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Developer Information

Blackmagicdesign

Blackmagic RAW SDK

Blackmagic RAW SDK

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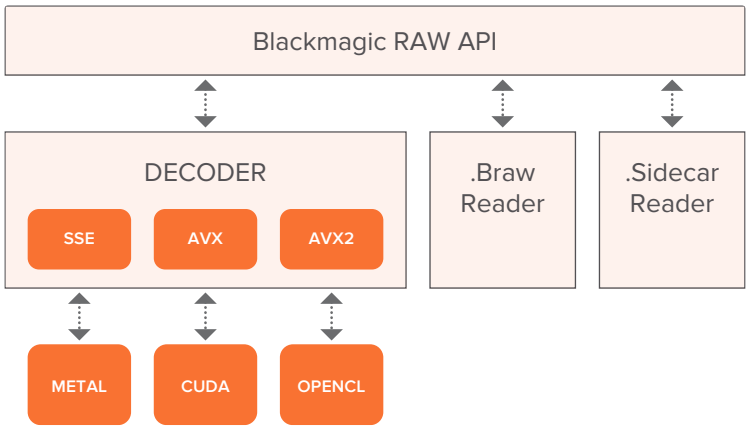
Introduction and Overview

1.0 API Overview

The Blackmagic RAW SDK provides a highly optimised decoder and image processing pipeline.



Available on Mac, Windows, and Linux platforms, the SDK supports supports multiple CPU architectures and multiple GPU APIs in order to take full advantage of your machine.

The goal is to provide an easy to use yet powerful SDK, which will utilise cross-platform efficient decoding of .braw files produced by Blackmagic Cameras.

1.1 Decoder Overview

The CPU decoder has been designed to scale from laptops to workstations with a large number of cores. The CPU decoder will utilise SSE, AVX and AVX2 instructions if available. The user has control to limit the CPU decoder to fewer threads if desired.

There are several GPU decoders available, including Metal, CUDA, and OpenCL. The final processed image from each decoder will be provided in a buffer object native to the respective GPU API. This will allow quick access for further processing or display.

The GPU decoders are dynamically loaded, meaning they will require the system to have the relevant APIs installed in order to function.

The SDK has been designed for multi-GPU and multi-process capabilities allowing high level workstations to use all the resources available in the system.

1.2 Sidecar

A .sidecar file may be used, storing any metadata that is modified after the original .braw file is produced. The intent here is to not modify the original .braw file. This sidecar file can be manually deleted if the user wants to restore the movie metadata to its original state.

When metadata or image processing values (such as white balance) are modified via the SDK, the user can then choose to save this data to the sidecar file. Now when the movie is loaded (potentially in a different application) the sidecar file be applied and the picture will look consistent.

At this time, the user can run the ‘trim’ operation which will bake the sidecar changes into a newly created .braw file saved to disk. This can be run on any frame range right down to a single frame which produces handy images to pass between colleagues.

The .sidecar file is stored as a text JSON file, allowing users to manually edit or use external tools if they wish to modify it.

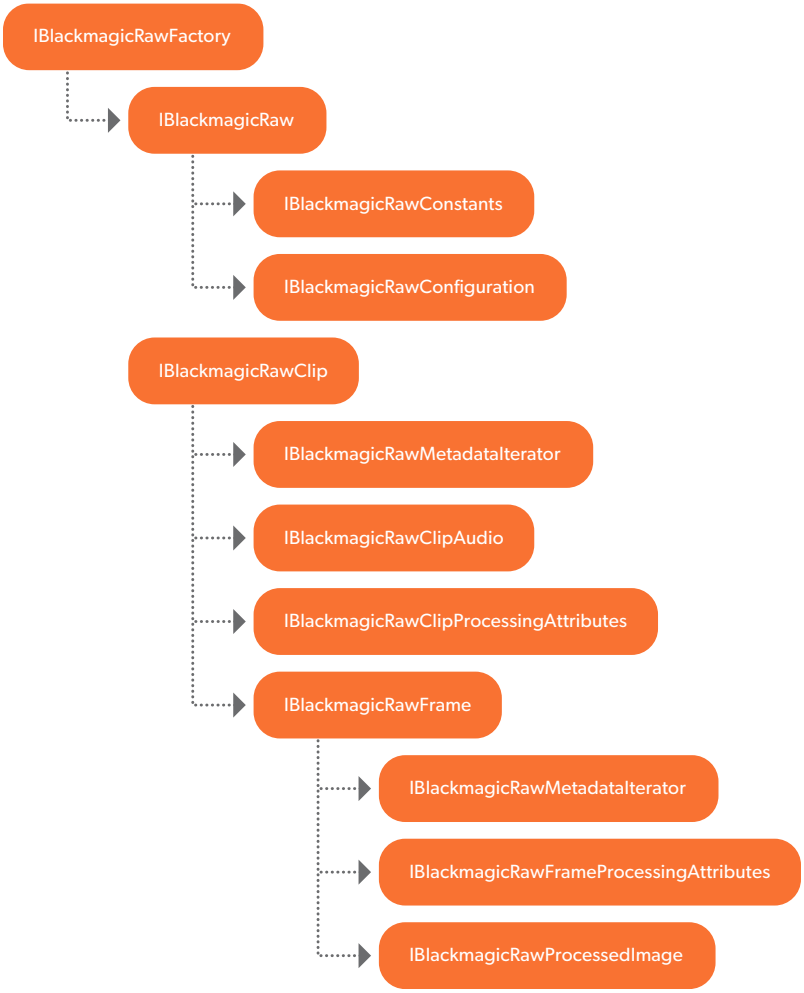
3DLUT data (in DaVinci Resolve .cube format) can be embedded into .braw clips and also be stored in sidecar files. This provides additional ways for 3DLUTs to travel with .braw clips to maintain consistency in viewing. The SDK allows users to optionally process the clip with the embedded 3DLUT in the clip itself, from the sidecar, or for 3DLUT processing to be disabled. Tetrahedral interpolation is used for both GPU and CPU pipelines.

An example sidecar with an identity 3DLUT follows. The information has been truncated for brevity.


```
{

    "tone_curve_contrast"              : 1.450000,
    "tone_curve_saturation"            : 1.150000,
    "tone_curve_midpoint"              : 0.409000,
    "tone_curve_highlights"            : 0.600000,
    "tone_curve_shadows"               : 1.800000,
    "tone_curve_black_level"           : 0.000000,
    "tone_curve_white_level"           : 1.000000,
    "tone_curve_video_black_level"     : 1,
    "highlight_recovery"               : 1,
    "viewing_gamma"                    : "Blackmagic Design Custom",
    "viewing_gamut"                    : "Blackmagic Design",
    "exposure": {
        "14:57:33:00"                  : 0.200000
    },
    "white_balance_kelvin": {
        "14:57:33:00"                  : 4520
    },
    "white_balance_tint": {
        "14:57:33:00"                  : 5
    },


    "iso": {
        "14:57:33:00"                  : 500
    },
    "post_3dlut_mode"                  : "Sidecar",
    "post_3dlut_sidecar_name"          : "Identity3DLUT.cube",
    "post_3dlut_sidecar_title"         : "My Identity 3D LUT",
    "post_3dlut_sidecar_size"          : 33,
    "post_3dlut_sidecar_data"          : "0.0000000000 0.0000000000 0.0000000000
                                          0.0312500000 0.0000000000 0.0000000000
                                          0.0625000000 0.0000000000 0.0000000000
                                          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
                                          0.9375000000 1.0000000000 1.0000000000
                                          0.9687500000 1.0000000000 1.0000000000
                                          1.0000000000 1.0000000000 1.0000000000"

}
```

2.0 Interface Overview

This chapter covers a basic overview of the interfaces used via the Blackmagic RAW API



IBlackmagicRawFactory is the API entry point. From here the user creates a *IBlackmagicRaw* object. This object owns a single decoder instance.

This object can be configured via *IBlackmagicRawConfiguration* allowing the user to define CPU constraints or set up the SDK to use desired GPU APIs.

After completing the above steps, the user can start opening clips. Once the first clip has been opened, the decoder is started and any further configuration changes will be discarded.

2.2 Clip Object

Once a clip is opened its components can now be accessed. A metadata iterator is available to provide all clip-level metadata (see frame-level metadata in 2.4 below).

Clip audio & clip-level processing attributes can also be accessed. The clip-level processing attributes allow the user to modify fields such as displayed gamma, displayed gamut, Blackmagic colour science generation and custom gamma parameters.

Finally with the clip object we create an asynchronous job to read a frame from the clip. This will provide a frame object.

2.3 Frame Object

A frame object provides access to frame-level metadata & frame-level processing attributes. The frame-level processing attributes allow the user to modify fields that can change on a per-frame basis. They include white balance tint/kelvin, exposure & ISO.

The user can also specify output scale & the desired pixel format of the processed image which is produced upon request from the frame.

Once ready, the user creates an asynchronous job to produce the processed image. This image is then ready for display.

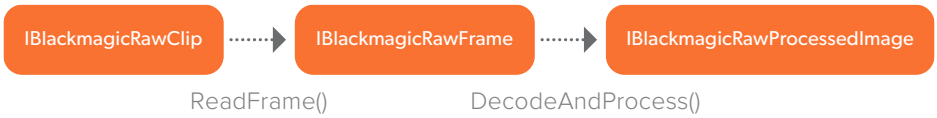
3.0 SDK Operations and flow

This chapter provides a brief explanation of how the above objects work together to produce a final image.

The SDK provides three main operations, read, decode and process. The read operation is reading the compressed image from an opened *IBlackmagicRawClip* file into a *IBlackmagicRawFrame*. The decode operation decodes this compressed image format and prepares it for processing. The process operation applies colour processing (such as white balancing, exposure) and provides the final image.

Each of these operations are asynchronous and occur across multiple CPU threads / GPU contexts. By default this is all handled internally to provide an easy yet efficient solution.

The flow described above is: open a clip, read a frame, decode and process frame:



3.1 Manual Decoders

There are manual decoders available which split the 3 above operations into separated user-driven steps. These are for advanced use and provide closer access to buffer control, memory use, GPU contexts and so forth, should your application require it.

Please see the *IBlackmagicRawManualDecoder** interfaces available in the API header to use this approach.

4.0 GPU Configuration

When utilising the GPU, at configuration time (described above in section 2.0) the GPU devices must be provided to the *IBlackmagicRawConfiguration* object. This includes passing in a context and commandQueue for the desired device.

To create a context and *commandQueue* the user needs to utilise their desired compute API library (i.e. Metal, CUDA or OpenCL).

To make this easier for the user, Blackmagic RAW SDK offers pipeline and device iterators. These allow creation of devices in an abstract way, removing the need to deal directly with compute APIs.

4.1 Pipeline iterators

Iterating through the available pipelines will allow your application to query for the presence and usability of CUDA, Metal, OpenCL and CPU based decoder pipelines. Each of these may be used to create a pipeline device iterator, with which associated compatible devices may be created.

Using this interface allows applications to check for various compute APIs without the need to set-up and call any of the API functions and hence removes the requirement of linking against API libraries and associated dependencies explicitly.

The pipeline iterator is created via *IBlackmagicRawFactory's* CreatePipelineIterator method.

4.2 Pipeline device iterators

The pipeline device iterator (IBlackmagicRawPipelineDeviceIterator) is used to iterate over all devices that a specific pipeline supports.

Once a (*IBlackmagicRawPipelineDevice*) device has been created via the device iterator, it may be used to configure a decoder with the SetFromDevice method of *IBlackmagicRawConfiguration*.

This is equivalent to, but more convenient than, querying the context and command queue from the device with the GetPipeline method and providing these parameters to the decoder configuration via SetPipeline.

> *The context and command queue owned by a device are compute-level API objects that are used directly by the decoder. The life-time of these compute-level API objects must outlive that of the decoder, therefore the device instance* ***MUST*** *outlive the decoder instance.*

4.3 Pipeline preparation

A pipeline may have resources which require preparation, such as compilation or binding of GPU kernels to a device. The SDK provides a mechanism whereby the user may prepare these resources ahead of time, removing any stall necessitated by the use of these resources in the actual decoding process.

The preparation of these resources is a potentially time-consuming process and as such is executed asynchronously. The callback interface has a method (*PreparePipelineComplete*) to allow the user to respond to the completion of a pipeline preparation.

A pipeline is prepared on *IBlackmagicRaw* with either PreparePipeline (providing context and command queue) or *PreparePipelineForDevice* (providing an instance of *IBlackmagicRawPipelineDevice*), noting that the pipeline configuration MUST have been set prior.

4.4 Multi GPU Devices

When using multiple GPUs, a default GPU device is provided to the *IBlackmagicRawConfiguration* object.

Taking advantage of the manual decoders (specified in section 3.1 above) allows the user to distribute decoding operations across multiple devices.

Recommended UI Controls and Behavior

Decode Quality

Type: **Drop down selector**

Default: Full Res.

Options: – Full Res.
– 1/2 Res.
– 1/4 Res.
– 1/8 Res.

Color Science Version

Type: **Drop down selector**

Default: Read from metadata

Options: Use IBlackmagicRawConstants::GetClipProcessingAttributeList()
- blackmagicRawClipProcessingAttributeColorScienceGen

Color Space/Gamut

Type: **Drop down selector**

Default: Read from metadata

Options: Use IBlackmagicRawConstants::GetClipProcessingAttributeList()
- blackmagicRawClipProcessingAttributeGamut

Gamma

Type: **Drop down selector**

Default: Read from metadata.

Options: Use IBlackmagicRawConstants::GetClipProcessingAttributeList()
- blackmagicRawClipProcessingAttributeGamma

ISO

Type: **Drop down selector**

Default: Read from metadata.

Options: Use IBlackmagicRawConstants::GetClipProcessingAttributeList()
- blackmagicRawFrameProcessingAttributeISO

Exposure

Type: **Slider**

Default: 0.

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawFrameProcessingAttributeExposure

Color Temp

Type: **Slider**

Default: 5600

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawFrameProcessingAttributeWhiteBalanceKelvin

Tint

Type: **Slider**

Default: 10

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawFrameProcessingAttributeWhiteBalanceTint

Highlight Recovery

Type: **Checkbox**

Default: Off

Export Frame

Type: **Button**

Exports a single frame of the currently viewed video frame.

Update Sidecar

Type: **Button**

Saves sidecar file with the currently set parameters for the clip.

Custom Gamma Controls

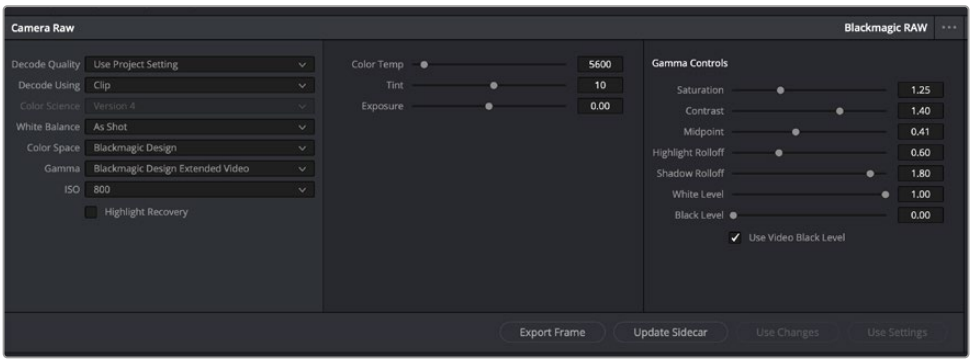
Custom gamma controls should only be enabled and selectable for the following gamma selections:

- **Blackmagic Design Film**
- **Blackmagic Design Extended Video**
- **Blackmagic Design Custom**

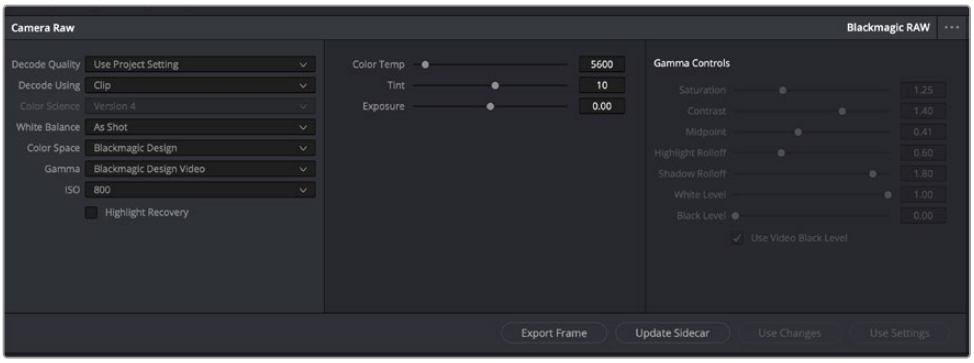
Note: Blackmagic Design Video should have the custom gamma controls DISABLED.

When selecting **Blackmagic Design Film** or **Blackmagic Design Extended Video** the custom gamma controls take on the values supplied by the SDK. When a user adjusts a custom gamma control slider, the gamma selection should automatically change to **Blackmagic Design Custom** which should be written with the current values shown in the UI. The user is now creating their own custom gamma which can be stored.

The following image examples show the custom gamma controls selectable with Blackmagic Design Film, and disabled with an incompatible gamma such as Rec.709.



Example: The custom gamma controls (last 3rd of the RAW panel) are enabled and selectable with Blackmagic Design Extended Video.



Example: The custom gamma controls (last 3rd of the RAW panel) are disabled with Blackmagic Design Video gamma.

Saturation

Type: **Slider**

Default: 1.0

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawClipProcessingAttributeToneCurveSaturation

Contrast

Type: **Slider**

Default: 0.5

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawClipProcessingAttributeToneCurveContrast

Midpoint

Type: **Slider**

Default: 0.41

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawClipProcessingAttributeToneCurveMidpoint

Highlight Rolloff

Type: **Slider**

Default: 1.0

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawClipProcessingAttributeToneCurveHighlights

Shadow Rolloff

Type: **Slider**

Default: 1.0

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawClipProcessingAttributeToneCurveShadows

Black Level

Type: **Slider**

Default: 1.0

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawClipProcessingAttributeToneCurveBlackLevel

White Level

Type: **Slider**

Default: 1.0

Range: Use IBlackmagicRawConstants::GetFrameProcessingAttributeRange()
- blackmagicRawClipProcessingAttributeToneCurveWhiteLevel

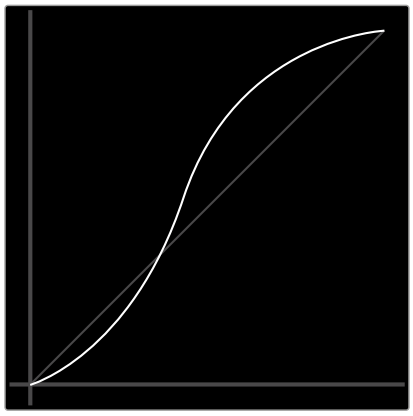
Set Video Black Level

Type: Checkbox

Default: Off

IBlackmagicRawToneCurve::EvaluateToneCurve()

The EvaluateToneCurve method can be used to return a buffer that can then be used to draw and visualize the result of the custom gamma controls. This is particularly useful when users are creating their own custom gammas. An example of such a UI is shown below:

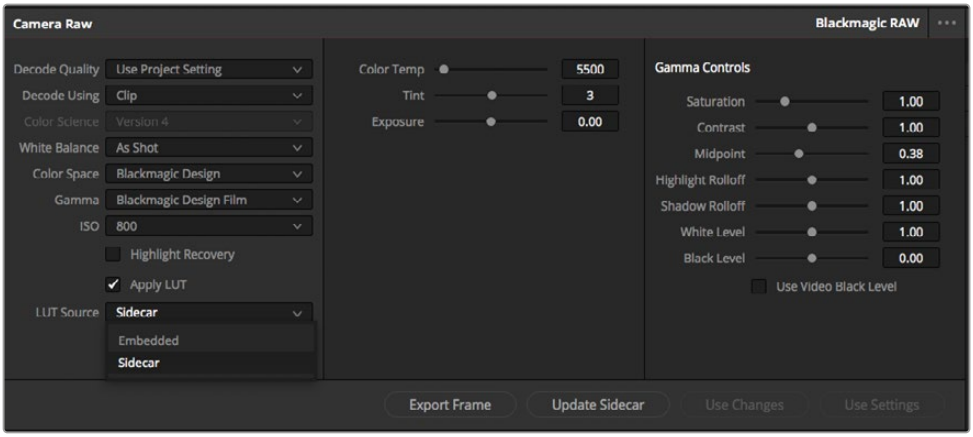


3D LUT

Type: **Drop down selector**

Default: Read from metadata.

