

Advanced Media Framework – FRC

Programming Guide

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Contents

- [1 Introduction](#)
- [2 AMF Video FRC Component](#)
 - [2.1 Component Initialization](#)
 - [2.2 Configuring the FRC](#)
 - [2.3 Submitting Input and Retrieving Output](#)
 - [2.4 Terminating the FRC Component](#)

1 Introduction

AMF FRC is a technique for achieving high-end video frame rate conversion results from lower frame rate video inputs. This document provides a complete description of the AMD Advanced Media Framework (AMF) Video FRC Component. This component performs the frame generation.

2 AMF Video FRC Component

Video FRC accepts input frames stored in `AMFSurface` objects wrapping DirectX 12 textures or OpenCL surfaces. The output is placed in `AMFSurface` objects wrapping DirectX 12 textures or OpenCL surfaces, depending on the component configuration.

Include `public/include/components/FRC.h`

2.1 Component Initialization

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

1. Create an AMF Context and initialize it for one of the following:

1. DirectX 12
2. OpenCL
2. Configure the FRC component by setting the necessary properties using the `AMFPropertyStorage::SetProperty` method on the FRC object.
3. Call the `AMFFRCImpl::Init` method of the video FRC object.

The details on component setup can be found from the document `AMF_API_Reference.pdf`

2.2 Configuring the FRC

The FRC supports the following input and output formats:

1. BRGA
2. NV12
3. RGBA
4. R10G10B10A2
5. RGBA_F16
6. P010

The output format must be same as the input and the format conversion is not supported. The parameters are set using the following properties:

Property Name	Type
AMF_FRC_ENGINE_TYPE	AMF_MEMORY_TYPE
AMF_FRC_MODE	AMF_FRC_MODE_TYPE
AMF_FRC_ENABLE_FALLBACK	Bool
AMF_FRC_INDICATOR	Bool

Table 1. AMF FRC Properties

Name: AMF_FRC_ENGINE_TYPE

Values: DX12, OpenCL

Default Value: DX12

Description: Specifies the engine used to run shaders.

Name: AMF_FRC_MODE

Values:

Name	Description
FRC_OFF	Frame rate conversion is disabled. The frame data will be copied over to the output.
FRC_ON	Frame rate conversion is enabled. Note that the component will need to be called with a frame rate equal to double that of the input video.
FRC_ONLY_INTERPOLATED	Frame rate conversion is enabled. However, only the interpolated frames are returned.
FRC_x2_PRESENT	AMF_REPEAT will be returned for the QueryOutput() call with each source frame. The caller needs to call the FRC component with the same source frame again to get x2 frame rate.

Default Value: FRC_ONLY_INTERPOLATED

Description: Specifies which FRC frames are presented.

Name: AMF_FRC_ENABLE_FALLBACK

Values:

Name	Description
true	Low confidence to do the interpolation, two frames will be blended together.
false	Low confidence to do the interpolation, frame will be duplicated.

Default Value: false

Description: Specifies the fallback mode.

Name: AMF_FRC_INDICATOR

Values: true, false

Default Value: true

Description: Specifies whether or not the FRC indicator square is shown in the top right corner of the video.

2.3 Submitting Input and Retrieving Output

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

At the same time poll for output by calling `AMFComponent::QueryOutput` on the FRC 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 FRC Component

To terminate the FRC component, call the `Terminate` method, or simply release the object. Ensure that the context used to create the FRC component still exists during termination.