

# Advanced Media Framework – VQ Enhancer

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## Programming Guide

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## 1 Introduction

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AMF VQ Enhancer is a technique for reconstructing high-quality videos from low-quality compressed videos. This document provides a complete description of the AMD Advanced Media Framework (AMF) Video Enhancer Component. This component performs the following functions:

- Removing/reducing the blocking artifacts introduced by AVC/HEVC compression with low bit rate.
- Preserving details.

## 2 AMF Video VQ Enhancer Component

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Video VQ Enhancer accepts input frames stored in `AMFSurface` objects wrapping DirectX 11/12 textures, Vulkan surfaces, OpenCL surfaces. The output is placed in `AMFSurface` objects wrapping DirectX 11/12 textures, OpenCL surfaces, Vulkan surfaces, depending on the component configuration.

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

### 2.1 Component Initialization

The AMF VQ Enhancer component should be initialized using the following sequence:

1. Create an AMF Context and initialize it for one of the following:
  - i. DirectX 11
  - ii. DirectX 12
  - iii. Vulkan
  - iv. OpenCL
2. Configure the VQ Enhancer component by setting the necessary properties using the `AMFPropertyStorage::SetProperty` method on the VQ Enhancer object.
3. Call the `VideoEnhancer::Init` method of the video HQ Scaler object.

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

### 2.2 Configuring the VQ Enhancer

VQ enhancer 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 of the output stream are set using the following properties:

Name (prefix "AMF_VIDEO_ENHANCER" / "AMF_VE_FCR_")	Type
ENGINE_TYPE	AMF_MEMORY_TYPE
OUTPUT_SIZE	AMFSize
ATTENUATION	Float
RADIUS <sup>[1]</sup>	amf_int64
SPLIT_VIEW	amf_int64

Table 1. AMF VQ Enhancer properties of the output stream

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**Name:**

AMF\_VIDEO\_ENHANCER\_ENGINE\_TYPE

**Values:** AMF\_MEMORY\_DX11 , AMF\_MEMORY\_DX12 , AMF\_MEMORY\_VULKAN , AMF\_MEMORY\_OPENCL

**Default Value:** AMF\_MEMORY\_DX11

**Description:** Specifies the memory type of output surfaces (surfaces are allocated internally by the VQ Enhancer component). The output surface type can be different from input surface and this enables sharing a resource with another API using interop. For example, DX11 output can be interoped to OCL, processed in OCL and output will be DX11.

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**Name:** AMF\_VIDEO\_ENHANCER\_OUTPUT\_SIZE

**Values:** A valid size

**Default Value:** N/A

**Description:** Output image resolution. VQ enhancer will be performed when this property is set.

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**Name:** AMF\_VE\_FCR\_ATTENUATION

**Values:** Float in the range of [0.02, 0.4]

**Default Value:** 0.1

**Description:** Control VQEnhancer strength.

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**Name:** AMF\_VE\_FCR\_RADIUS

**Values:** Int in the range of [1, 4]

**Default Value:** 4

**Description:** Deprecated. Setting this property has no effect.

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**Name:** AMF\_VE\_FCR\_SPLIT\_VIEW

**Values:** 0 / 1 (OFF / ON)

**Default Value:** 0

**Description:** Experimental. When set, enables a side by side view with processing enabled on one side and disabled on the other side.

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## 2.3 Submitting Input and Retrieving Output

Once the VQ enhancer 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 VQ enhancer 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 VQ Enhancer Component

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

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