Options: Use IBlackmagicRawConstants::GetClipProcessingAttributeList()
- blackmagicRawClipProcessingAttributePost3DLUTMode



Example: For clips that have an embedded or sidecar 3DLUT available, an “Apply LUT” checkbox and “LUT Source” dropdown are shown.

Basic Types

enum

The enumerator type is represented differently on each platform, using the most appropriate system type:

Windows	unsigned int
macOS	uint32_t
Linux	uint32_t

uuid

The Universally unique identifier type is represented differently on each platform, using the most appropriate system type:

Windows	GUID
macOS	CFUUIDBytes
Linux	GUID

Boolean

A boolean is represented differently on each platform, using the most appropriate system type:

Windows	BOOL
macOS	bool
Linux	bool

int8_t

The signed 8 bit integer type is represented differently on each platform, using the most appropriate system type:

Windows	signed char
macOS	int8_t
Linux	int8_t

uint8_t

The unsigned 8 bit integer type is represented differently on each platform, using the most appropriate system type:

Windows	unsigned char
macOS	uint8_t
Linux	uint8_t

int16_t

The signed 16 bit integer type is represented differently on each platform, using the most appropriate system type:

Windows	short
macOS	int16_t
Linux	int16_t

uint16_t

The unsigned 16 bit integer type is represented differently on each platform, using the most appropriate system type:

Windows	unsigned short
macOS	uint16_t
Linux	uint16_t

int32_t

The signed 32 bit integer type is represented differently on each platform, using the most appropriate system type:

Windows	int
macOS	int32_t
Linux	int32_t

uint32_t

The unsigned 32 bit integer type is represented differently on each platform, using the most appropriate system type:

Windows	unsigned int
macOS	uint32_t
Linux	uint32_t

int64_t

The signed 64 bit integer type is represented differently on each platform, using the most appropriate system type:

Windows	long long
macOS	int64_t
Linux	int64_t

uint64_t

The unsigned 64 bit integer type is represented differently on each platform, using the most appropriate system type:

Windows	unsigned long long
macOS	uint64_t
Linux	uint64_t

long

The long type is represented differently on each platform, using the most appropriate system type:

Windows	LONG
macOS	long
Linux	long

string

Strings are represented differently on each platform, using the most appropriate system type:

Windows	BSTR
macOS	CFStringRef
Linux	const char*

SafeArray

The **SafeArray** type is represented differently on each platform, using the most appropriate system type:

macOS	SafeArray*
Linux	SafeArray*

SafeArrayData

The **SafeArray**Data type is represented differently on each platform, using the most appropriate system type:

macOS	uint8_t*
Linux	uint8_t*

Variant

The Variant type is represented differently on each platform, using the most appropriate system type:

Windows	VARIANT
macOS	Variant
Linux	Variant

Type Definitions

BmdIoVec

Buffer for file IO reading and writing

Windows	struct { void* iovBase; unsigned long long iovLen; }
macOS	struct { void* iovBase; uint64_t iovLen; }
Linux	struct { void* iovBase; uint64_t iovLen; }

SafeArray

None

Windows	SAFEARRAY

SafeArrayBound

None

Windows	SAFEARRAYBOUND

BlackmagicRawVariantType

Variant types that may be stored as metadata

Key	**Value**		**Description**
	macOS, Linux	**Windows**	
blackmagicRawVariantTypeEmpty	0	VT_EMPTY	Undefined type
blackmagicRawVariantTypeU8	1	VT_UI1	Unsigned 8 bit integer
blackmagicRawVariantTypeS16	2	VT_I2	Signed 16 bit integer
blackmagicRawVariantTypeU16	3	VT_UI2	Unsigned 16 bit integer
blackmagicRawVariantTypeS32	4	VT_I4	Signed 32 bit integer
blackmagicRawVariantTypeU32	5	VT_UI4	Unsigned 32 bit integer

Key	Value		Description
	macOS, Linux	Windows	
blackmagicRawVariantTypeFloat32	6	VT_R4	Single precision 32 bit (IEEE 754) floating point number
blackmagicRawVariantTypeString	7	VT_BSTR	String variable
blackmagicRawVariantTypeSafeArray	8	VT_SAFEARRAY	Array variable
blackmagicRawVariantTypeFloat64	9	VT_R8	Double precision 64 bit (IEEE 754) floating point number

BlackmagicRawResourceType

Used in **IBlackmagicRawResourceManager**

Key	Value	Description
blackmagicRawResourceType BufferCPU	'cpub'	Page aligned CPU addressable memory
blackmagicRawResourceTypeBuffer Metal	'metb'	Metal MTLBuffer
blackmagicRawResourceTypeBuffer CUDA	'cudb'	CUDA CUdeviceptr device pointer
blackmagicRawResourceTypeBuffer OpenCL	'oclb'	OpenCL cl_mem buffer object

BlackmagicRawResourceFormat

Used for resource allocation

Key	Value	Description
blackmagicRawResourceFormat RGBAU8	'rgba'	Unsigned 8bit interleaved RGBA
blackmagicRawResourceFormat BGRAU8	'bgra'	Unsigned 8bit interleaved BGRA
blackmagicRawResourceFormat RGBU16	'16il'	Unsigned 16bit interleaved RGB
blackmagicRawResourceFormat RGBAU16	'16al'	Unsigned 16bit interleaved RGBA
blackmagicRawResourceFormat BGRAU16	'16la'	Unsigned 16bit interleaved BGRA
blackmagicRawResourceFormat RGBU16Planar	'16pl'	Unsigned 16bit planar RGB
blackmagicRawResourceFormat RGBF32	'f32s'	Single precision floating point interleaved RGB
blackmagicRawResourceFormat RGBAF32	'f32l'	Single precision floating point interleaved RGBA

Key	Value	Description
blackmagicRawResourceFormat BGRAF32	‘f32a’	Single precision floating point interleaved BGRA
blackmagicRawResourceFormat RGBF32Planar	‘f32p’	Single precision floating point planar RGB
blackmagicRawResourceFormat RGBF16	‘f16s’	Half precision floating point interleaved RGB
blackmagicRawResourceFormat RGBAF16	‘f16l’	Half precision floating point interleaved RGBA
blackmagicRawResourceFormat BGRAF16	‘f16a’	Half precision floating point interleaved BGRA
blackmagicRawResourceFormat RGBF16Planar	‘f16p’	Half precision floating point planar RGB

BlackmagicRawResourceUsage

Used in **IBlackmagicRawResourceManager**

Key	Value	Description
blackmagicRawResourceUsageReadCPUWriteCPU	‘rcwc’	CPU readable and writable memory
blackmagicRawResourceUsageReadGPUWriteGPU	‘rgwg’	GPU readable and writable memory
blackmagicRawResourceUsageReadGPUWriteCPU	‘rgwc’	GPU readable, CPU writable memory
blackmagicRawResourceUsageReadCPUWriteGPU	‘rcwg’	CPU readable, GPU writable memory

BlackmagicRawPipeline

Used in **IBlackmagicRawConfiguration**. Each pipeline has different mappings to context/commandQueue

Key	Value	Description
blackmagicRawPipelineCPU	‘cpub’	None
blackmagicRawPipelineCUDA	‘cuda’	CUDA pipeline, context/commandQueue map to CUcontext/CUstream
blackmagicRawPipelineMetal	‘metl’	Metal pipeline, context/commandQueue map to nil/MTLCommandQueue
blackmagicRawPipelineOpenCL	‘opcl’	OpenCL pipeline, context/commandQueue map to cl_context/cl_command_queue

BlackmagicRawInstructionSet

Used in **IBlackmagicRawConfiguration**

Key	Value	Description
blackmagicRawInstructionSetSSE41	'se41'	SSE 4.1 CPU Instruction Set
blackmagicRawInstructionSetAVX	'avx_'	AVX CPU Instruction Set
blackmagicRawInstructionSetAVX2	'avx2'	AVX2 CPU Instruction Set
blackmagicRawInstructionSetNEON	'neon'	NEON CPU Instruction Set

BlackmagicRawAudioFormat

Used in **IBlackmagicRawFile**Audio

Key	Value	Description
blackmagicRawAudioFormatPCM LittleEndian	'pcml'	PCM little endian audio

BlackmagicRawResolutionScale

Used in **IBlackmagicRawFrame**

Key	Value	Description
blackmagicRawResolutionScaleFull	'full'	Full Resolution
blackmagicRawResolutionScaleHalf	'half'	Half height and width
blackmagicRawResolutionScale Quarter	'qrtr'	Quarter height and width
blackmagicRawResolutionScale Eighth	'eith'	Eighth height and width

BlackmagicRawClipProcessingAttribute

Variant types that may be stored as metadata

Key	Value	Description
blackmagicRawClipProcessing AttributeColorScienceGen	'csgn'	Blackmagic Color Science generation
blackmagicRawClipProcessing AttributeGamma	'gama'	The gamma curve
blackmagicRawClipProcessing AttributeGamut	'gamt'	The color gamut
blackmagicRawClipProcessing AttributeToneCurveContrast	'tcon'	Contrast used in Blackmagic Design Custom Gamma
blackmagicRawClipProcessing AttributeToneCurveSaturation	'tsat'	Saturation used in Blackmagic Design Custom Gamma
blackmagicRawClipProcessing AttributeToneCurveMidpoint	'tmid'	Midpoint used in Blackmagic Design Custom Gamma

Key	Value	Description
blackmagicRawClipProcessing AttributeToneCurveHighlights	‘thih’	Highlight rolloff used in Blackmagic Design Custom Gamma
blackmagicRawClipProcessing AttributeToneCurveShadows	‘tsha’	Shadow rolloff used in Blackmagic Design Custom Gamma
blackmagicRawClipProcessing AttributeToneCurveVideoBlackLevel	‘tvbl’	VideoBlackLevel used in Blackmagic Design Custom Gamma
blackmagicRawClipProcessing AttributeToneCurveBlackLevel	‘tblk’	BlackLevel used in Blackmagic Design Custom Gamma
blackmagicRawClipProcessing AttributeToneCurveWhiteLevel	‘twit’	WhiteLevel used in Blackmagic Design Custom Gamma
blackmagicRawClipProcessing AttributeHighlightRecovery	‘hlry’	Is highlight recovery enabled
blackmagicRawClipProcessing AttributeAnalogGainIsConstant	‘agic’	Is analog gain constant throughout the clip
blackmagicRawClipProcessing AttributeAnalogGain	‘gain’	Analog gain for entire clip if analog gain is constant, otherwise analog gain of the first frame
blackmagicRawClipProcessing AttributePost3DLUTMode	‘lutm’	Is the Post 3D LUT being applied embedded, sidecar or disabled
blackmagicRawClipProcessing AttributeEmbeddedPost3DLUTName	‘emln’	Name of embedded 3D LUT
blackmagicRawClipProcessing AttributeEmbeddedPost3DLUTTitle	‘emlt’	Title of embedded 3D LUT
blackmagicRawClipProcessing AttributeEmbeddedPost3DLUTSize	‘emls’	Size of embedded 3D LUT
blackmagicRawClipProcessing AttributeEmbeddedPost3DLUTData	‘emld’	Float array of embedded 3D LUT data
blackmagicRawClipProcessing AttributeSidecarPost3DLUTName	‘scln’	Name of sidecar 3D LUT
blackmagicRawClipProcessing AttributeSidecarPost3DLUTTitle	‘sclt’	Title of sidecar 3D LUT
blackmagicRawClipProcessing AttributeSidecarPost3DLUTSize	‘scls’	Size of sidecar 3D LUT
blackmagicRawClipProcessing AttributeSidecarPost3DLUTData	‘scld’	Float array of sidecar 3D LUT data

Key	Value	Description
blackmagicRawClipProcessing AttributeGamutCompressionEnable	‘gace’	Enable gamut compression
blackmagicRawClipProcessing AttributeLensShadingEnable	‘shde’	Is shading enabled
blackmagicRawClipProcessing AttributeLensDistortionCorrection Enable	‘dice’	Is distortion correction enabled
blackmagicRawClipProcessing AttributeLensChromaticAberration CorrectionEnable	‘cace’	Is chromatic aberration correction enabled

BlackmagicRawFrameProcessingAttribute

Variant types that may be stored as metadata

Key	Value	Description
blackmagicRawFrameProcessing AttributeWhiteBalanceKelvin	‘wbkv’	The white balance Kelvin value
blackmagicRawFrameProcessing AttributeWhiteBalanceTint	‘wbtn’	The white balance Tint value
blackmagicRawFrameProcessing AttributeExposure	‘expo’	The linear exposure adjustment value (in stops)
blackmagicRawFrameProcessing AttributeISO	‘fiso’	The ISO gamma curve
blackmagicRawFrameProcessing AttributeAnalogGain	‘agpf’	Analog Gain per-frame value, cannot be changed

BlackmagicRawImmersiveAttribute

Variant types that may be stored as metadata

Key	Value	Description
blackmagicRawImmersiveAttribute OpticalLensProcessingDataFileUUID	‘oldu’	UUID of the projection data file
blackmagicRawImmersiveAttribute OpticalILPDFileName	‘oldf’	Name of the ILPD projection data file
blackmagicRawImmersiveAttribute OpticalInteraxial	‘olix’	Interaxial lens separation
blackmagicRawImmersiveAttribute OpticalProjectionKind	‘olpk’	Projection kind set to ‘fish’ to indicate Apple immersive video
blackmagicRawImmersiveAttribute OpticalCalibrationType	‘olct’	Calibration type set to ‘meiRives’ to indicate ILPD lens projection
blackmagicRawImmersiveAttribute OpticalProjectionData	‘olpd’	The contents of the projection data file

BlackmagicRawInterop

None

Key	Value	Description
blackmagicRawInteropNone	'none'	None
blackmagicRawInteropOpenGL	'opgl'	None

BlackmagicRawAnamorphicRatio

None

Key	Value	Description
blackmagicRawAnamorphicRatio FromMetadata	'meta'	None
blackmagicRawAnamorphicRatio Disabled	'dsbl'	None
blackmagicRawAnamorphicRatio133x	'133x'	None
blackmagicRawAnamorphicRatio15x	'15x_'	None
blackmagicRawAnamorphicRatio16x	'16x_'	None
blackmagicRawAnamorphic Ratio166x	'166x'	None
blackmagicRawAnamorphicRatio18x	'18x_'	None
blackmagicRawAnamorphicRatio2x	'2x__'	None

BlackmagicRawRotation

None

Key	Value	Description
blackmagicRawRotationFrom Metadata	'meta'	None
blackmagicRawRotationDisabled	'dsbl'	None
blackmagicRawRotationClockwise90	'r90_'	None
blackmagicRawRotation Clockwise180	'r180'	None
blackmagicRawRotation Clockwise270	'r270'	None

BlackmagicRawFlip

None

Key	Value	Description
blackmagicRawFlipFromMetadata	‘meta’	None
blackmagicRawFlipDisabled	‘dsbl’	None
blackmagicRawFlipHorizontal	‘flpx’	None
blackmagicRawFlipVertical	‘flpy’	None
blackmagicRawFlipBoth	‘flpb’	None

BlackmagicRawSizeLimit

Used in **IBlackmagicRawConfigurationEx**

Key	Value	Description
blackmagicRawSizeLimitNone	‘szln’	None
blackmagicRawSizeLimitScale	‘szsc’	None
blackmagicRawSizeLimitCrop	‘szlc’	None

BlackmagicRawImmersiveVideoTrack

None

Key	Value	Description
blackmagicRawImmersiveVideoTrack Left	0	None
blackmagicRawImmersiveVideoTrack Right	1	None

Interface Reference

IBlackmagicRaw Interface

Each codec interface will have its own memory storage and decoder. When decoding multiple clips via one codec, first in first out ordering will apply

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRaw::OpenClip outputs an IBlackmagicRawClip object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRaw::OpenClipWithGeometry outputs an IBlackmagicRawClip object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRaw::OpenClipFromFile outputs an IBlackmagicRawClip object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRaw::OpenClipFromFileWithGeometry outputs an IBlackmagicRawClip object interface
IBlackmagicRawFactory	IID_IBlackmagicRawFactory	An IBlackmagicRawFactory object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRawFactory	IID_IBlackmagicRawFactory	IBlackmagicRawFactory::CreateCodec outputs an IBlackmagicRaw object interface
IBlackmagicRawConfiguration	IID_IBlackmagicRaw Configuration	An IBlackmagicRawConfiguration object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRawConfigurationEx	IID_IBlackmagicRaw ConfigurationEx	An IBlackmagicRawConfigurationEx object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRawManualDecoder Flow1	IID_IBlackmagicRawManual DecoderFlow1	An IBlackmagicRawManualDecoderFlow1 object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRawManualDecoder Flow2	IID_IBlackmagicRawManual DecoderFlow2	An IBlackmagicRawManualDecoderFlow2 object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRawToneCurve	IID_IBlackmagicRawToneCurve	An IBlackmagicRawToneCurve object interface may be obtained from IBlackmagicRaw using QueryInterface

Public Member Functions	
Method	**Description**
OpenClip	Opens a clip
OpenClipWithGeometry	Opens a clip with specified geometry
OpenClipFromFile	Opens a clip
OpenClipFromFileWithGeometry	Opens a clip with specified geometry

Public Member Functions	
Method	**Description**
SetCallback	Registers a callback with the codec object
PreparePipeline	Asynchronously prepares the current pipeline for decoding, calling the registered callback's PreparePipelineComplete() method upon completion. This reduces the potential performance impact of decoding the first frame due to on-demand GPU kernel compilation.
PreparePipelineForDevice	Asynchronously prepares the current pipeline for decoding, calling the registered callback's PreparePipelineComplete() method upon completion. This reduces the potential performance impact of decoding the first frame due to on-demand GPU kernel compilation.
FlushJobs	Blocking call which will only return once all jobs have been completed

IBlackmagicRaw::OpenClip method

Opens a clip

Syntax

HRESULT `OpenClip(string filePath, IBlackmagicRawClip** clip)`

Parameters

Name	Direction	Description
filePath	in	Filesystem path to the source file for this clip
clip	out	Returned object with opened clip

IBlackmagicRaw::OpenClipWithGeometry method

Opens a clip with specified geometry

Syntax

HRESULT

```
OpenClipWithGeometry(string filePath,
                     IBlackmagicRawClipGeometry* geometry,
                     IBlackmagicRawClip** clip)
```

Parameters

Name	Direction	Description
filePath	in	Filesystem path to the source file for this clip
geometry	in	Geometry properties to be explicitly applied regardless of the clip's metadata.
clip	out	Returned object with opened clip

IBlackmagicRaw::OpenClipFromFile method

Opens a clip

Syntax

```
HRESULT    OpenClipFromFile(IBlackmagicRawFile* brawFile,
                            IBlackmagicRawClip** clip)
```

Parameters

Name	Direction	Description
brawFile	in	File interface representing the clip to open
clip	out	Returned object with opened clip

IBlackmagicRaw::OpenClipFromFileWithGeometry method

Opens a clip with specified geometry

Syntax

```
HRESULT    OpenClipFromFileWithGeometry(IBlackmagicRawFile* brawFile,
                                        IBlackmagicRawClipGeometry* geometry,
                                        IBlackmagicRawClip** clip)
```

Parameters

Name	Direction	Description
brawFile	in	File interface representing the clip to open
geometry	in	Geometry properties to be explicitly applied regardless of the clip's metadata.
clip	out	Returned object with opened clip

IBlackmagicRaw::SetCallback method

Registers a callback with the codec object

Syntax

```
HRESULT    SetCallback(IBlackmagicRawCallback* callback)
```

Parameters

Name	Direction	Description
callback	in	your callback object

IBlackmagicRaw::PreparePipeline method

Asynchronously prepares the current pipeline for decoding, calling the registered callback's **PreparePipeline**Complete() method upon completion. This reduces the potential performance impact of decoding the first frame due to on-demand GPU kernel compilation.

Syntax

```
HRESULT    PreparePipeline(BlackmagicRawPipeline pipeline,
                           void* pipelineContext,
                           void* pipelineCommandQueue,
                           void* userData)
```

Parameters

Name	Direction	Description
pipeline	in	Pipeline for which to prepare. This must be the same as the current pipeline and is provided for validation purposes
pipelineContext	in	Context to use for preparation. For CPU/CUDA/Metal/OpenCL, this maps to null/CUcontext/null/cl_context
pipelineCommandQueue	in	Command queue to use for preparation. For CPU/CUDA/Metal/OpenCL, this maps to null/CUstream/MTLCommandQueue/cl_command_queue
userData	in	User data to pass through to the callback's PreparePipelineComplete() method

IBlackmagicRaw::PreparePipelineForDevice method

Asynchronously prepares the current pipeline for decoding, calling the registered callback's **PreparePipeline**Complete() method upon completion. This reduces the potential performance impact of decoding the first frame due to on-demand GPU kernel compilation.

