

Mpeg Program Stream Player (exolMpegPS)

NDK 5.7/MPTK 2.4

Application Note, 12 December 2007

Overview

This example program demonstrates the use of MPEG decoder, demultiplexer and audio components in order to build a MPEG movie player.

When you use `build_exe` at the command line to build the application, you get an overview of all the libraries the application needs.

Description

The MPEG movie player demonstrates the following TSSA chain:

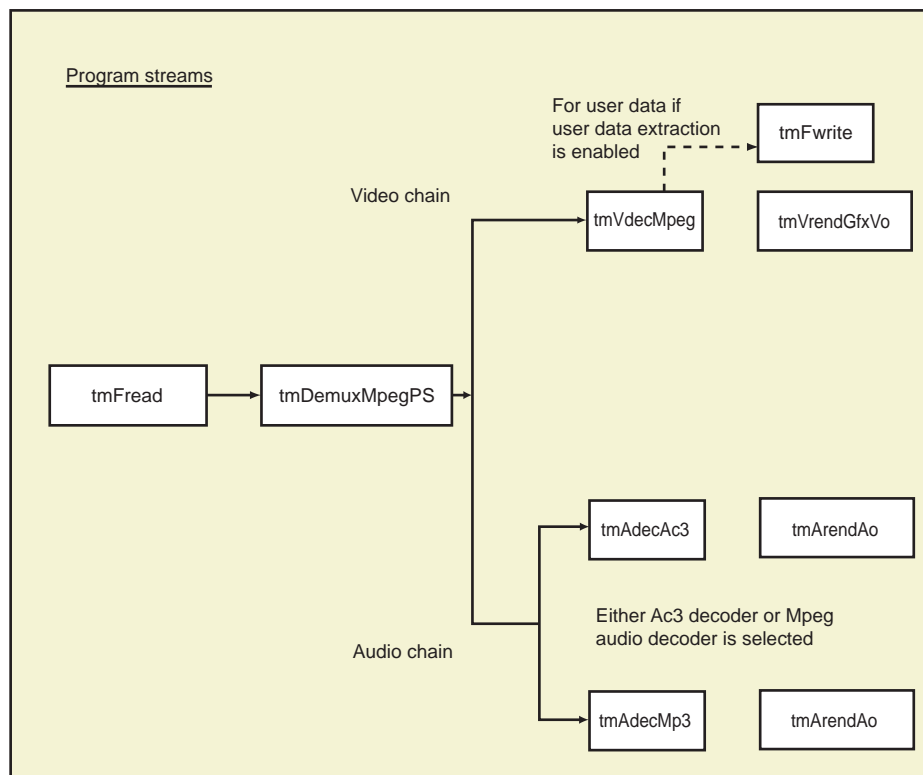


Figure 1: Program Stream

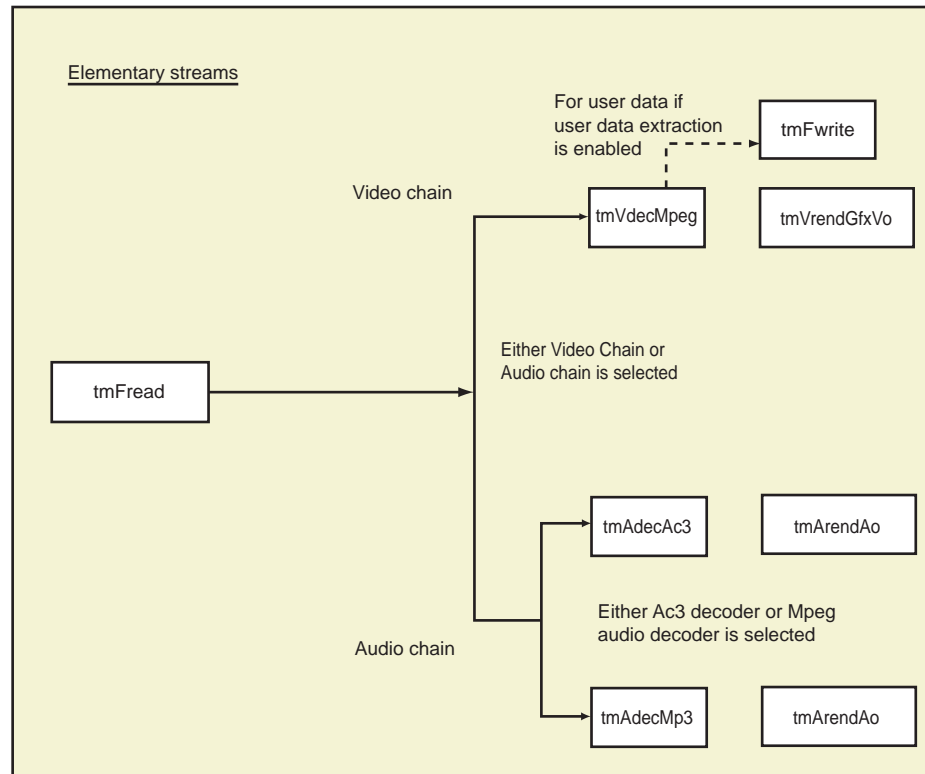


Figure 2: Elementary Streams

Instructions

MPEG movie player is configured to display MPEG files present locally or from a server using the HTTP 1.1 protocol.

You have to specify the name and the location of the file to display it on a TV screen. You can also specify the output video mode. This is optional. If the user does not specify anything, the application uses the video standard of the stream. If the output video mode specified is progressive, the deinterlacing method and eddy level should also be specified.

By default the application will rewind the file and play it again when it reaches the end of the file. You can either specify a new URL or quit the application at any time.

The type of the stream being fed should be specified. If not specified, the decoder will assume the stream is a program stream. In case of audio elementary stream, either Mp3 or Ac3 should be mentioned.

A file name can be specified for the file into which user data is to be dumped. If this is not explicitly specified, the application assumes it is "userdata.dat". The user data file is only created when the option User Data Extraction is turned on in the application menu. On execution you might get an fwrite error on some machines. This error occurs because the fwrite component is unable to create a file to write to in the specified path. If this happens do the following:

