Audio codec library user guide

1. Introduction

Audio codec library include G711, ADPCM and AAC codec library, plus AEC library, user can use them to encode pcm data to G711, ADPCM or AAC bitstream, or decode G711 and ADPCM bitstream to pcm data.

2. File directory list

These codec source files include three directories, include, source and sample, include directory contain header file of codec API, source directory contain files for codec function, and sample directory contain sample code and pcm files for test.

G711

- g711/Include
- g711/source
- g711/sample

ADPCM

- adpcm/Include
- adpcm/source
- adpcm/sample

AAC

- faac/source
- faac/sample

AEC

- aec/include
- aec/source
- aec/sample

3. Building library

to build these library for platform, please copy files into sdk path first, then use “make all” under sdk root directory to build these libraries

G711

Source	sdk path
g711/Include	code/lib/Include/nvtaudlib
adpcm/source	code/lib/source/nvtaudlib
adpcm/sample	code/sample/g711_test

ADPCM

source	sdk path
adpcm/Include	code/lib/Include/nvtaudlib_adpcm
adpcm/source	code/lib/source/nvtaudlib_adpcm
adpcm/sample	code/sample/adpcm_test

AAC

source	sdk path
faac/sample	code/sample/faac_test

AEC

source	sdk path
aec/Include	code/lib/Include/nvtaudlib_aec
aec/source	code/lib/source/nvtaudlib_aec
aec/sample	code/sample/aec_test

Before build faac library, please use the following instruction to install the necessary Ubuntu package:

```
sudo apt install libtool
```

Execute **`make && make install`**, header and lib files will be copied to specified folder.

4. Sample code test

To run sample code for test, the steps are as follows.

G711

a. copy g711_test and libnvtaudlib_g711.so to current directory
b. copy g711_in.PCM to /mnt/sd/
c. set LD_LIBRARY_PATH to current directory
   Ex : export LD_LIBRARY_PATH=/mnt/mtd:$LD_LIBRARY_PATH
d. run g711_test, then it will output file to /mnt/sd/
   g711_bs_alaw.PCM //encode g711_in.PCM to alaw bitstream
   g711_bs_ulaw.PCM //encode g711_in.PCM to ulaw bitstream
   g711_out_alaw.PCM // deocde alaw bitstream to pcm
   g711_out_ulaw.PCM // deocde ulaw bitstream to pcm

test log:

```
root@NVTEVM:/mnt/mtd$ ./g711_test
Hello, in g711 user space test program ~
In run_g711_test
g711 pattern sample = [720384]
g711 buf_in        addr = [b0920010]
g711 buf_out       addr = [b0bdf810]
g711 buf_bsout addr = [b0a7fc10]
write addr =    b0a7fc10
a-law encode done
write addr =    b0bdf810
a-law decode done
write addr =    b0a7fc10
u-law encode done
write addr =    b0bdf810
u-law decode done
```

ADPCM

a. copy adpcm_test and libnvtaudlib_adpcm.so to current directory
b. copy adpcm_in.PCM to /mnt/sd/
c. set LD_LIBRARY_PATH to current directory
   Ex : export LD_LIBRARY_PATH=/mnt/mtd:$LD_LIBRARY_PATH
d. run adpcm_test, then it will output file to /mnt/sd/
   adpcm_out.PCM //encode adpcm_in.PCM to adpcm, then decode to pcm, and save to adpcm_out.PCM

test log:

```
root@NVTEVM:/mnt/mtd$ ./adpcm_test
Hello, in g711 user space test program ~
In run adpcm test
adpcm pattern size = [1440768] sample count = [720384]
adpcm encode done
adpcm decode done
write addr =    ae9d5810
Out run_adpcm_test
```

AAC

a. copy faac_test and faac_in.PCM to current directory
b. copy libfaac.so.0.0.0 to current directory and create links as libfaac.so.0
c. set LD_LIBRARY_PATH to current directory
   Ex : export LD_LIBRARY_PATH=/mnt/mtd:$LD_LIBRARY_PATH
d. run faac_test, then it will output file to current directory
   faac_out_8khz_16bit.aac //encode faac_in.PCM to AAC.

test log:

```
root@NVTEVM:/mnt/mtd$ ./faac_test
pConfiguration->bitRate:64000, pConfiguration->bandWidth:3360
faac complete aac encoder finish!!
```

AEC

a. copy aec_test, aec_mic.pcm and aec_speaker.pcm to current directory
b. copy libnvtaudlib_aec.so to current directory
c. set LD_LIBRARY_PATH to current directory
   Ex : export LD_LIBRARY_PATH=/mnt/mtd:$LD_LIBRARY_PATH
d. run aec_test, then it will output file to current directory
   aec_output.pcm // aec_mic.pcm with echo removed

test log:

```
root@NVTEVM:/mnt/mtd$ ./aec_test
    mic pcm : aec_mic.pcm
speaker pcm: aec_speaker.pcm
  output pcm: aec_output.pcm

sample rate: 8000, num_mic: 1, num_speaker: 1, channel: 1
decode time = 0.652313 seconds
decode time = 0.102467 seconds
```

5. Check output files

User can use audio application to check correction of output files, for example, you can use Audcity for this check, it is free and open source audio software, you can download it from website https://www.audacityteam.org/

To use Audcity to playback g711, adpcm file, open file from menubar File -> Import -> Raw data, please refer its user's manual for detail.

After importing ffmpeg library, Audcity can playback aac file, open file from menubar File -> Open, please refer its user's manual for detail.