Syntax

```
HRESULT    PreparePipelineForDevice(IBlackmagicRawPipelineDevice*
                                    pipelineDevice,
                                    void* userData)
```

Parameters

Name	Direction	Description
pipelineDevice	in	The device to use for preparation
userData	in	User data to pass through to the callback's PreparePipelineComplete() method

IBlackmagicRaw::FlushJobs method

Blocking call which will only return once all jobs have been completed

Syntax

```
HRESULT    FlushJobs()
```

IBlackmagicRawFactory Interface

Use this to create one or more Codec objects

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRaw	IID_IBlackmagicRaw	An IBlackmagicRawFactory object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRaw	IID_IBlackmagicRaw	IBlackmagicRawFactory::CreateCodec outputs an IBlackmagicRaw object interface
IBlackmagicRawPipelineIterator	IID_IBlackmagicRawPipeline Iterator	IBlackmagicRawFactory::CreatePipeline Iterator outputs an IBlackmagicRawPipelineIterator object interface
IBlackmagicRawPipelineDevice Iterator	IID_IBlackmagicRawPipeline DeviceIterator	IBlackmagicRawFactory::CreatePipelineDevice Iterator outputs an IBlackmagicRawPipelineDeviceIterator object interface
IBlackmagicRawClipGeometry	IID_ IBlackmagicRawClipGeometry	IBlackmagicRawFactory::CreateClipGeometry outputs an IBlackmagicRawClipGeometry object interface

Public Member Functions	
Method	**Description**
CreateCodec	Create a codec from the factory
CreatePipelineIterator	Create a pipeline iterator from the factory
CreatePipelineDeviceIterator	Create a pipeline device iterator from the factory
CreateClipGeometry	Create empty clip geometry object

IBlackmagicRawFactory::CreateCodec method

Create a codec from the factory

Syntax

HRESULT `CreateCodec(IBlackmagicRaw** codec)`

Parameters

Name	Direction	Description
codec	out	Returned codec object

IBlackmagicRawFactory::CreatePipelineIterator method

Create a pipeline iterator from the factory

Syntax

```
HRESULT    CreatePipelineIterator(BlackmagicRawInterop interop,
                                  IBlackmagicRawPipelineIterator**
                                  pipelineIterator)
```

Parameters

Name	Direction	Description
interop	in	Interoperability (with other APIs) required from the pipeline
pipelineIterator	out	The created pipeline iterator

IBlackmagicRawFactory::CreatePipelineDeviceIterator method

Create a pipeline device iterator from the factory

Syntax

```
HRESULT    CreatePipelineDeviceIterator(BlackmagicRawPipeline pipeline,
                                        BlackmagicRawInterop interop,
                                        IBlackmagicRawPipelineDeviceIterator**
                                        deviceIterator)
```

Parameters

Name	Direction	Description
pipeline	in	The pipeline from which to query the available devices
interop	in	Interoperability (with other APIs) required from the pipeline and devices
deviceIterator	out	The created pipeline device iterator

IBlackmagicRawFactory::CreateClipGeometry method

Create empty clip geometry object

Syntax

```
HRESULT    CreateClipGeometry(IBlackmagicRawClipGeometry** geometry)
```

Parameters

Name	Direction	Description
geometry	out	The created geometry object

IBlackmagicRawPipelineIterator Interface

Use this to determine pipelines available for use on the system

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFactory	IID_IBlackmagicRawFactory	IBlackmagicRawFactory::CreatePipelineIterator outputs an IBlackmagicRawPipelineIterator object interface

Public Member Functions	
Method	**Description**
Next	Step to next pipeline entry. S_FALSE is returned when called on last entry
GetName	Get the name of the pipeline
GetInterop	Get the interoperability of the pipeline
GetPipeline	Get the pipeline

IBlackmagicRawPipelineIterator::Next method

Step to next pipeline entry. S_FALSE is returned when called on last entry

Syntax

HRESULT `Next()`

IBlackmagicRawPipelineIterator::GetName method

Get the name of the pipeline

Syntax

HRESULT `GetName(string* pipelineName)`

Parameters

Name	Direction	Description
pipelineName	out	None

IBlackmagicRawPipelineIterator::GetInterop method

Get the interoperability of the pipeline

Syntax

HRESULT `GetInterop(BlackmagicRawInterop* interop)`

Parameters

Name	Direction	Description
interop	out	None

IBlackmagicRawPipelineIterator::GetPipeline method

Get the pipeline

Syntax

HRESULT `GetPipeline(BlackmagicRawPipeline* pipeline)`

Parameters

Name	Direction	Description
pipeline	out	None

IBlackmagicRawPipelineDeviceIterator Interface

Use this to determine pipeline devices available for use on the system

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFactory	IID_IBlackmagicRawFactory	IBlackmagicRawFactory::CreatePipelineDeviceIterator outputs an IBlackmagicRawPipelineDeviceIterator object interface
IBlackmagicRawPipelineDevice	IID_IBlackmagicRawPipelineDevice	IBlackmagicRawPipelineDeviceIterator::CreateDevice outputs an IBlackmagicRawPipelineDevice object interface

Public Member Functions	
Method	**Description**
Next	Step to next device entry, will return S_FALSE when called on last entry
GetPipeline	Get the pipeline
GetInterop	Get the interoperability of the device's pipeline
CreateDevice	Create the pipeline device (container for context and command queue)

IBlackmagicRawPipelineDeviceIterator::Next method

Step to next device entry, will return S_FALSE when called on last entry

Syntax

HRESULT `Next()`

IBlackmagicRawPipelineDeviceIterator::GetPipeline method

Get the pipeline

Syntax

HRESULT `GetPipeline(BlackmagicRawPipeline* pipeline)`

Parameters

Name	Direction	Description
pipeline	out	None

IBlackmagicRawPipelineDeviceIterator::GetInterop method

Get the interoperability of the device's pipeline

Syntax

HRESULT `GetInterop(BlackmagicRawInterop* interop)`

Parameters

Name	Direction	Description
interop	out	None

IBlackmagicRawPipelineDeviceIterator::CreateDevice method

Create the pipeline device (container for context and command queue)

Syntax

HRESULT `CreateDevice(IBlackmagicRawPipelineDevice** pipelineDevice)`

Parameters

Name	Direction	Description
pipelineDevice	out	None

IBlackmagicRawOpenGLInteropHelper Interface

None

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawPipelineDevice	IID_IBlackmagicRawPipelineDevice	IBlackmagicRawPipelineDevice::GetOpenGLInteropHelper outputs an IBlackmagicRawOpenGLInteropHelper object interface

Public Member Functions	
Method	**Description**
GetPreferredResourceFormat	Gets the preferred resource format for interaction between the device and OpenGL
SetImage	Copies the processed image into an OpenGL texture

IBlackmagicRawOpenGLInteropHelper::GetPreferredResourceFormat method

Gets the preferred resource format for interaction between the device and OpenGL

Syntax

```
HRESULT    GetPreferredResourceFormat(BlackmagicRawResourceFormat*
                                      preferredFormat)
```

Parameters

Name	Direction	Description
preferredFormat	out	None

IBlackmagicRawOpenGLInteropHelper::SetImage method

Copies the processed image into an OpenGL texture

Syntax

```
HRESULT    SetImage(IBlackmagicRawProcessedImage* processedImage,
                    uint32_t* openGLTextureName,
                    int32_t* openGLTextureTarget)
```

Parameters

Name	Direction	Description
processedImage	in	None
openGLTextureName	out	name of OpenGL texture containing image
openGLTextureTarget	out	OpenGL target of texture containing image, typically GL_TEXTURE or GL_TEXTURE_RECTANGLE

IBlackmagicRawPipelineDevice Interface

A device is essentially a container for a context and command queue associated with a pipeline. This object is provided so the user need not deal directly with the underlying compute API in order to provide context and command queue to the codec configuration. As such, the device instance MUST outlive that of the codec instance on which the device is used.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawPipelineDeviceIterator	IID_IBlackmagicRawPipelineDeviceIterator	IBlackmagicRawPipelineDeviceIterator::CreateDevice outputs an IBlackmagicRawPipelineDevice object interface
IBlackmagicRawOpenGLInteropHelper	IID_IBlackmagicRawOpenGLInteropHelper	IBlackmagicRawPipelineDevice::GetOpenGLInteropHelper outputs an IBlackmagicRawOpenGLInteropHelper object interface

Public Member Functions	
Method	**Description**
SetBestInstructionSet	Sets the CPU instruction set of the device to be that representing the best capabilities of the system
SetInstructionSet	Sets the CPU instruction set to use for the device
GetInstructionSet	Gets the CPU instruction set of the device
GetIndex	Gets the index of the device in the pipeline's device list. This is typically used to differentiate devices in multi-GPU configurations.
GetName	Gets the name of the device
GetUniqueIdentifier	Returns the unique identifier of the device.
GetInterop	Gets the API interoperability of the device
GetPipeline	Gets the pipeline configuration information associated with the device. These parameters may be provided to **IBlackmagicRawConfiguration::SetPipeline**. **IBlackmagicRawConfiguration::SetFromDevice** may be a better option.
GetPipelineName	Gets the name of the pipeline associated with the device
GetOpenGLInteropHelper	Creates an instance of a helper to get the results of a processed image as an OpenGL texture
GetSupportedResourceFormats	Gets the list of supported resource formats for the device
GetMaximumTextureSize	Returns the maximum texture size.

IBlackmagicRawPipelineDevice::SetBestInstructionSet method

Sets the CPU instruction set of the device to be that representing the best capabilities of the system

Syntax

HRESULT `SetBestInstructionSet()`

IBlackmagicRawPipelineDevice::SetInstructionSet method

Sets the CPU instruction set to use for the device

Syntax

HRESULT `SetInstructionSet(BlackmagicRawInstructionSet instructionSet)`

Parameters

Name	Direction	Description
instructionSet	in	None

IBlackmagicRawPipelineDevice::GetInstructionSet method

Gets the CPU instruction set of the device

Syntax

HRESULT `GetInstructionSet(BlackmagicRawInstructionSet* instructionSet)`

Parameters

Name	Direction	Description
instructionSet	out	None

IBlackmagicRawPipelineDevice::GetIndex method

Gets the index of the device in the pipeline's device list. This is typically used to differentiate devices in multi-GPU configurations.

Syntax

HRESULT `GetIndex(uint32_t* deviceIndex)`

Parameters

Name	Direction	Description
deviceIndex	out	None

IBlackmagicRawPipelineDevice::GetName method

Gets the name of the device

Syntax

HRESULT `GetName(string* deviceName)`

Parameters

Name	Direction	Description
deviceName	out	None

IBlackmagicRawPipelineDevice::GetUniqueIdentifier method

Returns the unique identifier of the device.

Syntax

HRESULT `GetUniqueIdentifier(uint64_t* uniqueIdentifier)`

Parameters

Name	Direction	Description
uniqueIdentifier	out	Returned unique identifier

IBlackmagicRawPipelineDevice::GetInterop method

Gets the API interoperability of the device

Syntax

HRESULT `GetInterop(BlackmagicRawInterop* interop)`

Parameters

Name	Direction	Description
interop	out	None

IBlackmagicRawPipelineDevice::GetPipeline method

Gets the pipeline configuration information associated with the device. These parameters may be provided to **IBlackmagicRawConfiguration::SetPipeline**.
IBlackmagicRawConfiguration::SetFromDevice may be a better option.

Syntax

HRESULT
```
GetPipeline(BlackmagicRawPipeline* pipeline,
            void** context,
            void** commandQueue)
```

Parameters

Name	Direction	Description
pipeline	out	None
context	out	None
commandQueue	out	None

IBlackmagicRawPipelineDevice::GetPipelineName method

Gets the name of the pipeline associated with the device

Syntax

HRESULT `GetPipelineName(string* pipelineName)`

Parameters

Name	Direction	Description
pipelineName	out	None

IBlackmagicRawPipelineDevice::GetOpenGLInteropHelper method

Creates an instance of a helper to get the results of a processed image as an OpenGL texture

Syntax

HRESULT `GetOpenGLInteropHelper(IBlackmagicRawOpenGLInteropHelper** interopHelper)`

Parameters

Name	Direction	Description
interopHelper	out	None

IBlackmagicRawPipelineDevice::GetSupportedResourceFormats method

Gets the list of supported resource formats for the device

Syntax

HRESULT `GetSupportedResourceFormats(BlackmagicRawResourceFormat* array, uint32_t* arrayElementCount)`

Parameters

Name	Direction	Description
array	out	The array into which the results will be written. If nullptr is supplied then arrayElementCount will still be returned.
arrayElementCount	in, out	Array element count. Input value shall indicate the number of elements available in array. Output value indicates the number of elements populated in array.

IBlackmagicRawPipelineDevice::GetMaximumTextureSize method

Returns the maximum texture size.

Syntax

HRESULT `GetMaximumTextureSize(uint32_t* maximumWidth, uint32_t* maximumHeight)`

Parameters

Name	Direction	Description
maximumWidth	out	Returned maximum width in pixels
maximumHeight	out	Returned maximum height in pixels

IBlackmagicRawToneCurve Interface

If desired, the user application can cache these results

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRaw	IID_IBlackmagicRaw	An **IBlackmagicRawToneCurve** object interface may be obtained from **IBlackmagicRaw** using **QueryInterface**

Public Member Functions	
Method	**Description**
GetToneCurve	Query tone curve parameters for a specific camera and gamma. These are only currently available on Gamut: Blackmagic Design, Gamma: Blackmagic Design Film, Blackmagic Design Extended Video, Blackmagic Design Custom. Note: Custom gamma can define a tone curve per clip, see **BlackmagicRawClipProcessingAttributes**: :GetToneCurveForCustomGamma()
EvaluateToneCurve	Evaluates tone curve, returned buffer can be used to visualise curve

IBlackmagicRawToneCurve::GetToneCurve method

Query tone curve parameters for a specific camera and gamma. These are only currently available on Gamut: Blackmagic Design, Gamma: Blackmagic Design Film, Blackmagic Design Extended Video, Blackmagic Design Custom. Note: Custom gamma can define a tone curve per clip, see **BlackmagicRawClipProcessingAttribute**s::**GetToneCurve**ForCustomGamma()

Syntax

HRESULT

```
GetToneCurve(string cameraType,
             string gamma,
             uint16_t gen,
             float* contrast,
             float* saturation,
             float* midpoint,
             float* highlights,
             float* shadows,
             float* blackLevel,
             float* whiteLevel,
             uint16_t* videoBlackLevel)
```

Parameters

Name	Direction	Description
cameraType	in	Type of camera, you can query this from **IBlackmagicRawClip::GetCameraType()**
gamma	in	String value of gamma to use
gen	in	Color science gen
contrast	out	Contrast of tonecurve
saturation	out	Saturation of tonecurve
midpoint	out	Midpoint of tonecurve

Name	Direction	Description
highlights	out	Control the highlights in the tonecurve
shadows	out	Control the shadows in the tonecurve
blackLevel	out	Black level in the tonecurve
whiteLevel	out	White level in the tonecurve
videoBlackLevel	out	Whether there is a black level pedestal applied

IBlackmagicRawToneCurve::EvaluateToneCurve method

Evaluates tone curve, returned buffer can be used to visualise curve

Syntax

```
HRESULT    EvaluateToneCurve(string cameraType,
                             uint16_t gen,
                             float contrast,
                             float saturation,
                             float midpoint,
                             float highlights,
                             float shadows,
                             float blackLevel,
                             float whiteLevel,
                             uint16_t videoBlackLevel,
                             float* array,
                             uint32_t arrayElementCount)
```

Parameters

Name	Direction	Description
cameraType	in	Type of camera, you can query this from **IBlackmagicRawClip::GetCameraType()**
gen	in	Color science gen
contrast	in	Contrast of tonecurve
saturation	in	Saturation of tonecurve
midpoint	in	Midpoint of tonecurve
highlights	in	Highlights of tonecurve
shadows	in	Shadows of tonecurve
blackLevel	in	Black level of tonecurve
whiteLevel	in	White level of tonecurve
videoBlackLevel	in	Do we apply a black level pedestal
array	out	Array to write the evaluated tonecurve in to
arrayElementCount	in	Size of array being provided

IBlackmagicRawConfiguration Interface

The configuration properties are read when the first call to OpenClip() occurs. After this configuration properties should not be changed, and changes will be ignored.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRaw	IID_IBlackmagicRaw	An **IBlackmagicRawConfiguration** object interface may be obtained from **IBlackmagicRaw** using **QueryInterface**

Public Member Functions	
Method	**Description**
SetPipeline	Set pipeline to use for decoding, see **BlackmagicRawPipeline**
GetPipeline	Get pipeline used for decoding, see **BlackmagicRawPipeline**
IsPipelineSupported	Determine if a pipeline is supported by this machine. This will verify relevant hardware / DLLs are installed
SetCPUThreads	Sets the number of CPU threads to use while decoding. Defaults to number of hardware threads available on system
GetCPUThreads	Gets the number of CPU threads to use while decoding
GetMaxCPUThreadCount	Query the number of hardware threads available on system
SetWriteMetadataPerFrame	Sets if per-frame metadata will be written to only the relevant frame.
GetWriteMetadataPerFrame	Gets if the per-frame metadata will be written to only the relevant frame
SetFromDevice	Equivalent to querying the device for instruction set, pipeline, context and command queue then calling SetInstructionSet and SetPipeline
GetVersion	Get the Blackmagic RAW SDK version.
GetCameraSupportVersion	Get the camera support version.

IBlackmagicRawConfiguration::SetPipeline method

Set pipeline to use for decoding, see **BlackmagicRawPipeline**

Syntax

```
HRESULT    SetPipeline(BlackmagicRawPipeline pipeline,
                       void* pipelineContext,
                       void* pipelineCommandQueue)
```

Parameters

Name	Direction	Description
pipeline	in	Set pipeline before allocating resources, as changing pipeline will cause the default resource manager to be re-created
pipelineContext	in	Set context to use. For CPU/CUDA/Metal/OpenCL maps to null/ CUcontext/null/cl_context
pipelineCommandQueue	in	Sets commandQueue to use. For CPU/CUDA/Metal/OpenCL maps to null/CUstream/MTLCommandQueue/cl_command_queue

IBlackmagicRawConfiguration::GetPipeline method

Get pipeline used for decoding, see **BlackmagicRawPipeline**

Syntax

```
HRESULT    GetPipeline(BlackmagicRawPipeline* pipeline,
                       void** pipelineContextOut,
                       void** pipelineCommandQueueOut)
```

Parameters

Name	Direction	Description
pipeline	out	returns the pipeline used
pipelineContextOut	out	Returns context applied. For CPU/CUDA/Metal/OpenCL maps to null/ CUcontext/null/cl_context
pipelineCommandQueueOut	out	Returns commandQueue applied. For CPU/CUDA/Metal/OpenCL maps to null/CUstream/MTLCommandQueue/cl_command_queue

IBlackmagicRawConfiguration::IsPipelineSupported method

Determine if a pipeline is supported by this machine. This will verify relevant hardware / DLLs are installed

Syntax

```
HRESULT    IsPipelineSupported(BlackmagicRawPipeline pipeline,
                               Boolean* pipelineSupported)
```

Parameters

Name	Direction	Description
pipeline	in	Type of pipeline to query
pipelineSupported	out	Returned result

IBlackmagicRawConfiguration::SetCPUThreads method

Sets the number of CPU threads to use while decoding. Defaults to number of hardware threads available on system

Syntax

HRESULT `SetCPUThreads(uint32_t threadCount)`

Parameters

Name	Direction	Description
threadCount	in	Thread count to utilise, setting to 0 will default to number of hardware threads available on system

IBlackmagicRawConfiguration::GetCPUThreads method

Gets the number of CPU threads to use while decoding

Syntax

HRESULT `GetCPUThreads(uint32_t* threadCount)`

Parameters

Name	Direction	Description
threadCount	out	Returned thread count

IBlackmagicRawConfiguration::GetMaxCPUThreadCount method

Query the number of hardware threads available on system

Syntax

HRESULT `GetMaxCPUThreadCount(uint32_t* threadCount)`

Parameters

Name	Direction	Description
threadCount	out	Returned thread count

IBlackmagicRawConfiguration::SetWriteMetadataPerFrame method

Sets if per-frame metadata will be written to only the relevant frame.

