VS1063 ENCODER DEMONSTRATION

VSMPG "VLSI Solution Audio Decoder"

Project Code:
Project Name: VSMPG

All information in this document is provided as-is without warranty. Features are subject to change without notice.

Revision History			
Rev.	**Date**	**Author**	**Description**
1.00	2011-07-01	HH	Initial release with Ogg Vorbis demonstration.

Contents

1   Introduction

VLSI Solution's flagship audio codec integrated circuit VS1063 allows the user to record from analog audio inputs into many formats, including the highly bit-efficient MP3 and Ogg Vorbis formats. This makes it possible to build a device using VS1063 that can record high-quality stereo sound while retaining moderate file sizes.

This software package has been built to demonstrate the capabilities and quality of the real-time Ogg Vorbis encoder of VS1063. It is a PC release of the VS1063 integer encoder. The only difference between this encoder and the VS1063 encoder is that this one reads its input from a file whereas VS1063 reads data from its analog inputs.

PC/Windows and Linux binaries of the encoder is provided. The program works using the command line. No graphical user interface is provided.

2   Disclaimer

VLSI Solution has taken utmost care to make sure that the output of the example programs provided in this package fully represent the audio quality a user of a real VS1063 encoder could expect. However, no warranties or guarantees are given for the correctness of this piece software.

3 Compressing into Ogg Vorbis with VENC

The whole process of getting Ogg Vorbis files looks roughly like this:

- Rip a CD to WAV format or otherwis arrange some 16-bit mono or stereo audio files to be compressed. If possible, avoid transcoding (e.g. decoding an MP3 file and then recompressing it into .OGG).
- Using the command line, run `win\venc.exe` (PC/Window) or `linux/venc` (PC386/Linux). For command line options, see Chapter 3.1 below.

3.1 VENC Command Line Options

Command line options for VENC are as follows:

```
venc [-h] [-l freq] [-q qual] [-v brate] in.wav out.ogg
```

VENC command line options			
Option	**Param**	**Limits**	**Description**
-q	qual	0...10	Set quality to *qual*. Higher is better. (Recommended way to adjust bitrate)
-v	br	1...511	Set nominal VBR (Variable BitRate) to *br* kbit/s
-l (lower-case L)	freq	1...24000	Set low-pass filter to freq Hz (Recommended for bitrate fine tuning)
in.wav			Input PCM file name (required)
out.ogg			Output OGG file name (required)

Note: Option "-v" does not set a bitrate directly. It internally converts the given bitrate to a quality setting and uses that for encoding.

Note: The equivalent of option "-l" is not available on VS1063. This option is included to allow bitrate optimization on a PC (see Chapter 3.2 for details).

3.2 Optimizing .OGG File Bitrate on a PC (not VS1063-related)

NOTE! This Chapter is here only to describe how to optimize bitrate on a PC. It is for the most part not applicable to the VS1063!

Often a situation may arise where a large number of files need to be encoded into a memory unit of a given size (e.g. 512 MB). In this case, for the best audio quality, VENC should be used as follows:

- Make sure you have the source audio files as clean as possible. They should preferably be in 16-bit WAV or AU format. Avoid transcoding if possible (transcoding = using a compressed format like MP3 / WMA / OGG / AAC / etc as the source format for the PCM files). See that the source files have no background noise. Avoid background music or excessive amounts of sound effects if you want to reach the absolute highest compression rates.

- First compress the audio files in a batch with a relatively high-quality setting, e.g. `venc -q 5 in.wav out.ogg`.

- If the files don't fit into your memory, consider the following options (in roughly the order presented):

  - Do your files need to be in stereo or is mono ok? Turning stereo into mono will often save between 10-35% file space.

  - Resample audio to the lowest acceptable samplerate before encoding. For music, 44.1 kHz is not necessarily needed. Very few people can tell the difference between 32 and 44.1 kHz, and lower samplerates like 28 or even 22.05 kHz can do the trick. For speech applications 16 kHz is still very good, and anything downto 8 kHz may still be ok.

  - Adjust the quality value "-q" downwards. For many applications 2 or 3 is good, sometimes even lower is acceptable. Listen closely, however, to how much artifacts like "metallic sound" or "echo" you can accept.

  - Final fine tuning can be done with the low-pass filter option "-l" (lower-case L).

Example of some parameter sets and estimated bitrates for a high-quality mono speech source:

VENC command line options			
Command line Command line	Sample- rate/kHz	Bitrate kbit/s	Description
venc -q 0 -l 2500 in08.wav out.ogg	8	6.5	Intelligible but not good.
venc -q 5 -l 3500 in08.wav out.ogg	8	13	Better than mobile phone.
venc -q 3 -l 5000 in16.wav out.ogg	16	16	Low-end wideband speech.
venc -q 5 -l 7000 in16.wav out.ogg	16	24	Wideband speech.

4 Latest Version Changes

This chapter describes the most important changes to the VS1063 Encoder Demonstration package and this document.

Version 1.00, 2011-07-01

Initial release with Ogg Vorbis encoding demonstration.

5 Contact Information

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