70 00 00 00 20 00 00 00 00 12 34 56 78
00 00 AC 44 00 00 00 00 00 00 00 00 00 00 00 00
73 6F 6D 65 61 75 64 69 6F 00 00 00 00 00 00 00
```

If you want to port some music to PS2 version, remember that input audio should be 44100 Hz mono. Then you can use Awave studio to perform conversion to VAG format. After conversion, remove VAG header in hex editor. Now you can put file on PS2 HL disc.

If you just want to disable certain music tracks in game, you can delete corresponding music files and that is it.

## 2.1 List of PS2 music files

Music files are located at “MUSIC” folder on PS2 HL disc.

Interesting fact: there is no “TRACK1” and “TRACK29” files (are two more music tracks were planned to be in game?).

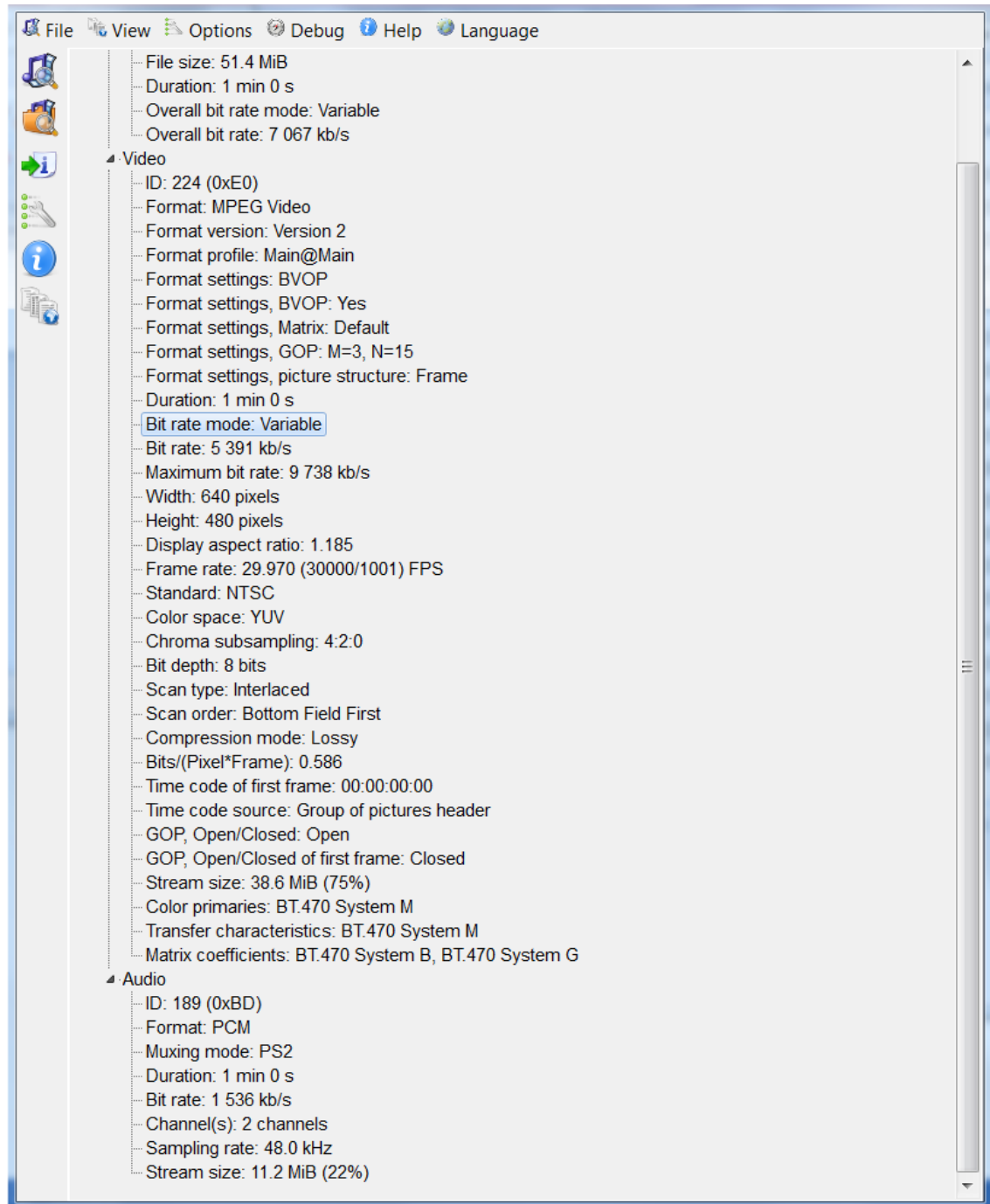
# (OST)	Name (OST)	PC file name	PS2 file name	Length	Description
-	-	-	FELOOP.VAG	1:20	Menu music
1	Adrenaline Horror	Half-Life01.mp3	TRACK2.VAG	02:10	Present in PC version
2	Vague Voices	Prospero01.mp3	TRACK3.VAG	02:12	Present in PC version
3	Klaxon Beat	Half-Life12.mp3	TRACK4.VAG	01:00	Present in PC version
4	Space Ocean	Half-Life07.mp3	TRACK5.VAG	01:36	Present in PC version
5	Cavern Ambience	Half-Life10.mp3	TRACK6.VAG	01:40	Present in PC version
6	Apprehensive	Suspense01.mp3	TRACK7.VAG	00:23	Present in PC version
7	Bass String	Suspense03.mp3	TRACK8.VAG	00:09	Present in PC version
8	Hurricane Strings	Half-Life09.mp3	TRACK9.VAG	01:33	Present in PC version
9	Diab. Adrenaline Guitar	Half-Life02.mp3	TRACK10.VAG	01:44	Present in PC version
10	Valve Theme [Extended]	Half-Life13.mp3	TRACK11.VAG	01:23	Present in PC version
11	Nepal Monastery	Half-Life04.mp3	TRACK12.VAG	02:08	Present in PC version
12	Alien Shock	Half-Life15.mp3	TRACK13.VAG	00:36	Present in PC version
13	Sirens In The Distance	Half-Life14.mp3	TRACK14.VAG	01:13	Present in PC version