Syntax

HRESULT `SetWriteMetadataPerFrame(Boolean writePerFrame)`

Parameters

Name	Direction	Description
writePerFrame	in	if true, frame metadata will be written to only the relevant frame, if false, setting frame metadata will set to all frames at once

IBlackmagicRawConfiguration::GetWriteMetadataPerFrame method

Gets if the per-frame metadata will be written to only the relevant frame

Syntax

HRESULT `GetWriteMetadataPerFrame(Boolean* writePerFrame)`

Parameters

Name	Direction	Description
writePerFrame	out	if true, frame metadata will be written to only the relevant frame, if false, setting frame metadata will set to all frames at once

IBlackmagicRawConfiguration::SetFromDevice method

Equivalent to querying the device for instruction set, pipeline, context and command queue then calling SetInstructionSet and **SetPipeline**

Syntax

HRESULT `SetFromDevice(IBlackmagicRawPipelineDevice* pipelineDevice)`

Parameters

Name	Direction	Description
pipelineDevice	in	None

IBlackmagicRawConfiguration::GetVersion method

Get the Blackmagic RAW SDK version.

Syntax

HRESULT `GetVersion(string* version)`

Parameters

Name	Direction	Description
version	out	Version string

IBlackmagicRawConfiguration::GetCameraSupportVersion method

Get the camera support version.

Syntax

HRESULT `GetCameraSupportVersion(string* version)`

Parameters

Name	Direction	Description
version	out	Camera support version string

IBlackmagicRawConfigurationEx Interface

Extended Configuration for Codec Object

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRaw	IID_IBlackmagicRaw	An IBlackmagicRawConfigurationEx object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRawResource Manager	IID_IBlackmagicRawResource Manager	IBlackmagicRawConfigurationEx::GetResource Manager outputs an IBlackmagicRawResourceManager object interface

Public Member Functions	
Method	**Description**
GetResourceManager	Get the current resource manager
SetResourceManager	Set the current resource manager, this allows the user to provide a custom resource manager
GetInstructionSet	Get the CPU instruction set used by the decoder
SetInstructionSet	Set the CPU instruction set used by the decoder
GetSizeLimit	Get imposed resolution size limitation
SetSizeLimit	Set resolution size limitation, ensuring any resulting imagery does not exceed these limits (such as maximum displayable size imposed by hardware)

IBlackmagicRawConfigurationEx::GetResourceManager method

Get the current resource manager

Syntax

HRESULT `GetResourceManager(IBlackmagicRawResourceManager** resourceManager)`

Parameters

Name	Direction	Description
resourceManager	out	Returned resource manager

IBlackmagicRawConfigurationEx::SetResourceManager method

Set the current resource manager, this allows the user to provide a custom resource manager

Syntax

HRESULT `SetResourceManager(IBlackmagicRawResourceManager* resourceManager)`

Parameters

Name	Direction	Description
resourceManager	in	setting null will restore the default resource manager

IBlackmagicRawConfigurationEx::GetInstructionSet method

Get the CPU instruction set used by the decoder

Syntax

HRESULT `GetInstructionSet(BlackmagicRawInstructionSet* instructionSet)`

Parameters

Name	Direction	Description
instructionSet	out	Returned instruction set

IBlackmagicRawConfigurationEx::SetInstructionSet method

Set the CPU instruction set used by the decoder

Syntax

HRESULT `SetInstructionSet(BlackmagicRawInstructionSet instructionSet)`

Parameters

Name	Direction	Description
instructionSet	in	the instruction set to use

IBlackmagicRawConfigurationEx::GetSizeLimit method

Get imposed resolution size limitation

Syntax

HRESULT
```
GetSizeLimit(BlackmagicRawSizeLimit* sizeLimit,
             uint32_t* sizeLimitWidth,
             uint32_t* sizeLimitHeight)
```

Parameters

Name	Direction	Description
sizeLimit	out	Returned active size limit
sizeLimitWidth	out	Returned width size limit
sizeLimitHeight	out	Returned height limit

IBlackmagicRawConfigurationEx::SetSizeLimit method

Set resolution size limitation, ensuring any resulting imagery does not exceed these limits (such as maximum displayable size imposed by hardware)

Syntax

HRESULT
```
SetSizeLimit(BlackmagicRawSizeLimit sizeLimit,
             uint32_t sizeLimitWidth,
             uint32_t sizeLimitHeight)
```

Parameters

Name	Direction	Description
sizeLimit	in	the method by which to limit the size
sizeLimitWidth	in	the width size limit to impose
sizeLimitHeight	in	the height limit to impose

IBlackmagicRawClipGeometry Interface

Geometry properties of Clip object

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFactory	IID_IBlackmagicRawFactory	IBlackmagicRawFactory::CreateClipGeometry outputs an IBlackmagicRawClipGeometry object interface

Public Member Functions	
Method	**Description**
GetAnamorphicRatio	Get the anamorphic ratio
SetAnamorphicRatio	Set the anamorphic ratio
GetRotation	Get the rotation state
SetRotation	Set the rotation state
GetFlip	Get the flip state
SetFlip	Set the flip state

IBlackmagicRawClipGeometry::GetAnamorphicRatio method

Get the anamorphic ratio

Syntax

HRESULT `GetAnamorphicRatio(BlackmagicRawAnamorphicRatio* anamorphic)`

Parameters

Name	Direction	Description
anamorphic	out	Returned anamorphic ratio

IBlackmagicRawClipGeometry::SetAnamorphicRatio method

Set the anamorphic ratio

Syntax

HRESULT `SetAnamorphicRatio(BlackmagicRawAnamorphicRatio anamorphic)`

Parameters

Name	Direction	Description
anamorphic	in	the anamorphic ratio to use

IBlackmagicRawClipGeometry::GetRotation method

Get the rotation state

Syntax

HRESULT `GetRotation(BlackmagicRawRotation* rotation)`

Parameters

Name	Direction	Description
rotation	out	Returned rotation state

IBlackmagicRawClipGeometry::SetRotation method

Set the rotation state

Syntax

HRESULT `SetRotation(BlackmagicRawRotation rotation)`

Parameters

Name	Direction	Description
rotation	in	the rotation state to use

IBlackmagicRawClipGeometry::GetFlip method

Get the flip state

Syntax

HRESULT `GetFlip(BlackmagicRawFlip* flip)`

Parameters

Name	Direction	Description
flip	out	Returned flip state

IBlackmagicRawClipGeometry::SetFlip method

Set the flip state

Syntax

HRESULT `SetFlip(BlackmagicRawFlip flip)`

Parameters

Name	Direction	Description
flip	in	the flip state to use

IBlackmagicRawResourceManager Interface

Using this interface the user can create their own Resource manager to allow ownership over resource allocations. An internal resource manager that implements this is interface is provided by default.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawConfigurationEx	IID_IBlackmagicRaw ConfigurationEx	IBlackmagicRawConfigurationEx::GetResource Manager outputs an IBlackmagicRawResourceManager object interface

Public Member Functions	
Method	**Description**
CreateResource	Called when a new resource is created
ReleaseResource	Release a resource
CopyResource	Copy a resource
GetResourceHostPointer	Obtains a pointer to a resource's host addressable memory

IBlackmagicRawResourceManager::CreateResource method

Called when a new resource is created

Syntax

```
HRESULT   CreateResource(void* context,
                         void* commandQueue,
                         uint32_t sizeBytes,
                         BlackmagicRawResourceType type,
                         BlackmagicRawResourceUsage usage,
                         void** resource)
```

Parameters

Name	Direction	Description
context	in	Context on which to create the resource
commandQueue	in	Command Queue on which to create the resource
sizeBytes	in	Size (in bytes) of the resource to create
type	in	Type of resource to create
usage	in	Usage of resource to create
resource	out	Return the created resource

IBlackmagicRawResourceManager::ReleaseResource method

Release a resource

Syntax

```
HRESULT    ReleaseResource(void* context,
                           void* commandQueue,
                           void* resource,
                           BlackmagicRawResourceType type)
```

Parameters

Name	Direction	Description
context	in	Context the resource was created on
commandQueue	in	CommandQueue the resource was created on
resource	in	Resource to release
type	in	Type of resource we are releasing

IBlackmagicRawResourceManager::CopyResource method

Copy a resource

Syntax

```
HRESULT    CopyResource(void* context,
                        void* commandQueue,
                        void* source,
                        BlackmagicRawResourceType sourceType,
                        void* destination,
                        BlackmagicRawResourceType destinationType,
                        uint32_t sizeBytes,
                        Boolean copyAsync)
```

Parameters

Name	Direction	Description
context	in	Context the resource was created on
commandQueue	in	CommandQueue the resource was created on
source	in	Source resource to copy
sourceType	in	Type of resource to copy from
destination	in	Destination resource of the copy
destinationType	in	Type of resource to copy to
sizeBytes	in	Size (in bytes) of the resource to copy
copyAsync	in	if true, queue the copy to happen asynchronously (implying the source buffer MUST exist for the duration)

IBlackmagicRawResourceManager::GetResourceHostPointer method

Obtains a pointer to a resource's host addressable memory

Syntax

```
HRESULT    GetResourceHostPointer(void* context,
                                  void* commandQueue,
                                  void* resource,
                                  BlackmagicRawResourceType resourceType,
                                  void** hostPointer)
```

Parameters

Name	Direction	Description
context	in	Context the resource was created on
commandQueue	in	CommandQueue the resource was created on
resource	in	Resource to query
resourceType	in	Type of resource we are querying
hostPointer	out	Resultant host pointer of the resource

IBlackmagicRawMetadataIterator Interface

Iterating metadata

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFrame	IID_IBlackmagicRawFrame	IBlackmagicRawFrame::GetMetadataIterator outputs an IBlackmagicRawMetadataIterator object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRawClip::GetMetadataIterator outputs an IBlackmagicRawMetadataIterator object interface

Public Member Functions	
Method	**Description**
Next	Step to next metadata entry, will return S_FALSE when called on last entry
GetKey	Query key name of this metadata entry
GetData	Query data in this metadata entry

IBlackmagicRawMetadataIterator::Next method

Step to next metadata entry, will return S_FALSE when called on last entry

Syntax

HRESULT `Next()`

IBlackmagicRawMetadataIterator::GetKey method

Query key name of this metadata entry

Syntax

HRESULT `GetKey(string* key)`

Parameters

Name	Direction	Description
key	out	Name of key

IBlackmagicRawMetadataIterator::GetData method

Query data in this metadata entry

Syntax

HRESULT `GetData(Variant* data)`

Parameters

Name	Direction	Description
data	out	Variant to store the data in

IBlackmagicRawClipProcessingAttributes Interface

Clip Processing attributes allows the user to adjust clip-level processing attributes

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawPost3DLUT	IID_IBlackmagicRawPost3DLUT	IBlackmagicRawClipProcessingAttributes::GetPost3DLUT outputs an IBlackmagicRawPost3DLUT object interface
IBlackmagicRawPost3DLUT	IID_IBlackmagicRawPost3DLUT	IBlackmagicRawClipProcessingAttributes::GetSidecarPost3DLUT outputs an IBlackmagicRawPost3DLUT object interface
IBlackmagicRawPost3DLUT	IID_IBlackmagicRawPost3DLUT	IBlackmagicRawClipProcessingAttributes::GetEmbeddedPost3DLUT outputs an IBlackmagicRawPost3DLUT object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRawClip::CloneClipProcessingAttributes outputs an IBlackmagicRawClipProcessingAttributes object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	An IBlackmagicRawClipProcessingAttributes object interface may be obtained from IBlackmagicRawClip using QueryInterface

Public Member Functions	
Method	**Description**
GetClipAttribute	Get the attribute
SetClipAttribute	Set the attribute
GetClipAttributeRange	Get the clip processing attribute range for the specified attribute
GetClipAttributeList	Get the clip processing attribute value list for the specified attribute. The arrayElementCount may be queried first (with NULL array parameter) to allocate correct size. A subsequent call (with non-NULL array parameter) can be used to populate the array.
GetISOList	Obtains a list of available ISOs (for the clip's analog gain) which is primarily intended for GUI presentation.
GetPost3DLUT	Get the active 3D LUT
GetSidecarPost3DLUT	Get the sidecar 3D LUT
SetSidecarPost3DLUT	Set the sidecar 3D LUT
GetEmbeddedPost3DLUT	Get the embedded 3D LUT
SetEmbeddedPost3DLUT	Set the embedded 3D LUT

IBlackmagicRawClipProcessingAttributes::GetClipAttribute method

Get the attribute

Syntax

```
HRESULT    GetClipAttribute(BlackmagicRawClipProcessingAttribute attribute,
                            Variant* value)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to query
value	out	Variant to store the queried value in

IBlackmagicRawClipProcessingAttributes::SetClipAttribute method

Set the attribute

Syntax

```
HRESULT    SetClipAttribute(BlackmagicRawClipProcessingAttribute attribute,
                            Variant* value)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to set
value	in	Variant to set the attribute to

IBlackmagicRawClipProcessingAttributes: :GetClipAttributeRange method

Get the clip processing attribute range for the specified attribute

Syntax

```
HRESULT    GetClipAttributeRange(BlackmagicRawClipProcessingAttribute
                                 attribute,
                                 Variant* valueMin,
                                 Variant* valueMax,
                                 Boolean* isReadOnly)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to query
valueMin	out	Variant to store the data in
valueMax	out	Variant to store the data in
isReadOnly	out	Returned boolean indicating if this attribute can be modified. Serves as a hint that any corresponding GUI control shall be disabled.

IBlackmagicRawClipProcessingAttributes: :GetClipAttributeList method

Get the clip processing attribute value list for the specified attribute. The arrayElementCount may be queried first (with NULL array parameter) to allocate correct size. A subsequent call (with non-NULL array parameter) can be used to populate the array.

Syntax

```
HRESULT    GetClipAttributeList(BlackmagicRawClipProcessingAttribute attribute,
                                Variant* array,
                                uint32_t* arrayElementCount,
                                Boolean* isReadOnly)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to query
array	out	The array into which the results will be written. If nullptr is supplied then arrayElementCount will still be returned.
arrayElementCount	out	Array element count
isReadOnly	out	Returned boolean indicating if this attribute can be modified. Serves as a hint that any corresponding GUI control shall be disabled.

IBlackmagicRawClipProcessingAttributes::GetISOList method

Obtains a list of available ISOs (for the clip's analog gain) which is primarily intended for GUI presentation.

Syntax

```
HRESULT    GetISOList(uint32_t* array,
                      uint32_t* arrayElementCount,
                      Boolean* isReadOnly)
```

Parameters

Name	Direction	Description
array	out	The array into which the results will be written. If nullptr is supplied then arrayElementCount will still be returned.
arrayElementCount	in, out	Array element count. Input value shall indicate the number of elements available in array. Output value indicates the number of elements populated in array.
isReadOnly	out	Returned boolean indicating if this attribute can be modified. Serves as an indication that any corresponding GUI control shall be disabled.

IBlackmagicRawClipProcessingAttributes::GetPost3DLUT method

Get the active 3D LUT

Syntax

```
HRESULT    GetPost3DLUT(IBlackmagicRawPost3DLUT** lut)
```

Parameters

Name	Direction	Description
lut	out	Look up table (LUT) to query

IBlackmagicRawClipProcessingAttributes: :GetSidecarPost3DLUT method

Get the sidecar 3D LUT

Syntax

```
HRESULT    GetSidecarPost3DLUT(IBlackmagicRawPost3DLUT** lut)
```

Parameters

Name	Direction	Description
lut	out	The sidecar look up table (LUT)

IBlackmagicRawClipProcessingAttributes: :SetSidecarPost3DLUT method

Set the sidecar 3D LUT

Syntax

```
HRESULT    SetSidecarPost3DLUT(string name,
                               string title,
                               uint16_t size,
                               Variant* data)
```

Parameters

Name	Direction	Description
name	in	The LUT name
title	in	The LUT title
size	in	The LUT (dimensional) size
data	in	A floating point variant **SafeArray** of length (size x size x size) entries

IBlackmagicRawClipProcessingAttributes: :GetEmbeddedPost3DLUT method

Get the embedded 3D LUT

Syntax

```
HRESULT    GetEmbeddedPost3DLUT(IBlackmagicRawPost3DLUT** lut)
```

Parameters

Name	Direction	Description
lut	out	The embedded look up table (LUT)

IBlackmagicRawClipProcessingAttributes: :SetEmbeddedPost3DLUT method

Set the embedded 3D LUT

Syntax

```
HRESULT    SetEmbeddedPost3DLUT(string name,
                                string title,
                                uint16_t size,
                                Variant* data)
```

Parameters

Name	Direction	Description
name	in	The LUT name
title	in	The LUT title
size	in	The LUT (dimensional) size
data	in	A floating point variant **SafeArray** of length (size x size x size) entries

IBlackmagicRawFrameProcessingAttributes Interface

Processing attributes which can change per frame

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFrame	IID_IBlackmagicRawFrame	IBlackmagicRawFrame::CloneFrameProcessing Attributes outputs an IBlackmagicRawFrameProcessingAttributes object interface
IBlackmagicRawFrame	IID_IBlackmagicRawFrame	An IBlackmagicRawFrameProcessingAttributes object interface may be obtained from IBlackmagicRawFrame using QueryInterface

Public Member Functions	
Method	**Description**
GetFrameAttribute	Get the attribute
SetFrameAttribute	Set the attribute
GetFrameAttributeRange	Get the frame processing attribute range for the specified attribute
GetFrameAttributeList	Get the frame processing attribute value list for the specified attribute. To query an ISO list use GetISOList().
GetISOList	Obtains a list of available ISOs (for the frame's analog gain) which is primarily intended for GUI presentation.

IBlackmagicRawFrameProcessingAttributes: :GetFrameAttribute method

Get the attribute

Syntax

```
HRESULT    GetFrameAttribute(BlackmagicRawFrameProcessingAttribute attribute,
                             Variant* value)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to query
value	out	Variant to store the queried value in

IBlackmagicRawFrameProcessingAttributes: :SetFrameAttribute method

Set the attribute

Syntax

```
HRESULT    SetFrameAttribute(BlackmagicRawFrameProcessingAttribute attribute,
                             Variant* value)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to set
value	in	Variant to set the attribute to

IBlackmagicRawFrameProcessingAttributes: :GetFrameAttributeRange method

Get the frame processing attribute range for the specified attribute

Syntax

```
HRESULT    GetFrameAttributeRange(BlackmagicRawFrameProcessingAttribute
                                  attribute,
                                  Variant* valueMin,
                                  Variant* valueMax,
                                  Boolean* isReadOnly)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to query
valueMin	out	Variant to store the data in
valueMax	out	Variant to store the data in
isReadOnly	out	Returned boolean indicating if this attribute can be modified. Serves as a hint that any corresponding GUI control shall be disabled.

IBlackmagicRawFrameProcessingAttributes: :GetFrameAttributeList method

Get the frame processing attribute value list for the specified attribute. To query an ISO list use **GetISOList**().

Syntax

```
HRESULT    GetFrameAttributeList(BlackmagicRawFrameProcessingAttribute
                                 attribute,
                                 Variant* array,
                                 uint32_t* arrayElementCount,
                                 Boolean* isReadOnly)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to query
array	out	The array into which the results will be written. If nullptr is supplied then arrayElementCount will still be returned.
arrayElementCount	out	Array element count
isReadOnly	out	Returned boolean indicating if this attribute can be modified. Serves as a hint that any corresponding GUI control shall be disabled.

IBlackmagicRawFrameProcessingAttributes::GetISOList method

Obtains a list of available ISOs (for the frame's analog gain) which is primarily intended for GUI presentation.

Syntax

```
HRESULT    GetISOList(uint32_t* array,
                      uint32_t* arrayElementCount,
                      Boolean* isReadOnly)
```

Parameters

Name	Direction	Description
array	out	The array into which the results will be written. If nullptr is supplied then arrayElementCount will still be returned.
arrayElementCount	in, out	Array element count. Input value shall indicate the number of elements available in array. Output value indicates the number of elements populated in array.
isReadOnly	out	Returned boolean indicating if this attribute can be modified. Serves as an indication that any corresponding GUI control shall be disabled.

IBlackmagicRawPost3DLUT Interface

3D Look up table (LUT) object. This object provides additional information about LUTs and gives user the ability to control the lifetime of the resource.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClipProcessingAttributes	IID_IBlackmagicRawClipProcessingAttributes	**IBlackmagicRawClipProcessingAttributes::GetPost3DLUT** outputs an **IBlackmagicRawPost3DLUT** object interface
IBlackmagicRawClipProcessingAttributes	IID_IBlackmagicRawClipProcessingAttributes	**IBlackmagicRawClipProcessingAttributes::GetSidecarPost3DLUT** outputs an **IBlackmagicRawPost3DLUT** object interface
IBlackmagicRawClipProcessingAttributes	IID_IBlackmagicRawClipProcessingAttributes	**IBlackmagicRawClipProcessingAttributes::GetEmbeddedPost3DLUT** outputs an **IBlackmagicRawPost3DLUT** object interface

Public Member Functions	
Method	**Description**
GetName	Get the name of the 3D LUT
GetTitle	Get the title of the 3D LUT
GetSize	Get the size of the LUT. Eg, will return 17 for a 17x17x17 LUT.
GetResourceGPU	Get pointer to GPU resource the LUT is stored in
GetResourceCPU	Get pointer to CPU resource the LUT is stored in
GetResourceSizeBytes	Get size of resource in bytes
WriteCubeFile	Write LUT as cube file.
WriteCubeToFile	Write LUT as cube file.