Uncheck the checkbox "Switch to App dir on Execute" in the DVPMon download dialog box and specify a path where this file can be created in the "path" field.

Default settings

Eddi level setting	:off
Fullscreen display	:Disabled (display asis)
Deinterlace mode	:None
Auto standard detect	:Enabled
User data extraction	:Disabled
Default filename for User data	:userdata.dat
Graceful degradation	:Disabled (will decode irrespective of the value of the Decoding Time Stamp)
Loop file at end of stream	:Enabled (This cannot be turned off during runtime)

Start-up Options

Usage example: `-url <filename> [-type <type>][-videoOutMode <mode>][-eddiLevel <eddiLevel>][-deinterlaceMode <deMode>][-userDatafile <udFile>][-videoOutScalingMode <outScaleMode>][-operatingMode <opMode>][-filmDetectionMode <fdMode>][-EmbeddedResizingMode <EmbeddedResizingMode>][-loopenable]`

-url <filename>

The name of the file to be decoded, including its path.

Examples:

- 1) `-url c:\media\bike1.mpg`
- 2) `-url http://161.85.26.7/test/blonde.mpg`

-type <type>

The type of the stream being fed. If a type is not explicitly specified, the decoder assumes it is a program stream.

Different types are:

Program stream ---> Ps

Video Elementary stream ---> Ves

Audio Elementary Stream ---> Aes

Audio Elementary Stream should be followed by either Ac3 (for Dolby AC3 streams) or Mp3 (for MPEG1 layer 2 or 3 audio systems).

Examples:

- 1) `-type Ps`
- 2) `-type Ves`
- 3) `-type Aes Ac3`
- 4) `-type Aes Mp3`

-videoOutMode <mode>

The video output mode used. If this is not explicitly specified the application selects the video output mode based on the input stream.

