

Advanced Micro Devices

Advanced Media Framework – Video Converter

Programming Guide

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1 Introduction

This document provides a complete description of the AMD Advanced Media Framework (AMF) Video Converter Component. This component performs the following functions:

- Color space conversion
- Color format conversion
- Gamma correction
- Scaling

2 AMF Video Converter Component

Video Converter accepts input frames stored in *AMFSurface* objects wrapping DirectX 9 surfaces, DirectX 11 textures, OpenGL or OpenCL surfaces. The output is placed in *AMFSurface* objects wrapping DirectX 9 surfaces, DirectX 11 textures, OpenGL or OpenCL surfaces, depending on the component configuration.

Include *public/include/components/VideoConverter.h*

2.1 Component Initialization

The AMF Video Converter component should be initialized using the following sequence:

1. Create an AMF Context and initialize it for one of the following:
 - a. DirectX 11.1
 - b. DirectX 9
 - c. OpenGL
 - d. OpenCL
2. Configure the Converter component by setting the necessary properties using the *AMFPropertyStorage::SetProperty* method on the converter object.
3. Call the *AMFComponent::Init* method of the converter object.

2.2 Configuring the Converter

The *format*, *width* and *height* parameters of the *AMFComponent::Init* method describe the input stream. Parameters of the output stream are set using the following properties:

- *AMF_VIDEO_CONVERTER_OUTPUT_FORMAT* – specifies the output color format/space. Can be one of the following values:
 - *AMF_SURFACE_NV12* – convert to NV12
 - *AMF_SURFACE_BGRA* – convert to BGRA
 - *AMF_SURFACE_YUV420P* – convert to YUV 4:2:0 (progressive only)
- *AMF_VIDEO_CONVERTER_MEMORY_TYPE* – specifies the memory type of output surfaces (surfaces are allocated internally by the Converter component). Can be one of the following values:
 - *AMF_MEMORY_DX11* – place output in a DirectX 11 texture
 - *AMF_MEMORY_DX9* – place output in a DirectX 9 surface
 - *AMF_MEMORY_UNKNOWN* – retain the same memory type as input (no interop)
- *AMF_VIDEO_CONVERTER_OUTPUT_SIZE* – output image resolution specified as *AMFSize*. Scaling will be performed when this property is set.
- *AMF_VIDEO_CONVERTER_OUTPUT_RECT* – specifies the target rectangle in the output surface to scale the image into as *AMFRect*.
- *AMF_VIDEO_CONVERTER_KEEP_ASPECT_RATIO* – force the scaler to keep the aspect ratio of the input image when the output size specified by the *AMF_VIDEO_CONVERTER_OUTPUT_SIZE* property has a different aspect ratio.
- *AMF_VIDEO_CONVERTER_FILL* – Boolean: specifies whether the output image outside the region of interest, which does not fill the entire output surface should be filled with a solid color. The fill color is specified using the *AMF_VIDEO_CONVERTER_FILL_COLOR* property.
- *AMF_VIDEO_CONVERTER_FILL_COLOR* – fill color specified as *AMFColor* to fill the area outside the output rectangle. Applicable only when the *AMF_VIDEO_CONVERTER_FILL* property is set to *true*.
- *AMF_VIDEO_CONVERTER_SCALE* – specifies scaling method. This property can have one of the following values:
 - *AMF_VIDEO_CONVERTER_SCALE_BILINEAR* – use a bilinear scaler
 - *AMF_VIDEO_CONVERTER_SCALE_BICUBIC* – use a bicubic scaler

- *AMF_VIDEO_CONVERTER_FORCE_OUTPUT_SURFACE_SIZE* – instructs the Converter component to use the dimensions of the output surface as output size instead of the size specified by the *AMF_VIDEO_CONVERTER_OUTPUT_SIZE* property when a custom allocator is set through the *AMFComponent::SetOutputDataAllocatorCB* callback.
- *AMF_VIDEO_CONVERTER_COLOR_PROFILE_ENUM* – sets the color profile for color space conversion. This property can be set to one of the following values:
 - *AMF_VIDEO_CONVERTER_COLOR_PROFILE_601* – for ITU-R BT.601 (SDTV), 16..235 color range
 - *AMF_VIDEO_CONVERTER_COLOR_PROFILE_709* – for ITU-R BT.709 (HDTV), 16..235 color range
 - *AMF_VIDEO_CONVERTER_COLOR_PROFILE_2020* – for ITU-R BT.2020 (UHDTV), 16..235 color range
 - *AMF_VIDEO_CONVERTER_COLOR_PROFILE_JPEG* – for the full (0..255) color range

2.3 Submitting Input and Retrieving Output

Once the Converter component is successfully initialized, you may start submitting input samples to it. Input samples must be submitted as *AMFBuffer* objects.

At the same time poll for output by calling *AMFComponent::QueryOutput* on the Converter object. Polling for output samples can be done either from the same thread or from another thread.

Suspend submission of input samples briefly when *AMFComponent::SubmitInput* returns *AMF_INPUT_FULL*. Continue to poll for output samples and process them as they become available.

2.4 Terminating the Converter Component

To terminate the Converter component, call the *Terminate* method, or simply destroy the object. Ensure that the context used to create the Converter component still exists during termination.

3 Sample Applications

A sample application demonstrating the use of the Converter component in AMF is available as part of the AMF SDK in *public/samples/CPPSample/SimpleConverter*. The sample fills 100 frames in a 1920x1080 BGRA surface with an alternating color, submits it as input to the Converter object configured to scale it down to 1280x720 NV12 surface and writes the output to a file.

To run the sample, execute the '*SimpleConverter.exe*' command at the command prompt.