IBlackmagicRawPost3DLUT::GetName method

Get the name of the 3D LUT

Syntax

HRESULT `GetName(string* name)`

Parameters

Name	Direction	Description
name	out	Returned name

IBlackmagicRawPost3DLUT::GetTitle method

Get the title of the 3D LUT

Syntax

HRESULT `GetTitle(string* title)`

Parameters

Name	Direction	Description
title	out	Returned title

IBlackmagicRawPost3DLUT::GetSize method

Get the size of the LUT. Eg, will return 17 for a 17x17x17 LUT.

Syntax

HRESULT `GetSize(uint32_t* size)`

Parameters

Name	Direction	Description
size	out	Returned size in pixels

IBlackmagicRawPost3DLUT::GetResourceGPU method

Get pointer to GPU resource the LUT is stored in

Syntax

```
HRESULT    GetResourceGPU(void* context,
                          void* commandQueue,
                          BlackmagicRawResourceType* type,
                          void** resource)
```

Parameters

Name	Direction	Description
context	in	Context the resource should belong to. This will be API dependant, see **BlackmagicRawPipeline** for details
commandQueue	in	Command queue the resource should belong to. This will be API dependant, see **BlackmagicRawPipeline** for details
type	out	Returned type of resource
resource	out	This will differ per API. See **BlackmagicRawResourceType** for details

IBlackmagicRawPost3DLUT::GetResourceCPU method

Get pointer to CPU resource the LUT is stored in

Syntax

```
HRESULT    GetResourceCPU(void** resource)
```

Parameters

Name	Direction	Description
resource	out	CPU resource object

IBlackmagicRawPost3DLUT::GetResourceSizeBytes method

Get size of resource in bytes

Syntax

```
HRESULT    GetResourceSizeBytes(uint32_t* sizeBytes)
```

Parameters

Name	Direction	Description
sizeBytes	out	Returned size of resource in bytes

IBlackmagicRawPost3DLUT::WriteCubeFile method

Write LUT as cube file.

Syntax

HRESULT `WriteCubeFile(string filePath)`

Parameters

Name	Direction	Description
filePath	in	Filesystem path to the file where the cube will be written.

IBlackmagicRawPost3DLUT::WriteCubeToFile method

Write LUT as cube file.

Syntax

HRESULT `WriteCubeToFile(IBlackmagicRawFile* cubeFile)`

Parameters

Name	Direction	Description
cubeFile	in	Destination file in which to write the cube data.

IBlackmagicRawProcessedImage Interface

This object is created by the API and provided via a ProcessComplete() callback.

Public Member Functions	
Method	**Description**
GetWidth	Get the width of the processed image
GetHeight	Get the height of the processed image
GetResource	Get pointer to resource the image is stored in
GetResourceType	Get type of resource, see **BlackmagicRawResourceType**
GetResourceFormat	Get format of resource, see **BlackmagicRawResourceFormat**
GetResourceSizeBytes	Get size of resource in bytes
GetResourceContextAndCommandQueue	Get context and command queue that the resource was created on

IBlackmagicRawProcessedImage::GetWidth method

Get the width of the processed image

Syntax

HRESULT `GetWidth(uint32_t* width)`

Parameters

Name	Direction	Description
width	out	Returned width in pixels

IBlackmagicRawProcessedImage::GetHeight method

Get the height of the processed image

Syntax

HRESULT `GetHeight(uint32_t* height)`

Parameters

Name	Direction	Description
height	out	Returned height in pixels

IBlackmagicRawProcessedImage::GetResource method

Get pointer to resource the image is stored in

Syntax

HRESULT `GetResource(void** resource)`

Parameters

Name	Direction	Description
resource	out	This will differ per API. See BlackmagicRawResourceType for details

IBlackmagicRawProcessedImage::GetResourceType method

Get type of resource, see **BlackmagicRawResourceType**

Syntax

HRESULT `GetResourceType(BlackmagicRawResourceType* type)`

Parameters

Name	Direction	Description
type	out	Returned type of resource

IBlackmagicRawProcessedImage::GetResourceFormat method

Get format of resource, see **BlackmagicRawResourceFormat**

Syntax

HRESULT `GetResourceFormat(BlackmagicRawResourceFormat* format)`

Parameters

Name	Direction	Description
format	out	Returned format of resource

IBlackmagicRawProcessedImage::GetResourceSizeBytes method

Get size of resource in bytes

Syntax

HRESULT `GetResourceSizeBytes(uint32_t* sizeBytes)`

Parameters

Name	Direction	Description
sizeBytes	out	Returned size of resource in bytes

IBlackmagicRawProcessedImage: :GetResourceContextAndCommandQueue method

Get context and command queue that the resource was created on

Syntax

HRESULT
```
GetResourceContextAndCommandQueue(void** context,
                                  void** commandQueue)
```

Parameters

Name	Direction	Description
context	out	Returned context resource was created on, this native object will differ per API, see **BlackmagicRawPipeline**
commandQueue	out	Returned command queue resource was created on, this native object will differ per API, see **BlackmagicRawPipeline**

IBlackmagicRawJob Interface

This is the base object that is returned when any job is created with the SDK. Use this to control and identify jobs when callbacks occur.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawReadJobHints	IID_ IBlackmagicRawReadJobHints	An **IBlackmagicRawReadJobHints** object interface may be obtained from **IBlackmagicRawJob** using **QueryInterface**
IBlackmagicRawFrame	IID_IBlackmagicRawFrame	**IBlackmagicRawFrame::CreateJobDecodeAnd ProcessFrame** outputs an **IBlackmagicRawJob** object interface
IBlackmagicRawManualDecoder Flow1	IID_IBlackmagicRawManual DecoderFlow1	**IBlackmagicRawManualDecoderFlow1::CreateJob Decode** outputs an **IBlackmagicRawJob** object interface
IBlackmagicRawManualDecoder Flow1	IID_IBlackmagicRawManual DecoderFlow1	**IBlackmagicRawManualDecoderFlow1::CreateJob Process** outputs an **IBlackmagicRawJob** object interface
IBlackmagicRawManualDecoder Flow2	IID_IBlackmagicRawManual DecoderFlow2	**IBlackmagicRawManualDecoderFlow2::CreateJob Decode** outputs an **IBlackmagicRawJob** object interface

Interface	Interface ID	Description
IBlackmagicRawManualDecoderFlow2	IID_IBlackmagicRawManualDecoderFlow2	IBlackmagicRawManualDecoderFlow2::CreateJobProcess outputs an IBlackmagicRawJob object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRawClip::CreateJobReadFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRawClip::CreateJobReadAudio outputs an IBlackmagicRawJob object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRawClip::CreateJobTrim outputs an IBlackmagicRawJob object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRawClip::CreateJobTrimToFile outputs an IBlackmagicRawJob object interface
IBlackmagicRawClipEx	IID_IBlackmagicRawClipEx	IBlackmagicRawClipEx::CreateJobReadFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawClipEx	IID_IBlackmagicRawClipEx	IBlackmagicRawClipEx::CreateJobTrim outputs an IBlackmagicRawJob object interface
IBlackmagicRawClipEx	IID_IBlackmagicRawClipEx	IBlackmagicRawClipEx::CreateJobTrimToFile outputs an IBlackmagicRawJob object interface
IBlackmagicRawClipMultiVideo	IID_IBlackmagicRawClipMultiVideo	IBlackmagicRawClipMultiVideo::CreateJobReadFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawClipMultiVideo	IID_IBlackmagicRawClipMultiVideo	IBlackmagicRawClipMultiVideo::CreateJobReadFrameEx outputs an IBlackmagicRawJob object interface
IBlackmagicRawClipImmersiveVideo	IID_IBlackmagicRawClipImmersiveVideo	IBlackmagicRawClipImmersiveVideo::CreateJobImmersiveReadFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawClipImmersiveVideo	IID_IBlackmagicRawClipImmersiveVideo	IBlackmagicRawClipImmersiveVideo::CreateJobImmersiveReadFrameEx outputs an IBlackmagicRawJob object interface

Public Member Functions	
Method	**Description**
Submit	Submit the job to the decoder. This will insert the job in the decoders internal queue. From here the relevant callback (i.e. ProcessComplete()) will occur as soon as the job is completed. Note: When queuing on GPU decoders, this function will not return until the job has been submitted to the internal GPU API. So you can use GPU synchronization methods rather than waiting for the CPU callbacks.
Abort	Abort the job. This CAN fail if the job has already been started by the internal decoder.
SetUserData	Attach some generic userdata to the job object/
GetUserData	Retrieve previously attached generic userdata from the job object

IBlackmagicRawJob::Submit method

Submit the job to the decoder. This will insert the job in the decoders internal queue. From here the relevant callback (i.e. ProcessComplete()) will occur as soon as the job is completed. Note: When queuing on GPU decoders, this function will not return until the job has been submitted to the internal GPU API. So you can use GPU synchronization methods rather than waiting for the CPU callbacks.

Syntax

HRESULT `Submit()`

IBlackmagicRawJob::Abort method

Abort the job. This CAN fail if the job has already been started by the internal decoder.

Syntax

HRESULT `Abort()`

IBlackmagicRawJob::SetUserData method

Attach some generic userdata to the job object/

Syntax

HRESULT `SetUserData(void* userData)`

Parameters

Name	Direction	Description
userData	in	Userdata to attach

IBlackmagicRawJob::GetUserData method

Retrieve previously attached generic userdata from the job object

Syntax

HRESULT `GetUserData(void** userData)`

Parameters

Name	Direction	Description
userData	out	Userdata that was attached

IBlackmagicRawReadJobHints Interface

This object can be used to provide optimisation hints to the read job, such as specifying the scale at which to perform the read

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawJob	IID_IBlackmagicRawJob	An **IBlackmagicRawReadJobHints** object interface may be obtained from **IBlackmagicRawJob** using **QueryInterface**

Public Member Functions	
Method	**Description**
SetReaderResolutionScale	Set the reader resolution scale

IBlackmagicRawReadJobHints::SetReaderResolutionScale method

Set the reader resolution scale

Syntax

HRESULT `SetReaderResolutionScale(BlackmagicRawResolutionScale readerResolutionScale)`

Parameters

Name	Direction	Description
readerResolutionScale	in	The scale at which to perform the read. The resultant frame can only be decoded at a scale less than or equal to this scale

IBlackmagicRawCallback Interface

Central callback object for entire codec. Jobs submitted to any clip created by this codec will have their results provided through these function calls

Public Member Functions	
Method	**Description**
ReadComplete	Called when a read has completed
ReadAudioComplete	Called when a read of audio has completed
DecodeComplete	Called when a decode has completed
ProcessComplete	Called when a process has completed
TrimProgress	Called as a Trim job is processed to provide status updates
TrimComplete	Called when a trim has completed
SidecarMetadataParseWarning	Called when a parse warning occured when reading a related .sidecar file. Note: Parse warnings are not fatal, the offending line will be ignored. When SaveSidecarFile() is next called, the offending line will be removed.
SidecarMetadataParseError	Called when a parse error occured when reading a related .sidecar file. Note: If a parse error occurs, the entire file is ignored. When SaveSidecarFile() file is next called, the entire file will be replaced.
PreparePipelineComplete	Called when preparation of the pipeline has completed

IBlackmagicRawCallback::ReadComplete method

Called when a read has completed

Syntax

```
void ReadComplete(IBlackmagicRawJob* job,
HRESULT    result,
IBlackmagicRawFrame* frame)
```

Parameters

Name	Direction	Description
job	in	Job created to perform the read, see CreateJobReadFrame()
result	in	Result of the job. If the job succeeded, the job result is S_OK. The job result is E_UNEXPECTED if a dropped frame was encountered.
frame	in	Frame created (will be null if the job failed)

IBlackmagicRawCallback::ReadAudioComplete method

Called when a read of audio has completed

Syntax

```
void ReadAudioComplete(IBlackmagicRawJob* job,
HRESULT    result,
IBlackmagicRawAudioBuffer* audioBuffer)
```

Parameters

Name	Direction	Description
job	in	Job created to perform the read, see CreateJobRead()
result	in	Result of the job. If the job succeeded, the job result is S_OK.
audioBuffer	in	Audio buffer (will be null if the job failed)

IBlackmagicRawCallback::DecodeComplete method

Called when a decode has completed

Syntax

```
void DecodeComplete(IBlackmagicRawJob* job,
HRESULT    result)
```

Parameters

Name	Direction	Description
job	in	Job created to perform the decode, see CreateJobDecode(). Note: this function is only used with manual decoders
result	in	Result of the job

IBlackmagicRawCallback::ProcessComplete method

Called when a process has completed

Syntax

```
void ProcessComplete(IBlackmagicRawJob* job,
HRESULT    result,
IBlackmagicRawProcessedImage* processedImage)
```

Parameters

Name	Direction	Description
job	in	Job created to perform the process, see CreateJobDecodeAndProcess() or CreateJobProcess()
result	in	Result of the job
processedImage	in	Create processed frame. This contains the final image ready for display

IBlackmagicRawCallback::TrimProgress method

Called as a Trim job is processed to provide status updates

Syntax

```
void TrimProgress(IBlackmagicRawJob* job,
float progress)
```

Parameters

Name	Direction	Description
job	in	Job created to perform the trim
progress	in	Progress [0, 1] which defines how the trim operation has progressed

IBlackmagicRawCallback::TrimComplete method

Called when a trim has completed

Syntax

```
void TrimComplete(IBlackmagicRawJob* job,
HRESULT    result)
```

Parameters

Name	Direction	Description
job	in	Job created to perform the trim
result	in	Result of the job

IBlackmagicRawCallback::SidecarMetadataParseWarning method

Called when a parse warning occured when reading a related .sidecar file. Note: Parse warnings are not fatal, the offending line will be ignored. When SaveSidecarFile() is next called, the offending line will be removed.

Syntax

```
void SidecarMetadataParse
Warning(IBlackmagicRawClip* clip,
string fileName,
uint32_t lineNumber,
string info)
```

Parameters

Name	Direction	Description
clip	in	Clip which was parsing the .sidecar file
fileName	in	Filename of the .sidecar file
lineNumber	in	Line number where the parse error occured
info	in	any additional information to the parse error

IBlackmagicRawCallback::SidecarMetadataParseError method

Called when a parse error occured when reading a related .sidecar file. Note: If a parse error occurs, the entire file is ignored. When SaveSidecarFile() file is next called, the entire file will be replaced.

Syntax

```
void SidecarMetadataParse
Error(IBlackmagicRawClip* clip,
string fileName,
uint32_t lineNumber,
string info)
```

Parameters

Name	Direction	Description
clip	in	Clip which was parsing the .sidecar file
fileName	in	Filename of the .sidecar file
lineNumber	in	Line number where the parse error occured
info	in	any additional information to the parse error

IBlackmagicRawCallback::PreparePipelineComplete method

Called when preparation of the pipeline has completed

Syntax

```
void PreparePipelineComplete(void* userData,
HRESULT    result)
```

Parameters

Name	Direction	Description
userData	in	Userdata specified to PreparePipeline
result	in	Result of the pipeline preparation

IBlackmagicRawClipAudio Interface

Interface for accessing a clips audio.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClip	IID_IBlackmagicRawClip	An **IBlackmagicRawClipAudio** object interface may be obtained from **IBlackmagicRawClip** using **QueryInterface**

Public Member Functions	
Method	**Description**
GetAudioFormat	Get format the audio was recorded in
GetAudioBitDepth	Get the audio bit depth
GetAudioChannelCount	Get the audio channel count
GetAudioSampleRate	Get the audio sample rate
GetAudioSampleCount	Get the audio sample count per channel
GetAudioSamples	Get audio samples from the clip

IBlackmagicRawClipAudio::GetAudioFormat method

Get format the audio was recorded in

Syntax

```
HRESULT    GetAudioFormat(BlackmagicRawAudioFormat* format)
```

Parameters

Name	Direction	Description
format	out	Returned audio format

IBlackmagicRawClipAudio::GetAudioBitDepth method

Get the audio bit depth

Syntax

HRESULT `GetAudioBitDepth(uint32_t* bitDepth)`

Parameters

Name	Direction	Description
bitDepth	out	Returned audio bit depth

IBlackmagicRawClipAudio::GetAudioChannelCount method

Get the audio channel count

Syntax

HRESULT `GetAudioChannelCount(uint32_t* channelCount)`

Parameters

Name	Direction	Description
channelCount	out	Returned audio channel count

IBlackmagicRawClipAudio::GetAudioSampleRate method

Get the audio sample rate

Syntax

HRESULT `GetAudioSampleRate(uint32_t* sampleRate)`

Parameters

Name	Direction	Description
sampleRate	out	Returned audio sample rate

IBlackmagicRawClipAudio::GetAudioSampleCount method

Get the audio sample count per channel

Syntax

HRESULT `GetAudioSampleCount(uint64_t* sampleCount)`

Parameters

Name	Direction	Description
sampleCount	out	Returned audio sample count per channel

IBlackmagicRawClipAudio::GetAudioSamples method

Get audio samples from the clip

Syntax

```
HRESULT    GetAudioSamples(int64_t sampleFrameIndex,
                           void* buffer,
                           uint32_t bufferSizeBytes,
                           uint32_t maxSampleCount,
                           uint32_t* samplesRead,
                           uint32_t* bytesRead)
```

Parameters

Name	Direction	Description
sampleFrameIndex	in	Sample frame index to start reading from
buffer	in	Buffer to write the sample data in to
bufferSizeBytes	in	Size of the provided buffer in bytes
maxSampleCount	in	Max sample count to get with this query
samplesRead	out	Returned read sample count
bytesRead	out	Returned read byte count

IBlackmagicRawFilesystem Interface

Interface for abstracting filesystem operations for accessing files beyond locally mounted volumes.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFile	IID_IBlackmagicRawFile	IBlackmagicRawFilesystem::OpenCompanionFile outputs an IBlackmagicRawFile object interface
IBlackmagicRawFile	IID_IBlackmagicRawFile	IBlackmagicRawFilesystem::CreateCompanion File outputs an IBlackmagicRawFile object interface
IBlackmagicRawFile	IID_IBlackmagicRawFile	IBlackmagicRawFile::GetFilesystem outputs an IBlackmagicRawFilesystem object interface

Public Member Functions	
Method	**Description**
OpenCompanionFile	Open a file that is associated with the provided IBlackmagicRawFile instance
CreateCompanionFile	Create a file that is associated with the provided IBlackmagicRawFile instance

IBlackmagicRawFilesystem::OpenCompanionFile method

Open a file that is associated with the provided **IBlackmagicRawFile** instance

Syntax

```
HRESULT    OpenCompanionFile(IBlackmagicRawFile* parentFile,
                             string fileName,
                             IBlackmagicRawFile** fileOut)
```

Parameters

Name	Direction	Description
parentFile	in	An existing open file that serves as the location to search for the companion file
fileName	in	Name of file to open
fileOut	out	Returned instance of the opened file

IBlackmagicRawFilesystem::CreateCompanionFile method

Create a file that is associated with the provided **IBlackmagicRawFile** instance

Syntax

```
HRESULT    CreateCompanionFile(IBlackmagicRawFile* parentFile,
                               string fileName,
                               Boolean replaceExisting,
                               IBlackmagicRawFile** fileOut)
```

Parameters

Name	Direction	Description
parentFile	in	An existing open file that serves as the location for the creation of the companion file
fileName	in	Name of file to create
replaceExisting	in	Replace an existing file of the same name in the specified location
fileOut	out	Returned instance of the created file

IBlackmagicRawFile Interface

Interface for abstracting file operations to read and write files beyond locally mounted volumes.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFilesystem	IID_IBlackmagicRawFilesystem	IBlackmagicRawFilesystem::OpenCompanionFile outputs an IBlackmagicRawFile object interface
IBlackmagicRawFilesystem	IID_IBlackmagicRawFilesystem	IBlackmagicRawFilesystem::CreateCompanion File outputs an IBlackmagicRawFile object interface
IBlackmagicRawFilesystem	IID_IBlackmagicRawFilesystem	IBlackmagicRawFile::GetFilesystem outputs an IBlackmagicRawFilesystem object interface

