

# Decoding with Video Processing (VPP) Sample

[Overview](#)

[Features](#)

[Hardware Requirements](#)

[Software Requirements](#)

[How to Build the Application](#)

[Running the Software](#)

[Supported color conversions](#)

[Known Limitations](#)

[Legal Information](#)

## Overview

**Decoding with Video Processing (VPP) Sample** (hereinafter referred to as "**DecVPP Sample**") works with **Intel® Media Server Studio 2015 for Linux Server**.

It demonstrates how to use **Media Server Studio – SDK** (hereinafter referred to as "**SDK**") API to create a simple console application that performs decoding with video processing (color conversion) of raw video sequences.

The sample can work together with **Intel® Media Server Studio – HEVC Decoder & Encoder** (hereinafter referred to as "**HEVC**").

## Features

**DecVPP Sample** supports the following video formats:

input (compressed)	H.264 (AVC), HEVC (High Efficiency Video Coding)
output (uncompressed)	YUV420, RGB4 (RGB 32-bit), P010, A2RGB10

**Note 1: DecVPP Sample** renders the decoded video stream to a file in YUV 4:2:0 sampling format, with the parameters Y, U and V in that order.

## Hardware Requirements

See <install-folder>/Media Samples Guide.pdf.

## Software Requirements

See <install-folder>/Media Samples Guide.pdf.

## How to Build the Application

Use the *build.pl* script located at <install-folder>. For the details on how to build samples see <install-folder>/Media Samples Guide.pdf. Shortly, you may invoke the following commands to build the sample:

```
$ export MFX_HOME=/mediasdk/installation/folder
$ cd <install-folder>
$ ./build.pl --cmake=intel64,make,release --clean
$ cd <install-folder>/__cmake/intel64.make.release && make
```

Output will be placed in the following folder: <install-folder>/\_\_cmake/intel64.make.release/\_\_bin/release

## Running the Software

Sample is buildable in a few variants depending on LibVA backends availability and support:

- sample\_decvpp\_drm – sample variant to run on the system without Graphic Server installed (for example, X)
- sample\_decvpp\_x11 – sample variant to run under X

The executable file *sample\_decvpp\_\*\** (\*\* - one of the supported backends) requires the following command-line switches to function properly

h264 h265	Input video type. This is an elementary video stream. The use of option h265 is possible only if <b>HEVC</b> is installed.
-i <InputFile>	Input (compressed) video file, name and path
-o <Output>	Specifies output (YUV) video file(s), name and path.

The following command-line switches are optional:

-p guid path_to_plugin	32-character hexadecimal guid string or path to decoder plugin .so. Optional for <b>SDK</b> in-box plugins, required for user-decoder ones (HEVC, f.e.).
-vaapi	Use VAAPI surfaces
-r	Render output video file to the screen. Only for backends which support this: x11
-hw	Use platform-specific implementation of <b>SDK</b> (default)
-sw	Use software implementation of <b>SDK</b> . Should not be set since there is no software implementation on Linux platforms.
-i420 -rgb4 -p010 -a2rgb10	Destination output color format. Default is i420.

Below are examples of a command-line to execute **DecVPP Sample**:

```
$ sample_decvpp_drm h264 -i input.264 -o output.yuv -p010 -hw
$ sample_decvpp_drm h265 -i input.bit -r -i420 -vaapi
```

Please, also pay attention on "Running the Software" section of <install-folder>/Media Samples Guide.pdf document where you will find important notes on backend specific usage (drm and x11).

## Supported color conversions

The tables below shows supported/unsupported color conversions in different cases: output surfaces in system memory (in case of file dump only), output surfaces in video memory (always in case of rendering on screen and in case of file dump, if specified `-vaapi` option).

In all tables the left column corresponds to the decoder output color format, and the top row corresponds to the VPP output color format (result format).

Supported cases marked "+", unsupported cases marked "-" for h264/h265 video types respectively. KL means a known limitation exists, see Known Limitations section. Information is given for software implementation of **HEVC** Decoder Plug-in in case of h265 video type.

File dump with output surfaces in system memory:

	i420	rgb4	p010	a2rgb10
nv12	+/+	+/+	+/KL	-
p010	KL	-	KL	KL

File dump with output surfaces in video memory:

	i420	rgb4	p010	a2rgb10
nv12	+/+	+/+	-	-
p010	KL	-	-	KL

Rendering with output surfaces in video memory:

	i420	rgb4	p010	a2rgb10
nv12	+/+	KL/KL	-	-

p010	KL	-	-	KL
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## Known Limitations

- **DecVPP Sample** does not fully decode some video streams from a networked folder. Instead, copy the input file to local storage prior to decoding.
- **DecVPP Sample** renders output in the simplest way. The rendering window does not support time stamps and aspect ratio.
- **DecVPP Sample** doesn't support a2rgb10 output color format on Linux\*.
- **DecVPP Sample** can't render output surfaces with rgb4 color format.
- P010 is unsupported output color format for the decoder on Linux. Color conversion to p010 format is possible in case of dumping to the file and h264 video type.
- Plugins loading by path feature implemented using deprecated plugin loading mechanisms. Next versions of **DecVPP Sample** will use different methods for path-based plugins loading.

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