AAC-LC/ HE-AAC / HE-AAC-v2 Encoder

Getting Started Guide

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1. Introduction

1.1 Motivation

MPEG-2/4 AAC-LC (Advanced Audio Coding - Low Complexity version) is a popular audio coding technique recommended by MPEG committee. The codec handles audio signals sampled in the range of 8 kHz to 96 kHz. It operates on a frame of 1024 samples. The bit-rate can vary in the range from 8 kbps upto a maximum of six times the sampling frequency per channel (576 kbps/channel for 96 kHz) . Low Complexity version of AAC provides good compromise between the codec complexity and the audio quality.

HE-AAC (High Efficiency Advanced Audio Coding) also known as aacPlus is a popular audio coding technique recommended by MPEG (Moving Picture Experts Group) committee. SBR (Spectral Bandwidth Replication) is the tool used in combination with the AAC general audio codec resulting in aacPlus. It provides significant increase in coding gain. In SBR, the high-band, i.e. the high frequency part of the spectrum is replicated using the low-band. The bit-rate is far below the bit-rate required when using conventional AAC coding. This translates into better quality at lower bit-rates.

This document describes the Quick-start for the AAC/HEAAC/HEAACv2 encoder. It is intended take the user quickly through the different run-time options available. It also describes the tools available for validation of the encoder.

1.2 Scope

The document will provide information to developers in terms of the following:

- Running the sample Application (**Chapter 2**)
  - This chapter gives a complete overview of the procedure to run the sample application provided.
- Testing the encoder (**Chapter 3**)
  - This chapter describes the tools for validation.

1.3 Glossary

MPEG	Moving Picture Experts Group
AAC	Advanced Audio Coding
SBR	Spectral Band Replication
PS	Parametric stereo
aacPlus	AAC plus SBR
Enhanced aacPlus	aacPlus with PS feature.

2. Running the Sample Application

2.1 Memory Pools

Please refer the Memory Breakup table of the Datasheet and allocate that many number of cmem pools of corresponding sizes.

2.2 Parameter file

The application reads testvector names from the parameter file as mentioned in the Release Notes document. (paramfilesimple.txt / [1]<comp>_enc_params.txt). A sample test vector is given in test folder. The reference output files are also given in the same folder.These files may be used to check the bit exactness of the encoded files generated by the encoder. The syntax for writing parameter file is ...

```
@Start
<command line 1>
<command line 2>
....
@Stop
```

Command	Explanation
@Start	All commands following this command will be executed
@Stop	All commands until this command will be executed
@Input_path	Path specified in this command will be appended to the path and the input file name specified by all –ifile: commands until the next occurance of this command.
@Output_path	Path specified in this command will be appended to the path and the output file name specified by all –ofile: commands until the next occurance of this command.
<command line n>	For the complete list of configurable parameters, please refer to the table below.

Table 2-1 Parameter file commands

[1] The <comp> is aaclc/heaac/heaacv2 based on the AAC profile licensed

The syntax for the command line is as follows:

```
-ifile:<input_wav_file>  -ofile:<output_aac_file>  -br:<bit_rate>
-quality:<quality_level> -tns:<tns enable/disable> -aac_only:<aac
only mode enable/disable> -adts:<adts enable/disable> -adif<adif
enable/disable> -ps_enable:<ps enable/disable>
```

Eg:

```
-ifile:27.wav -ofile:27_128.aac -br:128000 –quality:2 –tns:1
–aac_only:1 –adts:1 –adif:0
```

2.3 Configurable Paramters

The complete list of parameters specified through the command line that can be used with the encoder is listed below. For the valid range of each parameter please refer the API Document.

Parameter	Explanation
SPECIFY INPUT/OUTPUT FILES	
-ifile:	Provide the name and path for the Input file to the encoder
-ofile:	Provide the name and path for the output file of the encoder
ENCODING OPTIONS	
-br:	Provide bit rate to be used for encoding in bps (bits per second)
–quality:	Provide quality level to be used for encoding. Tha valid values for this option are 0, 1 or 2; where 2 corresponds to the highest quality and 0 corresponds to the lowest complexity. Note: 1. This option is not available in AAC LC Encoder 2. For HEAAC / HEAACv2 encoders, if this option is not used then default quality level of 2 is assumed.
–tns:	Flag to enable Temporal Noise Shaping (TNS) tool for encoding. The valid values for this option are 0 or 1.
–aac_only:	Flag to enable AAC only mode for encoding. The valid values for this option are 0 or 1. Note: 1. For HEAAC / HEACCv2 encoders, if this option is not given then SBR mode is used by default. 2. This option is not available in AAC LC Encoder
–ps_enable:	Flag to enable PS mode for encoding. The valid values for this option are 0 or 1. Note: 1. This option is not available in AAC-LC / HE-AAC Encoders

OUTPUT FILE FORMATS	
-adts:	Flag to enable ADTS format of encoding. The valid values for this option are 0 or 1.
-adif:	Flag to enable ADIF format of encoding. The valid values for this option are 0 or 1.
raw format	To enable raw format of encoding, set both adts and adif flags to zero -adts:0 -adif:0
	Note: 1. If no file options are conveyed then by default, adts format is used.
INPUT FILE OPTIONS (in case of PCM input)	
-fs:	Provide sampling frequency of the input pcm file in Hz
-chans:	Provide number of channels of the input pcm file
-pcmsz:	Provide pcm width size of the input pcm file
-chan_mask:	Provide channel mask of the input pcm file
	Note: 1. These above options are only for .pcm input file. 2. In case of .wav input file, information from wav header is used to set all the above mentioned parameters.
OTHER OPTIONS	
-spc:	Flag to enable speech configuration. The valid values for this option are 0 or 1.
-downmix:	Flag to enable down mix of the input file. The valid values for this option are 0 or 1.
-nostprepro:	Flag to disbale stereo preprocessing. The valid values for this option are 0 or 1.
-full_bandwidth:	Flag to enable the use of full bandwidth. The valid values for this option are 0 or 1.
MULTICHANNEL BUILD OPTIONS	
-num_coup_chan:	Provide the number of coupling channels.
-writepce:	Flag to enable writing of PCE. The valid values for this option are 0 or 1.
-dual_mono:	Flag to enable dual mono mode of operation. The valid values for this option are 0 or 1.
	Note: 1. The above options are only for multichannel encoders. 2. The above options are not valid for setero encoders.

Table 2-2 List of Configurable Parameters

3. Tools for validation

This chapter describes the procedure for testing quality of Ittiam Encoder. For further details please refer to **[2].**

3.1 Testing the Encoder

The MPEG reference decoder and EAQUAL tool are used for testing the audio quality.

The usage of the tool is described below:

Decode the generated AAC file using the MPEG reference decoder

The ODG value can be tested using the tool EAQUAL, whose usage is described below

```
EAQUAL.exe –fref testInp\<input.wav> -ftest <output.wav>
```

It prints the ODG value of the output. The ODG rating is interpreted as shown in Table 3-1

Option	Description
0.0	Imperceptible distortion
-1.0	Perceptible but not annoying
-2.0	Slightly annoying
-3.0	Annoying
-4.0	Very Annoying

Table 3-1 Ratings of the ODG tool

4. Reference

[1] *MPEG-4 Part 3 (Formerly ISO/IEC 14496-3)*

[2] *Test Report Document*