Public Member Functions	
Method	**Description**
GetFilesystem	Returns an interface for performing operations on the filesystem on which this file resides
GetFileName	Returns the name of this file
SetFileLength	Sets the length of the file in bytes
GetFileLength	Get the length of the file in bytes
ReadV	None
WriteV	None
GetPreferredIoAlignment	Return the byte alignment for best performance when reading or writing to this file
FlushWrites	Ensure any data written to the file is flushed to disk from any write cache. This method can be called multiple times while the file is being written
CommitFile	This method is called on a file obtained by CreateCompanionFile, and is called once when the file has been completely written and no further writes are expected

IBlackmagicRawFile::GetFilesystem method

Returns an interface for performing operations on the filesystem on which this file resides

Syntax

HRESULT `GetFilesystem(IBlackmagicRawFilesystem** filesystemOut)`

Parameters

Name	Direction	Description
filesystemOut	out	Returned instance of the filesystem

IBlackmagicRawFile::GetFileName method

Returns the name of this file

Syntax

HRESULT `GetFileName(string* fileName)`

Parameters

Name	Direction	Description
fileName	out	None

IBlackmagicRawFile::SetFileLength method

Sets the length of the file in bytes

Syntax

HRESULT `SetFileLength(uint64_t fileLength)`

Parameters

Name	Direction	Description
fileLength	in	New length of the file in bytes

IBlackmagicRawFile::GetFileLength method

Get the length of the file in bytes

Syntax

HRESULT `GetFileLength(uint64_t* fileLength)`

Parameters

Name	Direction	Description
fileLength	out	Returned length of the file in bytes

IBlackmagicRawFile::ReadV method

None

Syntax

HRESULT
```
ReadV(BmdIoVec* buffers,
      uint32_t bufferCount,
      uint64_t fileOffset,
      uint64_t* bytesRead)
```

Parameters

Name	Direction	Description
buffers	in	List of buffers to read into from the file
bufferCount	in	Number of **BmdIoVec** items in the buffers list
fileOffset	in	Offset into the file at which to read
bytesRead	out	Number of bytes read from the file; may be less than the total requested bytes

IBlackmagicRawFile::WriteV method

None

Syntax

HRESULT
```
WriteV(BmdIoVec* buffers,
       uint32_t bufferCount,
       uint64_t fileOffset,
       uint64_t* bytesWritten)
```

Parameters

Name	Direction	Description
buffers	in	List of buffers to write out to the file
bufferCount	in	Number of **BmdIoVec** items in the buffers list
fileOffset	in	Offset into the file at which to write
bytesWritten	out	Number of bytes written to the file; may be less than the total requested bytes

IBlackmagicRawFile::GetPreferredIoAlignment method

Return the byte alignment for best performance when reading or writing to this file

Syntax

HRESULT `GetPreferredIoAlignment(uint32_t* alignment)`

Parameters

Name	Direction	Description
alignment	out	Returned alignment in bytes

IBlackmagicRawFile::FlushWrites method

Ensure any data written to the file is flushed to disk from any write cache. This method can be called multiple times while the file is being written

Syntax

HRESULT `FlushWrites()`

IBlackmagicRawFile::CommitFile method

This method is called on a file obtained by CreateCompanionFile, and is called once when the file has been completely written and no further writes are expected

Syntax

HRESULT `CommitFile()`

IBlackmagicRawClipAccelerometerMotion Interface

Interface for accessing a clip's accelerometer motion data.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClip	IID_IBlackmagicRawClip	An **IBlackmagicRawClip** object interface may be obtained from **IBlackmagicRawClipAccelerometerMotion** using **QueryInterface**
IBlackmagicRawClip	IID_IBlackmagicRawClip	An **IBlackmagicRawClipAccelerometerMotion** object interface may be obtained from **IBlackmagicRawClip** using **QueryInterface**

Public Member Functions	
Method	**Description**
GetSampleRate	Get the motion sample rate
GetSampleCount	Get the motion sample count
GetSampleSize	Get the size (in floats) of each motion sample
GetSampleRange	Get motion samples for the specified range

IBlackmagicRawClipAccelerometerMotion::GetSampleRate method

Get the motion sample rate

Syntax

HRESULT `GetSampleRate(float* sampleRate)`

Parameters

Name	Direction	Description
sampleRate	out	Returned motion sample rate (samples per second)

IBlackmagicRawClipAccelerometerMotion::GetSampleCount method

Get the motion sample count

Syntax

HRESULT `GetSampleCount(uint32_t* sampleCount)`

Parameters

Name	Direction	Description
sampleCount	out	Returned motion sample count

IBlackmagicRawClipAccelerometerMotion::GetSampleSize method

Get the size (in floats) of each motion sample

Syntax

HRESULT `GetSampleSize(uint32_t* sampleSize)`

Parameters

Name	Direction	Description
sampleSize	out	Returned motion sample size (count of floats)

IBlackmagicRawClipAccelerometerMotion::GetSampleRange method

Get motion samples for the specified range

Syntax

```
HRESULT   GetSampleRange(uint64_t sampleStartIndex,
                         uint32_t sampleCount,
                         float* samples,
                         uint32_t* sampleCountOut)
```

Parameters

Name	Direction	Description
sampleStartIndex	in	Requested sample start index
sampleCount	in	Requested sample count
samples	out	Filled motion samples (each in metres per second per second). Note that if N samples are requested, then 'samples' must be large enough to store GetSampleSize() * N float values
sampleCountOut	out	Returned sample count

IBlackmagicRawClipGyroscopeMotion Interface

Interface for accessing a clip's gyroscope motion data.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClip	IID_IBlackmagicRawClip	An **IBlackmagicRawClip** object interface may be obtained from **IBlackmagicRawClipGyroscopeMotion** using **QueryInterface**
IBlackmagicRawClip	IID_IBlackmagicRawClip	An **IBlackmagicRawClipGyroscopeMotion** object interface may be obtained from **IBlackmagicRawClip** using **QueryInterface**

Public Member Functions	
Method	**Description**
GetSampleRate	Get the motion sample rate
GetSampleCount	Get the motion sample count
GetSampleSize	Get the size (in floats) of each motion sample
GetSampleRange	Get motion samples for the specified range

IBlackmagicRawClipGyroscopeMotion::GetSampleRate method

Get the motion sample rate

Syntax

HRESULT `GetSampleRate(float* sampleRate)`

Parameters

Name	Direction	Description
sampleRate	out	Returned motion sample rate (samples per second)

IBlackmagicRawClipGyroscopeMotion::GetSampleCount method

Get the motion sample count

Syntax

HRESULT `GetSampleCount(uint32_t* sampleCount)`

Parameters

Name	Direction	Description
sampleCount	out	Returned motion sample count

IBlackmagicRawClipGyroscopeMotion::GetSampleSize method

Get the size (in floats) of each motion sample

Syntax

HRESULT `GetSampleSize(uint32_t* sampleSize)`

Parameters

Name	Direction	Description
sampleSize	out	Returned motion sample size (count of floats)

IBlackmagicRawClipGyroscopeMotion::GetSampleRange method

Get motion samples for the specified range

Syntax

```
HRESULT GetSampleRange(uint64_t sampleStartIndex,
                       uint32_t sampleCount,
                       float* samples,
                       uint32_t* sampleCountOut)
```

Parameters

Name	Direction	Description
sampleStartIndex	in	Requested sample start index
sampleCount	in	Requested sample count
samples	out	Filled motion samples (each in radians per second). Note that if N samples are requested, then 'samples' must be large enough to store GetSampleSize() * N float values
sampleCountOut	out	Returned sample count

IBlackmagicRawClipPDAFData Interface

Interface for accessing a clip's phase detection autofocus data.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClip	IID_IBlackmagicRawClip	An **IBlackmagicRawClip** object interface may be obtained from **IBlackmagicRawClipPDAFData** using **QueryInterface**
IBlackmagicRawClip	IID_IBlackmagicRawClip	An **IBlackmagicRawClipPDAFData** object interface may be obtained from **IBlackmagicRawClip** using **QueryInterface**

Public Member Functions	
Method	**Description**
GetSampleImageWidthInPixels	Get the PDAF sample image width in pixels
GetSampleImageHeightInPixels	Get the PDAF sample image height in pixels
GetSampleImageBytesPerPixel	Get the PDAF sample image bytes per pixel
GetSampleSize	Get the PDAF sample size in bytes (which will be at least sampleImageWidth * sampleImageHeight * sampleImageBytesPerPixel * 2 (where 2 is the number of images))
GetSampleCount	Get the PDAF sample count
GetSampleImages	Get the images for the specified PDAF sample

IBlackmagicRawClipPDAFData::GetSampleImageWidthInPixels method

Get the PDAF sample image width in pixels

Syntax

HRESULT `GetSampleImageWidthInPixels(uint32_t* sampleImageWidthInPixelsOut)`

Parameters

Name	Direction	Description
sampleImageWidthInPixelsOut	out	Returned PDAF sample image width in pixels

IBlackmagicRawClipPDAFData::GetSampleImageHeightInPixels method

Get the PDAF sample image height in pixels

Syntax

HRESULT `GetSampleImageHeightInPixels(uint32_t* sampleImageHeightInPixelsOut)`

Parameters

Name	Direction	Description
sampleImageHeightInPixelsOut	out	Returned PDAF sample image height in pixels

IBlackmagicRawClipPDAFData::GetSampleImageBytesPerPixel method

Get the PDAF sample image bytes per pixel

Syntax

HRESULT `GetSampleImageBytesPerPixel(uint32_t* sampleImageBytesPerPixelOut)`

Parameters

Name	Direction	Description
sampleImageBytesPerPixelOut	out	Returned PDAF sample image bytes per pixel

IBlackmagicRawClipPDAFData::GetSampleSize method

Get the PDAF sample size in bytes (which will be at least sampleImageWidth * sampleImageHeight * sampleImageBytesPerPixel * 2 (where 2 is the number of images))

Syntax

HRESULT `GetSampleSize(uint32_t* sampleSizeOut)`

Parameters

Name	Direction	Description
sampleSizeOut	out	Returned PDAF sample size in bytes

IBlackmagicRawClipPDAFData::GetSampleCount method

Get the PDAF sample count

Syntax

HRESULT `GetSampleCount(uint32_t* sampleCountOut)`

Parameters

Name	Direction	Description
sampleCountOut	out	Returned PDAF sample count

IBlackmagicRawClipPDAFData::GetSampleImages method

Get the images for the specified PDAF sample

Syntax

```
HRESULT    GetSampleImages(uint64_t sampleIndex,
                           uint8_t* leftSampleImageDataOut,
                           uint8_t* rightSampleImageDataOut,
                           uint32_t sampleImageDataSize)
```

Parameters

Name	Direction	Description
sampleIndex	in	Requested sample index
leftSampleImageDataOut	out	Filled with the PDAF sample's left image data
rightSampleImageDataOut	out	Filled with the PDAF sample's right image data
sampleImageDataSize	in	The size in bytes of each of leftSampleImageDataOut and rightSampleImageDataOut

IBlackmagicRawAudioBuffer Interface

A buffer containing audio data. This is returned in the ReadAudioComplete() callback.

Public Member Functions	
Method	**Description**
GetAudioFormat	Get format the audio was recorded in
GetAudioBitDepth	Get the audio bit depth
GetAudioChannelCount	Get the audio channel count
GetAudioSampleRate	Get the audio sample rate
GetAudioSampleCount	Get the audio sample count per channel
GetAudioSamples	Get audio samples from the clip

IBlackmagicRawAudioBuffer::GetAudioFormat method

Get format the audio was recorded in

Syntax

```
HRESULT    GetAudioFormat(BlackmagicRawAudioFormat* format)
```

Parameters

Name	Direction	Description
format	out	Returned audio format

IBlackmagicRawAudioBuffer::GetAudioBitDepth method

Get the audio bit depth

Syntax

HRESULT `GetAudioBitDepth(uint32_t* bitDepth)`

Parameters

Name	Direction	Description
bitDepth	out	Returned audio bit depth

IBlackmagicRawAudioBuffer::GetAudioChannelCount method

Get the audio channel count

Syntax

HRESULT `GetAudioChannelCount(uint32_t* channelCount)`

Parameters

Name	Direction	Description
channelCount	out	Returned audio channel count

IBlackmagicRawAudioBuffer::GetAudioSampleRate method

Get the audio sample rate

Syntax

HRESULT `GetAudioSampleRate(uint32_t* sampleRate)`

Parameters

Name	Direction	Description
sampleRate	out	Returned audio sample rate

IBlackmagicRawAudioBuffer::GetAudioSampleCount method

Get the audio sample count per channel

Syntax

HRESULT `GetAudioSampleCount(uint64_t* sampleCount)`

Parameters

Name	Direction	Description
sampleCount	out	Returned audio sample count per channel

IBlackmagicRawAudioBuffer::GetAudioSamples method

Get audio samples from the clip

Syntax

```
HRESULT    GetAudioSamples(void** buffer,
                           uint32_t* bufferSizeBytes)
```

Parameters

Name	Direction	Description
buffer	in	Buffer to write the sample data in to
bufferSizeBytes	in	Size of the provided buffer in bytes

IBlackmagicRawFrame Interface

A frame that has been read but not yet processed. This is returned in the ReadComplete() callback. From here the user should prepare the frame for processing, and call DecodeAndProcessFrame(). **QueryInterface** can return: 1. This frames FrameProcessingAttributes, modify this to change processing attributes of this frame in the clip. 2. FrameEx

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawMetadataIterator	IID_IBlackmagicRawMetadataIterator	IBlackmagicRawFrame::GetMetadataIterator outputs an IBlackmagicRawMetadataIterator object interface
IBlackmagicRawFrameProcessingAttributes	IID_IBlackmagicRawFrameProcessingAttributes	IBlackmagicRawFrame::CloneFrameProcessingAttributes outputs an IBlackmagicRawFrameProcessingAttributes object interface
IBlackmagicRawFrameProcessingAttributes	IID_IBlackmagicRawFrameProcessingAttributes	An IBlackmagicRawFrameProcessingAttributes object interface may be obtained from IBlackmagicRawFrame using QueryInterface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawFrame::CreateJobDecodeAndProcessFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawFrameEx	IID_IBlackmagicRawFrameEx	An IBlackmagicRawFrameEx object interface may be obtained from IBlackmagicRawFrame using QueryInterface
IBlackmagicRawFrameMultiVideo	IID_IBlackmagicRawFrameMultiVideo	An IBlackmagicRawFrameMultiVideo object interface may be obtained from IBlackmagicRawFrame using QueryInterface
IBlackmagicRawClip	IID_IBlackmagicRawClip	An IBlackmagicRawClip object interface may be obtained from IBlackmagicRawFrame using QueryInterface

Public Member Functions	
Method	**Description**
GetFrameIndex	Get the frameIndex
GetTimecode	Get a formatted timecode for this frame
GetMetadataIterator	Create a metadata iterator to iterate through the metadata in this frame
GetMetadata	Query a single frame metadata value defined by key
SetMetadata	Set metadata to this frame, this data is not saved to disk until **IBlackmagicRawClip**::SaveSideCar() is called.
CloneFrameProcessingAttributes	Clone this frames FrameProcessingAttributes into another copy. From here the returned FrameProcessingAttributes can be modified, and then provided to DecodeAndProcess() allowing the user to decode the frame with different processing attributes than specified in the clip. This is useful when the user wishes to preview different processing attributes.
SetResolutionScale	Set the resolution scale we want to decode this image to. This can be used to enchance turn-around time when working on the project
GetResolutionScale	Get the resolution scale set to the frame
SetResourceFormat	Set the desired resource format that we want to processing this frame in to
GetResourceFormat	Get the resource format this frame will be processed in to
GetSensorRate	Get the sensor rate with which this frame was recorded
CreateJobDecodeAndProcessFrame	Create a job that will decode and process our image in to. When completed we will receive a ProcessComplete() callback

IBlackmagicRawFrame::GetFrameIndex method

Get the frameIndex

Syntax

HRESULT `GetFrameIndex(uint64_t* frameIndex)`

Parameters

Name	Direction	Description
frameIndex	out	Returned frame index

IBlackmagicRawFrame::GetTimecode method

Get a formatted timecode for this frame

Syntax

HRESULT `GetTimecode(string* timecode)`

Parameters

Name	Direction	Description
timecode	out	Returned timecode for this frame

IBlackmagicRawFrame::GetMetadataIterator method

Create a metadata iterator to iterate through the metadata in this frame

Syntax

HRESULT `GetMetadataIterator(IBlackmagicRawMetadataIterator** iterator)`

Parameters

Name	Direction	Description
iterator	out	Returned metadata object

IBlackmagicRawFrame::GetMetadata method

Query a single frame metadata value defined by key

Syntax

```
HRESULT    GetMetadata(string key,
                       Variant* value)
```

Parameters

Name	Direction	Description
key	in	Key of the frame metadata entry we are looking for
value	out	Returned value of frame metadata entry at the provided key

IBlackmagicRawFrame::SetMetadata method

Set metadata to this frame, this data is not saved to disk until **IBlackmagicRawClip**::SaveSideCar() is called.

Syntax

```
HRESULT    SetMetadata(string key,
                       Variant* value)
```

Parameters

Name	Direction	Description
key	in	Key of the frame metadata entry we want to set. Note: to clear metadata from the sidecar and restore what was originally in the movie, set value to NULL.
value	in	Value we want to set to the frame metadata entry

IBlackmagicRawFrame::CloneFrameProcessingAttributes method

Clone this frames FrameProcessingAttributes into another copy. From here the returned FrameProcessingAttributes can be modified, and then provided to DecodeAndProcess() allowing the user to decode the frame with different processing attributes than specified in the clip. This is useful when the user wishes to preview different processing attributes.

Syntax

```
HRESULT
CloneFrameProcessingAttributes(IBlackmagicRawFrameProcessingAttributes**
                               frameProcessingAttributes)
```

Parameters

Name	Direction	Description
frameProcessingAttributes	out	Returned created FrameProcessingAttributes object

IBlackmagicRawFrame::SetResolutionScale method

Set the resolution scale we want to decode this image to. This can be used to enchance turn-around time when working on the project

Syntax

HRESULT `SetResolutionScale(BlackmagicRawResolutionScale resolutionScale)`

Parameters

Name	Direction	Description
resolutionScale	in	Desired resolution scale

IBlackmagicRawFrame::GetResolutionScale method

Get the resolution scale set to the frame

Syntax

HRESULT `GetResolutionScale(BlackmagicRawResolutionScale* resolutionScale)`

Parameters

Name	Direction	Description
resolutionScale	out	Returned resolution scale

IBlackmagicRawFrame::SetResourceFormat method

Set the desired resource format that we want to processing this frame in to

Syntax

HRESULT `SetResourceFormat(BlackmagicRawResourceFormat resourceFormat)`

Parameters

Name	Direction	Description
resourceFormat	in	The desired resource format, see **BlackmagicRawResourceFormat**

IBlackmagicRawFrame::GetResourceFormat method

Get the resource format this frame will be processed in to

Syntax

HRESULT `GetResourceFormat(BlackmagicRawResourceFormat* resourceFormat)`

Parameters

Name	Direction	Description
resourceFormat	out	Returned resource format, see **BlackmagicRawResourceFormat**

IBlackmagicRawFrame::GetSensorRate method

Get the sensor rate with which this frame was recorded

Syntax

HRESULT `GetSensorRate(float* sensorRate)`

Parameters

Name	Direction	Description
sensorRate	out	Returned sensor rate, in frames per second

IBlackmagicRawFrame::CreateJobDecodeAndProcessFrame method

Create a job that will decode and process our image in to. When completed we will receive a ProcessComplete() callback