14	Nuclear Mission Jam	Half-Life16.mp3	TRACK15.VAG	02:00	Present in PC version
15	Scared Confused Short	Suspense02.mp3	TRACK16.VAG	00:16	Present in PC version
16	Drums & Riffs	Half-Life03.mp3	TRACK17.VAG	02:04	Present in PC version
17	Hard Technology Rock	Half-Life08.mp3	TRACK18.VAG	01:40	Present in PC version
18	Steam In The Pipes	Prospero02.mp3	TRACK19.VAG	01:56	Present in PC version
19	Electric Guitar Ambience	Half-Life05.mp3	TRACK20.VAG	01:25	Present in PC version
20	Dimensionless Deepness	Prospero04.mp3	TRACK21.VAG	01:25	Present in PC version
21	Military Precision	Half-Life11.mp3	TRACK22.VAG	01:21	Present in PC version
22	Jungle Drums	Half-Life06.mp3	TRACK23.VAG	01:50	Present in PC version
23	Traveling Through Limbo	Prospero03.mp3	TRACK24.VAG	01:17	Present in PC version
24	Credits Closing Theme	Half-Life17.mp3	TRACK25.VAG	01:39	Present in PC version
25	Threatening Short	Prospero05.mp3	TRACK26.VAG	00:37	Present in PC version
26	Dark Piano Short	Suspense05.mp3	TRACK27.VAG	00:17	Present in PC version
27	Sharp Fear Short	Suspense07.mp3	TRACK28.VAG	00:06	Present in PC version
-	-	-	TRACK30.VAG	00:10	Heavy breathing of two persons (used at the end of Decay's “Dual Access” chapter)

### 3 Intro video

PS2 Half-Life demo contains intro video just like the PC version. As far as I know playback of intro video is hardcoded to the ELF. But maybe there is still a way to enable it in retail version of game.

File extension of PS2 HL intro video is \*.PSS. Video stream is generic MPEG. You can change extension to \*.mpg and watch it on PC. However, audio stream is likely has VAG format so you would not hear anything if you are playing this video on PC.

You can see full info on “GEARBOX.PSS” intro video file on fig 1 (file analyzed with MediaInfo).



**Fig. 1**