Format: `<width>x<height>x<framerate><scantype>`

Examples:

- 1) `-videoOutMode 720x480x60p`
- 2) `-videoOutMode pal`

-deinterlaceMode <deinterlace mode>

This is used to specify the method to be used for deinterlacing. This option only becomes applicable if the `videoOutMode` is progressive. If this is specified for interlaced `videoOutMode`, the default value of "No deinterlacing" is chosen.

Supported options:

median
majority2
majority3
majority3enh

Example: `-deinterlaceMode median`

-eddiLevel <eddy level>

This is used to specify the eddilevel.

Supported options:

NMcLowNoiseSafe
NMcLowNoiseNormal
NMcLowNoiseAggressive
NMcSafe
NMcNormal
NMcAggressive
McLowNoiseSafe
McLowNoiseNormal
McLowNoiseAggressive
McSafe
McNormal
McAggressive

Example: `-eddiLevel NMcLowNoiseSafe`

Note: The default value is eddi off.

-userDatafile <udFile>

This is used to specify the name of the file into which user data is to be dumped. If this is not explicitly specified, the application assumes a default filename "userdata.dat".

Note: This file is only created if User data extraction is turned on in the application menu. On execution you might get an `fwrite` error on some machines. This error occurs because the `fwrite` component is unable to create a file for writing in the specified path. If this error occurs you have to do the following:

Uncheck the checkbox "Switch to App dir on Execute" in the DVPMon download dialog box.
Specify a path where this file can be created in the "path" field.

-videoOutScalingMode <outScaleMode>

This is used to specify the scaling mode of the output video signal. If this is not specified a default setting of "asis" is assumed.

Supported options:

asis
fullscreen

Example: `-videoOutScalingMode fullScreen`

Note: letterbox, panScan and free are not supported.

-operatingmode <Opmode>

The operating mode for layer 0. The operating mode denotes whether the operations 1) scaling, 2) filtering and 3) picture repeat, in case of underruns are done field or frame based. For more details, please refer to the user manual of tmVrendGfxVo.

The default operating modes are 'tmolVrendGfxVo_OperatingModeFieldBased' for interlaced video output modes and 'tmolVrendGfxVo_OperatingModeFrameBased' for progressive video output modes.

This command line option is only relevant in case the film detection mode is 'filmDetectionModeNone'.

-filmDetectionMode <fdMode>

The film detection mode for layer 0. The film detection mode denotes which method is used to determine the scan type of the stream. The scan type of the stream is very important when determining the best operating mode, deinterlacing mode and eddi level. Possible values for the film detection mode are:

filmDetectionModeNone

No intelligence or assumptions. The operating mode, deinterlacing mode and eddi level are exactly as specified in the command line options.

filmDetectionModeTrustFlags

The flags in the stream (for example, vdfInterlaced, vdfProgressive) are being trusted and are used to set the operating mode, deinterlacing mode and eddi level:

	Interlaced video out	Progressive video out
Interlaced stream	tmolVrendGfxVo_OperatingModeFieldBased tmolVrendGfxVo_DeinterlaceModeNone tmolVrendGfxVo_Eddi0ff	tmolVrendGfxVo_OperatingModeFrameBased <deinterlacing mode as specified in the command line> <eddi level as specified in the command line>
Progressive stream	tmolVrendGfxVo_OperatingModeFrameBased tmolVrendGfxVo_DeinterlaceModeNone tmolVrendGfxVo_Eddi0ff	tmolVrendGfxVo_OperatingModeFrameBased tmolVrendGfxVo_DeinterlaceModeNone tmolVrendGfxVo_Eddi0ff

filmDetectionModeDetector

The film detector, included in the video renderer, is being used to determine the scan type of the stream. This is being done adaptively for every field. This mode is implemented for exolMpegPs, because in general, we cannot trust the scan type flags in the stream for MPEG-2. Note that the film detector is not supported in combination with an interlaced video output mode. With this film detector mode, the operating mode, the deinterlacing mode and the eddi level are set as follows:

	Progressive video out
Interlaced stream	tmolVrendGfxVo_OperatingModeFrameBased <deinterlacing mode as specified in the command line> <eddi level as specified in the command line>
Progressive stream	tmolVrendGfxVo_OperatingModeFrameBased tmolVrendGfxVo_DeinterlaceModeNone tmolVrendGfxVo_Eddi0ff

For more details on the film detector, please refer to the user manual of tmVrendGfxVo.