Syntax

HRESULT

```
CreateJobDecodeAndProcessFrame(IBlackmagicRawClipProcessingAttributes*
                               clipProcessingAttributes,
                               IBlackmagicRawFrameProcessingAttributes*
                               frameProcessingAttributes,
                               IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
clipProcessingAttributes	in	This allows the user to provide custom clip processing attributes which are not set to the clip. This allows the user to preview how the image would look with different settings before applying them to the clip
frameProcessingAttributes	in	This allows the user to provide custom frame processing attributes which are not set to the frame. This allows the user to preview how the image would look with different settings before applying them to the frame
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawFrameEx Interface

Query additional information for the frame. This information is useful when decoding via the manual decoders.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFrame	IID_IBlackmagicRawFrame	An IBlackmagicRawFrameEx object interface may be obtained from IBlackmagicRawFrame using QueryInterface

Public Member Functions	
Method	**Description**
GetBitStreamSizeBytes	Get the frame's bitstream size in bytes we've read off disk.
GetProcessedImageResolution	Query what the resolution of the processed image will be given the input resolution and the ResolutionScale applied

IBlackmagicRawFrameEx::GetBitStreamSizeBytes method

Get the frame's bitstream size in bytes we've read off disk.

Syntax

HRESULT `GetBitStreamSizeBytes(uint32_t* bitStreamSizeBytes)`

Parameters

Name	Direction	Description
bitStreamSizeBytes	out	Returned bitstream size in bytes

IBlackmagicRawFrameEx::GetProcessedImageResolution method

Query what the resolution of the processed image will be given the input resolution and the ResolutionScale applied

Syntax

HRESULT
```
GetProcessedImageResolution(uint32_t* width,
                            uint32_t* height)
```

Parameters

Name	Direction	Description
width	out	The resultant calculated width of the processed image
height	out	The resultant calculated height of the processed image

IBlackmagicRawFrameMultiVideo Interface

Query muklit video track related information for the frame.

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawFrame	IID_IBlackmagicRawFrame	An IBlackmagicRawFrameMultiVideo object interface may be obtained from IBlackmagicRawFrame using QueryInterface

Public Member Functions	
Method	**Description**
GetVideoTrackIndex	Get the video track index of this frame.

IBlackmagicRawFrameMultiVideo::GetVideoTrackIndex method

Get the video track index of this frame.

Syntax

HRESULT `GetVideoTrackIndex(uint32_t* videoTrackIndex)`

Parameters

Name	Direction	Description
videoTrackIndex	out	Returned video track index

IBlackmagicRawManualDecoderFlow1 Interface

Manual decoders give you more control over which buffers are used and how things are queued. **IBlackmagicRawManualDecoderFlow1** is a pure-CPU solution. Note: these decoders are optional and targetted at advanced users

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRaw	IID_IBlackmagicRaw	An IBlackmagicRawManualDecoderFlow1 object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawManualDecoderFlow1::CreateJob Decode outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawManualDecoderFlow1::CreateJob Process outputs an IBlackmagicRawJob object interface

Public Member Functions	
Method	**Description**
PopulateFrameStateBuffer	The manual decoders work with data blobs rather than API objects. This allows the user to transfer the data blob to another codec instance or potentially another computer for processing. This function converts the internal state of IBlackmagicRawFrame to frame state buffer, which is used to perform the decode
GetFrameStateSizeBytes	Query the same of the FrameState buffer in bytes
GetDecodedSizeBytes	Query the size of the decoded buffer
GetProcessedSizeBytes	Query the size of the processed buffer
GetPost3DLUTSizeBytes	Query the size of the post 3D LUT buffer
CreateJobDecode	Create a job to decode a frame. After this decode is complete the decoded buffer will need to be processed to get final result. This decode completion will be notified via the OnDecodeComplete() callback
CreateJobProcess	Create a job to process a frame. After this process is complete a final processed image will be provided via a OnProcessComplete() callback

IBlackmagicRawManualDecoderFlow1::PopulateFrameStateBuffer method

The manual decoders work with data blobs rather than API objects. This allows the user to transfer the data blob to another codec instance or potentially another computer for processing. This function converts the internal state of **IBlackmagicRawFrame** to frame state buffer, which is used to perform the decode

Syntax

```
HRESULT    PopulateFrameStateBuffer(IBlackmagicRawFrame* frame,
                                    IBlackmagicRawClipProcessingAttributes*
                                    clipProcessingAttributes,
                                    IBlackmagicRawFrameProcessingAttributes*
                                    frameProcessingAttributes,
                                    void* frameState,
                                    uint32_t frameStateSizeBytes)
```

Parameters

Name	Direction	Description
frame	in	Frame to read when creating a frame state
clipProcessingAttributes	in	optionally provide custom clip processing attributes to use, rather than values inside clip
frameProcessingAttributes	in	optionally provide custom frame processing attributes to use, rather than using values inside frame
frameState	out	output buffer location to store framebuffer information
frameStateSizeBytes	in	size (in bytes) of output framebuffer location

IBlackmagicRawManualDecoderFlow1::GetFrameStateSizeBytes method

Query the same of the FrameState buffer in bytes

Syntax

```
HRESULT    GetFrameStateSizeBytes(uint32_t* frameStateSizeBytes)
```

Parameters

Name	Direction	Description
frameStateSizeBytes	out	Returns the size in bytes

IBlackmagicRawManualDecoderFlow1::GetDecodedSizeBytes method

Query the size of the decoded buffer

Syntax

```
HRESULT    GetDecodedSizeBytes(void* frameStateBufferCPU,
                               uint32_t* decodedSizeBytes)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
decodedSizeBytes	out	Returns size of decoded frame in bytes

IBlackmagicRawManualDecoderFlow1::GetProcessedSizeBytes method

Query the size of the processed buffer

Syntax

```
HRESULT    GetProcessedSizeBytes(void* frameStateBufferCPU,
                                 uint32_t* processedSizeBytes)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
processedSizeBytes	out	Returns size of processed frame in bytes

IBlackmagicRawManualDecoderFlow1::GetPost3DLUTSizeBytes method

Query the size of the post 3D LUT buffer

Syntax

```
HRESULT    GetPost3DLUTSizeBytes(void* frameStateBufferCPU,
                                 uint32_t* post3DLUTSizeBytes)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
post3DLUTSizeBytes	out	Returns size of post 3D LUT buffer in bytes

IBlackmagicRawManualDecoderFlow1::CreateJobDecode method

Create a job to decode a frame. After this decode is complete the decoded buffer will need to be processed to get final result. This decode completion will be notified via the OnDecodeComplete() callback

Syntax

```
HRESULT    CreateJobDecode(void* frameStateBufferCPU,
                           void* bitStreamBufferCPU,
                           void* decodedBufferCPU,
                           IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
bitStreamBufferCPU	in	Previously read bitream buffer, see BlackmagicRawClipEx::CreateJobReadFrame()
decodedBufferCPU	in	Buffer to store decoded frame in
job	out	Job created to perform the decode. Note: Remember to call job->Submit() to submit the job to the decoder!

IBlackmagicRawManualDecoderFlow1::CreateJobProcess method

Create a job to process a frame. After this process is complete a final processed image will be provided via a OnProcessComplete() callback

Syntax

```
HRESULT    CreateJobProcess(void* frameStateBufferCPU,
                            void* decodedBufferCPU,
                            void* processedBufferCPU,
                            void* post3DLUTBufferCPU,
                            IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
decodedBufferCPU	in	Previously decoded buffer to read from
processedBufferCPU	in	Buffer to store processed image in
post3DLUTBufferCPU	in	Post3D LUT buffer to apply, should be non-null when frameState requires it
job	out	Job created to perform the process. Note: Remember to call job->Submit() to submit the job to the decoder

IBlackmagicRawManualDecoderFlow2 Interface

Manual decoders give you more control over which buffers are used and how things are queued. **IBlackmagicRawManualDecoderFlow2** is a hybrid CPU/GPU solution. This will likely be faster than Flow1, however it will depend on the GPU in the users system. Note: these decoders are optional and targetted at advanced users

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRaw	IID_IBlackmagicRaw	An IBlackmagicRawManualDecoderFlow2 object interface may be obtained from IBlackmagicRaw using QueryInterface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawManualDecoderFlow2::CreateJob Decode outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawManualDecoderFlow2::CreateJob Process outputs an IBlackmagicRawJob object interface

Public Member Functions	
Method	**Description**
PopulateFrameStateBuffer	The manual decoders work with data blobs rather than API objects. This allows the user to transfer the data blob to another codec instance or potentially another computer for processing. This function converts the internal state of IBlackmagicRawFrame to frame state buffer, which is used to perform the decode
GetFrameStateSizeBytes	Query the same of the FrameState buffer in bytes
GetDecodedSizeBytes	Query the size of the decoded buffer
GetWorkingSizeBytes	Query the size of the working buffer
GetProcessedSizeBytes	Query the size of the processed buffer
GetPost3DLUTSizeBytes	Query the size of the post 3D LUT buffer
CreateJobDecode	Create a job to decode a frame. This is performed on CPU. After this decode is complete the decoded buffer will need to be processed to get final result. This decode completion will be notified via the OnDecodeComplete() callback
CreateJobProcess	Create a job to process a frame. This is performed on the specified GPU. After this process is complete a final processed image will be provided via a OnProcessComplete() callback

IBlackmagicRawManualDecoderFlow2::PopulateFrameStateBuffer method

The manual decoders work with data blobs rather than API objects. This allows the user to transfer the data blob to another codec instance or potentially another computer for processing. This function converts the internal state of **IBlackmagicRawFrame** to frame state buffer, which is used to perform the decode

Syntax

```
HRESULT    PopulateFrameStateBuffer(IBlackmagicRawFrame* frame,
                                    IBlackmagicRawClipProcessingAttributes*
                                    clipProcessingAttributes,
                                    IBlackmagicRawFrameProcessingAttributes*
                                    frameProcessingAttributes,
                                    void* frameState,
                                    uint32_t frameStateSizeBytes)
```

Parameters

Name	Direction	Description
frame	in	Frame to read when creating a frame state
clipProcessingAttributes	in	optionally provide custom clip processing attributes to use, rather than values inside clip
frameProcessingAttributes	in	optionally provide custom frame processing attributes to use, rather than using values inside frame
frameState	out	output buffer location to store framebuffer information
frameStateSizeBytes	in	size (in bytes) of output framebuffer location

IBlackmagicRawManualDecoderFlow2::GetFrameStateSizeBytes method

Query the same of the FrameState buffer in bytes

Syntax

```
HRESULT    GetFrameStateSizeBytes(uint32_t* frameStateSizeBytes)
```

Parameters

Name	Direction	Description
frameStateSizeBytes	out	Returns the size in bytes

IBlackmagicRawManualDecoderFlow2::GetDecodedSizeBytes method

Query the size of the decoded buffer

Syntax

```
HRESULT    GetDecodedSizeBytes(void* frameStateBufferCPU,
                               uint32_t* decodedSizeBytes)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
decodedSizeBytes	out	Returns size of decoded frame in bytes

IBlackmagicRawManualDecoderFlow2::GetWorkingSizeBytes method

Query the size of the working buffer

Syntax

```
HRESULT    GetWorkingSizeBytes(void* frameStateBufferCPU,
                               uint32_t* workingSizeBytes)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
workingSizeBytes	out	Returns size of working buffer in bytes

IBlackmagicRawManualDecoderFlow2::GetProcessedSizeBytes method

Query the size of the processed buffer

Syntax

```
HRESULT    GetProcessedSizeBytes(void* frameStateBufferCPU,
                                 uint32_t* processedSizeBytes)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
processedSizeBytes	out	Returns size of the processed buffer in bytes

IBlackmagicRawManualDecoderFlow2::GetPost3DLUTSizeBytes method

Query the size of the post 3D LUT buffer

Syntax

```
HRESULT    GetPost3DLUTSizeBytes(void* frameStateBufferCPU,
                                 uint32_t* post3DLUTSizeBytes)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Previously prepared frame state buffer
post3DLUTSizeBytes	out	Returns size of post 3D LUT buffer in bytes

IBlackmagicRawManualDecoderFlow2::CreateJobDecode method

Create a job to decode a frame. This is performed on CPU. After this decode is complete the decoded buffer will need to be processed to get final result. This decode completion will be notified via the OnDecodeComplete() callback

Syntax

```
HRESULT    CreateJobDecode(void* frameStateBufferCPU,
                           void* bitStreamBufferCPU,
                           void* decodedBufferCPU,
                           IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
frameStateBufferCPU	in	Query the size of the processed buffer. Note: this is a CPU resource (and thus stored in CPU memory)
bitStreamBufferCPU	in	Previously read bitream buffer, see BlackmagicRawClipEx::CreateJobReadFrame(). Note: this is a CPU resource (and thus stored in CPU memory)
decodedBufferCPU	in	CPU resource where we the decoded buffer will be written to. Note: this is a CPU resource (and thus stored in CPU memory)
job	out	Job created to perform the decode. Note: Remember to call job->Submit() to submit the job to the decoder!

IBlackmagicRawManualDecoderFlow2::CreateJobProcess method

Create a job to process a frame. This is performed on the specified GPU. After this process is complete a final processed image will be provided via a OnProcessComplete() callback

Syntax

```
HRESULT    CreateJobProcess(void* context,
                            void* commandQueue,
                            void* frameStateBufferCPU,
                            void* decodedBufferGPU,
                            void* workingBufferGPU,
                            void* processedBufferGPU,
                            void* post3DLUTBufferGPU,
                            IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
context	in	Context to perform the process on. This will be API dependant, see **BlackmagicRawPipeline** for details
commandQueue	in	Command queue to perform the process on. This will be API dependant, see **BlackmagicRawPipeline** for details
frameStateBufferCPU	in	Previously prepared frame state buffer. Note: this is a CPU resource (and thus stored in CPU memory)
decodedBufferGPU	in	GPU resource where the decoded buffer has been decoded in to. Note: this is a GPU resource, and its type will differ depending on API, see **BlackmagicRawResourceType**. Note: The users responsibility to transfer the decoded buffer from CPU to GPU before calling this function.

Name	Direction	Description
workingBufferGPU	in	An additional GPU resource uses as working memory
processedBufferGPU	in	Resource to store the processed buffer in to. Note: this is a GPU resource, and thus it's type will be API dependant, see **BlackmagicRawPipeline** for details
post3DLUTBufferGPU	in	Post3D LUT buffer to apply, should be non-null when frameState requires it
job	out	Job created to perform the process. Note: Remember to call job->Submit() to submit the job to the decoder

IBlackmagicRawClip Interface

Clip object, created by calling **IBlackmagicRaw::OpenClip**()

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRaw	IID_IBlackmagicRaw	**IBlackmagicRaw::OpenClip** outputs an **IBlackmagicRawClip** object interface
IBlackmagicRaw	IID_IBlackmagicRaw	**IBlackmagicRaw::OpenClipWithGeometry** outputs an **IBlackmagicRawClip** object interface
IBlackmagicRaw	IID_IBlackmagicRaw	**IBlackmagicRaw::OpenClipFromFile** outputs an **IBlackmagicRawClip** object interface
IBlackmagicRaw	IID_IBlackmagicRaw	**IBlackmagicRaw::OpenClipFromFileWithGeometry** outputs an **IBlackmagicRawClip** object interface
IBlackmagicRawClip AccelerometerMotion	IID_IBlackmagicRawClip AccelerometerMotion	An **IBlackmagicRawClip** object interface may be obtained from **IBlackmagicRawClipAccelerometerMotion** using **QueryInterface**
IBlackmagicRawClip AccelerometerMotion	IID_IBlackmagicRawClip AccelerometerMotion	An **IBlackmagicRawClipAccelerometerMotion** object interface may be obtained from **IBlackmagicRawClip** using **QueryInterface**
IBlackmagicRawClipGyroscope Motion	IID_IBlackmagicRawClip GyroscopeMotion	An **IBlackmagicRawClip** object interface may be obtained from **IBlackmagicRawClipGyroscopeMotion** using **QueryInterface**
IBlackmagicRawClipGyroscope Motion	IID_IBlackmagicRawClip GyroscopeMotion	An **IBlackmagicRawClipGyroscopeMotion** object interface may be obtained from **IBlackmagicRawClip** using **QueryInterface**
IBlackmagicRawClipPDAFData	IID_ IBlackmagicRawClipPDAFData	An **IBlackmagicRawClip** object interface may be obtained from **IBlackmagicRawClipPDAFData** using **QueryInterface**
IBlackmagicRawClipPDAFData	IID_ IBlackmagicRawClipPDAFData	An **IBlackmagicRawClipPDAFData** object interface may be obtained from **IBlackmagicRawClip** using **QueryInterface**

Interface	Interface ID	Description
IBlackmagicRawFrame	IID_IBlackmagicRawFrame	An IBlackmagicRawClip object interface may be obtained from IBlackmagicRawFrame using QueryInterface
IBlackmagicRawMetadataIterator	IID_IBlackmagicRawMetadata Iterator	IBlackmagicRawClip::GetMetadataIterator outputs an IBlackmagicRawMetadataIterator object interface
IBlackmagicRawClipProcessing Attributes	IID_IBlackmagicRawClip ProcessingAttributes	IBlackmagicRawClip::CloneClipProcessing Attributes outputs an IBlackmagicRawClipProcessingAttributes object interface
IBlackmagicRawClipProcessing Attributes	IID_IBlackmagicRawClip ProcessingAttributes	An IBlackmagicRawClipProcessingAttributes object interface may be obtained from IBlackmagicRawClip using QueryInterface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClip::CreateJobReadFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClip::CreateJobReadAudio outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClip::CreateJobTrim outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClip::CreateJobTrimToFile outputs an IBlackmagicRawJob object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRawClip::CloneWithGeometry outputs an IBlackmagicRawClip object interface
IBlackmagicRawClip	IID_IBlackmagicRawClip	IBlackmagicRawClip::CloneWithGeometry outputs an IBlackmagicRawClip object interface
IBlackmagicRawClipEx	IID_IBlackmagicRawClipEx	An IBlackmagicRawClipEx object interface may be obtained from IBlackmagicRawClip using QueryInterface
IBlackmagicRawClipMultiVideo	IID_IBlackmagicRawClipMulti Video	An IBlackmagicRawClipMultiVideo object interface may be obtained from IBlackmagicRawClip using QueryInterface
IBlackmagicRawClipImmersive Video	IID_IBlackmagicRawClip ImmersiveVideo	An IBlackmagicRawClipImmersiveVideo object interface may be obtained from IBlackmagicRawClip using QueryInterface
IBlackmagicRawClipAudio	IID_IBlackmagicRawClipAudio	An IBlackmagicRawClipAudio object interface may be obtained from IBlackmagicRawClip using QueryInterface

Public Member Functions	
Method	**Description**
GetWidth	Get the width of the clip
GetHeight	Get the height of the clip
GetFrameRate	Get the frame rate of the clip

Public Member Functions	
Method	**Description**
GetFrameCount	Get the frame count in the clip
GetTimecodeForFrame	Get the timecode for the specified frame
GetMetadataIterator	Create a metadata iterator to iterate through the metadata in this clip
GetMetadata	Query a single clip metadata value defined by key
SetMetadata	Set metadata to this clip, this data is not saved to disk until **IBlackmagicRawClip**::SaveSideCar() is called
GetCameraType	Get the camera type on which this clip was recorded
CloneClipProcessingAttributes	Clone this clips ClipProcessingAttributes into another copy. From here the returned ClipProcessingAttributes can be modified, and then provided to DecodeAndProcess() allowing the user to decode the frame with different processing attributes than specified in the clip. This is useful when the user wishes to preview different processing attributes.
GetMulticardFileCount	Queries how many cards this movie was originally recorded on to
IsMulticardFilePresent	Queries if a particular card file from the original recording are present. If files are missing the movie will still play back, just at a lower framerate
GetSidecarFileAttached	Returns if a relevant .sidecar file was present on disk
SaveSidecarFile	This will save all set metadata and processing attributes to the .sidecar file on disk. From here the clip can be safely closed and data will be preserved
ReloadSidecarFile	Reload the .sidecar file, this will replace all previously non-saved metadata and processing attributes with the contents of the .sidecar file
CreateJobReadFrame	Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback
CreateJobReadAudio	Create a job to read audio samples into memory. When completed we will receive a ReadAudioComplete() callback
CreateJobTrim	A trim will export part of the clip with the .sidecar file baked in to a new .braw file. This is an asynchronous job and can take some time depending on the length of the trim
CreateJobTrimToFile	A trim will export part of the clip with the .sidecar file baked in to a new .braw file. This is an asynchronous job and can take some time depending on the length of the trim
CloneWithGeometry	None

IBlackmagicRawClip::GetWidth method

Get the width of the clip

Syntax

HRESULT `GetWidth(uint32_t* width)`

Parameters

Name	Direction	Description
width	out	Returns the width of the clip, in pixels

IBlackmagicRawClip::GetHeight method

Get the height of the clip

Syntax

HRESULT `GetHeight(uint32_t* height)`

Parameters

Name	Direction	Description
height	out	Returns the height of the clip, in pixels

IBlackmagicRawClip::GetFrameRate method

Get the frame rate of the clip

Syntax

HRESULT `GetFrameRate(float* frameRate)`

Parameters

Name	Direction	Description
frameRate	out	Returns the frame rate of the clip, in frames per second

IBlackmagicRawClip::GetFrameCount method

Get the frame count in the clip

Syntax

HRESULT `GetFrameCount(uint64_t* frameCount)`

Parameters

Name	Direction	Description
frameCount	out	Returns the number of frames in the clip

IBlackmagicRawClip::GetTimecodeForFrame method

Get the timecode for the specified frame

Syntax

HRESULT
```
GetTimecodeForFrame(uint64_t frameIndex,
                    string* timecode)
```

Parameters

Name	Direction	Description
frameIndex	in	Index of the frame we are querying
timecode	out	Returns a formatted timecode for the specified frame

IBlackmagicRawClip::GetMetadataIterator method

Create a metadata iterator to iterate through the metadata in this clip

Syntax

HRESULT `GetMetadataIterator(IBlackmagicRawMetadataIterator** iterator)`

Parameters

Name	Direction	Description
iterator	out	Returned metadata object

IBlackmagicRawClip::GetMetadata method

Query a single clip metadata value defined by key

Syntax

HRESULT
```
GetMetadata(string key,
            Variant* value)
```

Parameters

Name	Direction	Description
key	in	Key of the clip metadata entry we are looking for
value	out	Returned value of clip metadata entry at the provided key

IBlackmagicRawClip::SetMetadata method

Set metadata to this clip, this data is not saved to disk until **IBlackmagicRawClip**::SaveSideCar() is called

Syntax

HRESULT
```
SetMetadata(string key,
            Variant* value)
```

Parameters

Name	Direction	Description
key	in	Key of the clip metadata entry we want to set. Note: to clear metadata from the sidecar and restore what was originally in the movie, set value to NULL.
value	in	Value we want to set to the clip metadata entry

IBlackmagicRawClip::GetCameraType method

Get the camera type on which this clip was recorded

Syntax

HRESULT `GetCameraType(string* cameraType)`

Parameters

Name	Direction	Description
cameraType	out	Returned camera type. This string can be used for display purposes

IBlackmagicRawClip::CloneClipProcessingAttributes method

Clone this clips ClipProcessingAttributes into another copy. From here the returned ClipProcessingAttributes can be modified, and then provided to DecodeAndProcess() allowing the user to decode the frame with different processing attributes than specified in the clip. This is useful when the user wishes to preview different processing attributes.