The default film detection mode is 'filmDetectionModeNone'.

-EmbeddedResizingMode <EmbeddedResizingMode>

This is used to specify the embedded resizing mode. The default setting is "Full".

Supported options:

Full
Half
Quarter

Example: -EmbeddedResizingMode Half

-1937

Audio will play in the output speakers as well as in the spdif renderer output.

-loopenable

This is used to enable the looping of the stream. Without this the stream will play only once.

Example: -loopenable

Run Time Options

The menu that appears allows the user to choose one of the following options

1. print this message	This is used to print this menu.
2. to quit the example	
3. Set Url	This option is used to specify a new file to be decoded when the application is currently decoding a file. When this is selected it stops decoding the current file. The application then asks the user to input the new file name (with path). The user is also required to specify whether the new file is a program stream or an elementary stream. If it is an audio elementary stream, the type of encoding used (Ac3 for Dolby AC3 streams or Mp3 for MPEG1 layer 2 or 3 audio streams) is to be specified. It then proceeds to decode the new file.
4. pause / Resume	This option enables the user to pause and resume both video and audio in case of program stream. The same behavior is exhibited for video or audio depending on the type of elementary stream. Resume will start both(either) video and(or) audio from exactly the same place where it was paused.
5. freeze/unfreeze video	This option is used to freeze/unfreeze the display on screen and the audio. However, the decoder is not stopped. When the display is unfrozen, it resumes from the point in the stream where the decoder is at that moment and not from the frozen frame.
6. Scale the rendered video	This option is used to scale the rendered video. The Upper left X and Y coordinate and the lower right X and Y coordinates of the destination window have to be specified.
7. Clip the source	This option enables the user to clip the source window depending on the co-ordinates entered by the user.
8. Disable Scaling\Clipping	This option disables the scaling\clipping. It will nullify the Scaling/Clipping performed and set the display to normal. It retains the default display settings.
9. Set the Video output adapter	Currently, only S video adapter is supported.
10. decode I-frames only	This option is to switch on decoding of I frames only. When this option is enabled audio is muted.
11. decode I- and P-frames only	This option is to switch on decoding of IP frames only. When this option is enabled audio is muted.
12. decode all frames	This option is to switch on decoding of all frames. It also switches on audio if it had been muted by a previous operation.
13. Enable user data extraction	This option enables the user extraction. It starts dumping the user data into the file specified. The user can select any of the following levels: Sequence Level, GOP Level, Picture Level or All Levels.
14. Disable user data extraction	This option disables the user extraction. It stops dumping the user data into the file.
15. Enable/Disable graceful degradation	This option allows a user to enable or disable graceful degradation. If this is enabled, the decoder will drop the frames if the Decoding Time Stamp value is too old. If this is disabled, the decoder will decode all the frames irrespective of the value of Decoding Time Stamp. By default graceful degradation is disabled.

Note: Options 5 through 15 do not appear if an audio elementary stream is being decoded.

Expected output

The introductory message should appear on the console. The decoded video should appear on the TV and (or) audio should be heard from the speakers. In case of program streams, the audio should play and should be synchronized with the video. In case of elementary streams only video or only audio is played . Some information regarding the stream should appear (the actual information that appears may vary depending on whether the stream is MPEG 1 or 2 video, MPEG1 audio or Dolby Ac3 audio and so on). The menu is then displayed and the application prompts the user to enter a choice from the available options.

Some options of the menu have submenus or messages that prompt the user for additional information required to perform the selected option.