Syntax

HRESULT

```
CloneClipProcessingAttributes(IBlackmagicRawClipProcessingAttributes**
                              clipProcessingAttributes)
```

Parameters

Name	Direction	Description
clipProcessingAttributes	out	Returned created ClipProcessingAttributes object

IBlackmagicRawClip::GetMulticardFileCount method

Queries how many cards this movie was originally recorded on to

Syntax

HRESULT `GetMulticardFileCount(uint32_t* multicardFileCount)`

Parameters

Name	Direction	Description
multicardFileCount	out	Returned multicard file count

IBlackmagicRawClip::IsMulticardFilePresent method

Queries if a particular card file from the original recording are present. If files are missing the movie will still play back, just at a lower framerate

Syntax

HRESULT

```
IsMulticardFilePresent(uint32_t index,
                       Boolean* isMulticardFilePresent)
```

Parameters

Name	Direction	Description
index	in	Frame index to query
isMulticardFilePresent	out	Returned boolean indicating if this file was present

IBlackmagicRawClip::GetSidecarFileAttached method

Returns if a relevant .sidecar file was present on disk

Syntax

HRESULT `GetSidecarFileAttached(Boolean* isSidecarFileAttached)`

Parameters

Name	Direction	Description
isSidecarFileAttached	out	Returned boolean indicating if the .sidecar file was present on disk

IBlackmagicRawClip::SaveSidecarFile method

This will save all set metadata and processing attributes to the .sidecar file on disk. From here the clip can be safely closed and data will be preserved

Syntax

HRESULT `SaveSidecarFile()`

IBlackmagicRawClip::ReloadSidecarFile method

Reload the .sidecar file, this will replace all previously non-saved metadata and processing attributes with the contents of the .sidecar file

Syntax

HRESULT `ReloadSidecarFile()`

IBlackmagicRawClip::CreateJobReadFrame method

Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback

Syntax

HRESULT
```
CreateJobReadFrame(uint64_t frameIndex,
                   IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
frameIndex	in	The frame index to read
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClip::CreateJobReadAudio method

Create a job to read audio samples into memory. When completed we will receive a ReadAudioComplete() callback

Syntax

HRESULT
```
CreateJobReadAudio(uint64_t sampleIndex,
                   uint64_t maxSampleCount,
                   IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
sampleIndex	in	The sample index to read
maxSampleCount	in	Max sample count to read with this job
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClip::CreateJobTrim method

A trim will export part of the clip with the .sidecar file baked in to a new .braw file. This is an asynchronous job and can take some time depending on the length of the trim

Syntax

```
HRESULT    CreateJobTrim(string filePath,
                         uint64_t frameIndex,
                         uint64_t frameCount,
                         IBlackmagicRawClipProcessingAttributes*
                         clipProcessingAttributes,
                         IBlackmagicRawFrameProcessingAttributes*
                         frameProcessingAttributes,
                         IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
filePath	in	Path to the destination file that will be created for the resulting trimmed movie
frameIndex	in	The frame index to start trimming at
frameCount	in	The number of frames we want to trim
clipProcessingAttributes	in	Processing attributes to be applied to the trimmed clip
frameProcessingAttributes	in	Processing attributes to be applied to each frame of the trimmed clip
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClip::CreateJobTrimToFile method

A trim will export part of the clip with the .sidecar file baked in to a new .braw file. This is an asynchronous job and can take some time depending on the length of the trim

Syntax

```
HRESULT    CreateJobTrimToFile(IBlackmagicRawFile* destinationFile,
                               uint64_t frameIndex,
                               uint64_t frameCount,
                               IBlackmagicRawClipProcessingAttributes*
                               clipProcessingAttributes,
                               IBlackmagicRawFrameProcessingAttributes*
                               frameProcessingAttributes,
                               IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
destinationFile	in	Destination file for the resulting trimmed movie
frameIndex	in	The frame index to start trimming at
frameCount	in	The number of frames we want to trim
clipProcessingAttributes	in	Processing attributes to be applied to the trimmed clip
frameProcessingAttributes	in	Processing attributes to be applied to each frame of the trimmed clip
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClip::CloneWithGeometry method

None

Syntax

```
HRESULT    CloneWithGeometry(IBlackmagicRawClipGeometry* geometry,
                             IBlackmagicRawClip** clip)
```

Parameters

Name	Direction	Description
geometry	in	None
clip	out	None

IBlackmagicRawClipEx Interface

Extended use of **IBlackmagicRawClip**, to pass custom bitstream

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClip	IID_IBlackmagicRawClip	An IBlackmagicRawClipEx object interface may be obtained from IBlackmagicRawClip using QueryInterface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClipEx::CreateJobReadFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClipEx::CreateJobTrim outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClipEx::CreateJobTrimToFile outputs an IBlackmagicRawJob object interface

Public Member Functions	
Method	**Description**
GetMaxBitStreamSizeBytes	Inspects all frames in the movie and will return the maximum bit stream size encountered.
GetBitStreamSizeBytes	Returns the bitstream size for the provided frame
CreateJobReadFrame	Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback. This extended variation allows the user to control exactly where the bistream is stored in memory.
CreateJobTrim	A trim will export part of the clip with the .sidecar file baked in to a new .braw file. This is an asynchronous job and can take some time depending on the length of the trim
CreateJobTrimToFile	A trim will export part of the clip with the .sidecar file baked in to a new .braw file. This is an asynchronous job and can take some time depending on the length of the trim
QueryTimecodeInfo	Queries the timecode info for the clip. This information can be used to externally calculate valid timecodes from a frameIndex. Alternatively you can call IBlackmagicRawFrame::GetTimecode() on a frame object

Public Member Functions	
Method	**Description**
GetFrameImageOffsetAndSize	Returns the image data size and byte offset in the file of the specified frame
GetAudioChunkInfo	Returns the audio data size and byte offset in the file of the specified frame

IBlackmagicRawClipEx::GetMaxBitStreamSizeBytes method

Inspects all frames in the movie and will return the maximum bit stream size encountered.

Syntax

HRESULT `GetMaxBitStreamSizeBytes(uint32_t* maxBitStreamSizeBytes)`

Parameters

Name	Direction	Description
maxBitStreamSizeBytes	out	The maximum bit stream size in bytes, for any frame in the clip

IBlackmagicRawClipEx::GetBitStreamSizeBytes method

Returns the bitstream size for the provided frame

Syntax

HRESULT
```
GetBitStreamSizeBytes(uint64_t frameIndex,
                      uint32_t* bitStreamSizeBytes)
```

Parameters

Name	Direction	Description
frameIndex	in	The frame index to query
bitStreamSizeBytes	out	Returned bitstream size in bytes.

IBlackmagicRawClipEx::CreateJobReadFrame method

Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback. This extended variation allows the user to control exactly where the bistream is stored in memory.

Syntax

HRESULT
```
CreateJobReadFrame(uint64_t frameIndex,
                   void* bitStream,
                   uint32_t bitStreamSizeBytes,
                   IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
frameIndex	in	The frame index to read
bitStream	out	output CPU resource (i.e. memory address) where the frame's bitstream data is written to.
bitStreamSizeBytes	in	size of the bitstream buffer (in bytes) the frame data is being written to.
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClipEx::CreateJobTrim method

A trim will export part of the clip with the .sidecar file baked in to a new .braw file. This is an asynchronous job and can take some time depending on the length of the trim

Syntax

```
HRESULT    CreateJobTrim(string filePath,
                         uint64_t frameIndex,
                         uint64_t frameCount,
                         uint32_t frameStep,
                         float frameRate,
                         IBlackmagicRawClipProcessingAttributes*
                         clipProcessingAttributes,
                         IBlackmagicRawFrameProcessingAttributes*
                         frameProcessingAttributes,
                         IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
filePath	in	Path to the destination file that will be created for the resulting trimmed movie
frameIndex	in	The frame index to start trimming at
frameCount	in	The number of frames we want to trim
frameStep	in	The number of frames to move to the next frame in the trim sequence
frameRate	in	The playback frame rate of the trimmed file
clipProcessingAttributes	in	Processing attributes to be applied to the trimmed clip
frameProcessingAttributes	in	Processing attributes to be applied to each frame of the trimmed clip
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClipEx::CreateJobTrimToFile method

A trim will export part of the clip with the .sidecar file baked in to a new .braw file. This is an asynchronous job and can take some time depending on the length of the trim

Syntax

```
HRESULT    CreateJobTrimToFile(IBlackmagicRawFile* destinationFile,
                               uint64_t frameIndex,
                               uint64_t frameCount,
                               uint32_t frameStep,
                               float frameRate,
                               IBlackmagicRawClipProcessingAttributes*
                               clipProcessingAttributes,
                               IBlackmagicRawFrameProcessingAttributes*
                               frameProcessingAttributes,
                               IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
destinationFile	in	Destination file for the resulting trimmed movie
frameIndex	in	The frame index to start trimming at
frameCount	in	The number of frames we want to trim
frameStep	in	The number of frames to move to the next frame in the trim sequence
frameRate	in	The playback frame rate of the trimmed file
clipProcessingAttributes	in	Processing attributes to be applied to the trimmed clip
frameProcessingAttributes	in	Processing attributes to be applied to each frame of the trimmed clip
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClipEx::QueryTimecodeInfo method

Queries the timecode info for the clip. This information can be used to externally calculate valid timecodes from a frameIndex. Alternatively you can call **IBlackmagicRawFrame::GetTimecode**() on a frame object

Syntax

```
HRESULT    QueryTimecodeInfo(uint32_t* baseFrameIndex,
                             Boolean* isDropFrameTimecode)
```

Parameters

Name	Direction	Description
baseFrameIndex	out	Frame index (at the clips framerate) where the timecode begins.
isDropFrameTimecode	out	Returns whether this movie has a drop frame timecode or not.

IBlackmagicRawClipEx::GetFrameImageOffsetAndSize method

Returns the image data size and byte offset in the file of the specified frame

Syntax

```
HRESULT    GetFrameImageOffsetAndSize(uint64_t frameIndex,
                                      uint32_t* imageSizeBytes,
                                      uint64_t* imageOffsetBytes,
                                      uint32_t* fileIndex)
```

Parameters

Name	Direction	Description
frameIndex	in	The frame index to query
imageSizeBytes	out	Returned frame image data size found in bytes.
imageOffsetBytes	out	Returned frame image data offset in file.
fileIndex	out	Returned index of the file this frame belongs to.

IBlackmagicRawClipEx::GetAudioChunkInfo method

Returns the audio data size and byte offset in the file of the specified frame

Syntax

```
HRESULT    GetAudioChunkInfo(uint64_t sampleIndex,
                             uint32_t* audioChunkSizeBytesOut,
                             uint64_t* audioChunkOffsetBytesOut,
                             uint64_t* audioChunkSampleCountOut,
                             uint64_t* audioChunkStartSampleIndexOut)
```

Parameters

Name	Direction	Description
sampleIndex	in	The sample index to query
audioChunkSizeBytesOut	out	Returns the audio chunk size (in bytes)
audioChunkOffsetBytesOut	out	Returns the audio chunk file offset (in bytes)
audioChunkSampleCountOut	out	Returns the number of samples in the audio chunk
audioChunkStartSampleIndexOut	out	Returns the index of the first sample in the audio chunk

IBlackmagicRawClipMultiVideo Interface

Extended use of **IBlackmagicRawClip**, to support multi video track video clips

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClip	IID_IBlackmagicRawClip	An IBlackmagicRawClipMultiVideo object interface may be obtained from IBlackmagicRawClip using QueryInterface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClipMultiVideo::CreateJobReadFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClipMultiVideo::CreateJobReadFrameEx outputs an IBlackmagicRawJob object interface

Public Member Functions	
Method	**Description**
GetVideoTrackCount	Returns the number of video tracks in the clip
GetVideoFrameCount	Returns the number of video frames in the specified track
GetVideoTrackSource	Returns the fourCC video track source identifier
CreateJobReadFrame	Create a job that will read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback
GetBitStreamSizeBytes	Returns the bitstream size for the provided frame
CreateJobReadFrameEx	Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback. This extended variation allows the user to control exactly where the bistream is stored in memory.
GetFrameImageOffsetAndSize	Returns the image data size and byte offset in the file of trhe specified frame

IBlackmagicRawClipMultiVideo::GetVideoTrackCount method

Returns the number of video tracks in the clip

Syntax

HRESULT `GetVideoTrackCount(uint32_t* videoTrackCount)`

Parameters

Name	Direction	Description
videoTrackCount	out	Returned number of video tracks contained in the clip.

IBlackmagicRawClipMultiVideo::GetVideoFrameCount method

Returns the number of video frames in the specified track

Syntax

```
HRESULT    GetVideoFrameCount(uint32_t videoTrackIndex,
                              uint64_t* videoFrameCount)
```

Parameters

Name	Direction	Description
videoTrackIndex	in	Zero based index of the video track.
videoFrameCount	out	Returned number of video frames in the specified track.

IBlackmagicRawClipMultiVideo::GetVideoTrackSource method

Returns the fourCC video track source identifier

Syntax

```
HRESULT    GetVideoTrackSource(uint32_t videoTrackIndex,
                               uint32_t* videoSourceFourCC)
```

Parameters

Name	Direction	Description
videoTrackIndex	in	Zero based index of the video track.
videoSourceFourCC	out	Returned fourCC video source identifier for the specified video track.

IBlackmagicRawClipMultiVideo::CreateJobReadFrame method

Create a job that will read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback

Syntax

```
HRESULT    CreateJobReadFrame(uint32_t videoTrackIndex,
                              uint64_t frameIndex,
                              IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
videoTrackIndex	in	Zero based index of the video track.
frameIndex	in	The index of the frame to read
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClipMultiVideo::GetBitStreamSizeBytes method

Returns the bitstream size for the provided frame

Syntax

```
HRESULT    GetBitStreamSizeBytes(uint32_t videoTrackIndex,
                                 uint64_t frameIndex,
                                 uint32_t* bitStreamSizeBytes)
```

Parameters

Name	Direction	Description
videoTrackIndex	in	Zero based index of the video track.
frameIndex	in	The index of the frame to query
bitStreamSizeBytes	out	Returned maximum bitstream size found in bytes.

IBlackmagicRawClipMultiVideo::CreateJobReadFrameEx method

Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback. This extended variation allows the user to control exactly where the bistream is stored in memory.

Syntax

```
HRESULT    CreateJobReadFrameEx(uint32_t videoTrackIndex,
                                uint64_t frameIndex,
                                void* bitStream,
                                uint32_t bitStreamSizeBytes,
                                IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
videoTrackIndex	in	Zero based index of the video track.
frameIndex	in	The frame index to read
bitStream	out	output CPU resource (i.e. memory address) where the frame's bitstream data is written to.
bitStreamSizeBytes	in	size of the bitstream buffer (in bytes) the frame data is being written to.
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClipMultiVideo::GetFrameImageOffsetAndSize method

Returns the image data size and byte offset in the file of trhe specified frame

Syntax

```
HRESULT    GetFrameImageOffsetAndSize(uint32_t videoTrackIndex,
                                      uint64_t frameIndex,
                                      uint32_t* imageSizeBytes,
                                      uint64_t* imageOffsetBytes,
                                      uint32_t* fileIndex)
```

Parameters

Name	Direction	Description
videoTrackIndex	in	Zero based index of the video track.
frameIndex	in	The frame index to query
imageSizeBytes	out	Returned frame image data size found in bytes.
imageOffsetBytes	out	Returned frame image data offset in file.
fileIndex	out	Returned index of the file this frame belongs to.

IBlackmagicRawClipImmersiveVideo Interface

Extended use of **IBlackmagicRawClip**, to support immersive video clips

Related Interfaces

Interface	Interface ID	Description
IBlackmagicRawClip	IID_IBlackmagicRawClip	An IBlackmagicRawClipImmersiveVideo object interface may be obtained from IBlackmagicRawClip using QueryInterface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClipImmersiveVideo::CreateJob ImmersiveReadFrame outputs an IBlackmagicRawJob object interface
IBlackmagicRawJob	IID_IBlackmagicRawJob	IBlackmagicRawClipImmersiveVideo::CreateJob ImmersiveReadFrameEx outputs an IBlackmagicRawJob object interface

Public Member Functions	
Method	**Description**
CreateJobImmersiveReadFrame	Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback
GetImmersiveBitStreamSizeBytes	Returns the bitstream size for the provided frame
CreateJobImmersiveReadFrameEx	Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback. This extended variation allows the user to control exactly where the bistream is stored in memory.
GetDistanceBetweenLenses	Returns distance between lenses

Public Member Functions	
Method	**Description**
GetComfortDisparityAdjustment	Returns comfort disparity adjustment
GetHorizontalFieldOfView	Returns horizontal field of view
GetImmersiveAttribute	Get the attribute

IBlackmagicRawClipImmersiveVideo: :CreateJobImmersiveReadFrame method

Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback

Syntax

```
HRESULT    CreateJobImmersiveReadFrame(BlackmagicRawImmersiveVideoTrack
                                       videoTrack,
                                       uint64_t frameIndex,
                                       IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
videoTrack	in	Immersive video track.
frameIndex	in	The index of the frame to read
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClipImmersiveVideo: :GetImmersiveBitStreamSizeBytes method

Returns the bitstream size for the provided frame

Syntax

```
HRESULT    GetImmersiveBitStreamSizeBytes(BlackmagicRawImmersiveVideoTrack
                                          videoTrack,
                                          uint64_t frameIndex,
                                          uint32_t* bitStreamSizeBytes)
```

Parameters

Name	Direction	Description
videoTrack	in	Immersive video track.
frameIndex	in	The index of the frame to query
bitStreamSizeBytes	out	Returned maximum bitstream size found in bytes.

IBlackmagicRawClipImmersiveVideo: :CreateJobImmersiveReadFrameEx method

Create a job to read the frame's bitstream into memory. When completed we will receive a ReadComplete() callback. This extended variation allows the user to control exactly where the bistream is stored in memory.

Syntax

```
HRESULT    CreateJobImmersiveReadFrameEx(BlackmagicRawImmersiveVideoTrack
                                         videoTrack,
                                         uint64_t frameIndex,
                                         void* bitStream,
                                         uint32_t bitStreamSizeBytes,
                                         IBlackmagicRawJob** job)
```

Parameters

Name	Direction	Description
videoTrack	in	Immersive video track.
frameIndex	in	The index of the frame to read
bitStream	out	output CPU resource (i.e. memory address) where the frame's bitstream data is written to.
bitStreamSizeBytes	in	size of the bitstream buffer (in bytes) the frame data is being written to.
job	out	Created job object used to track the job. Note: Be sure to call Submit() on the job when ready

IBlackmagicRawClipImmersiveVideo: :GetDistanceBetweenLenses method

Returns distance between lenses

Syntax

```
HRESULT    GetDistanceBetweenLenses(uint32_t* distanceBetweenLenses)
```

Parameters

Name	Direction	Description
distanceBetweenLenses	out	Returns distance between lenses in unit of micrometers.

IBlackmagicRawClipImmersiveVideo: :GetComfortDisparityAdjustment method

Returns comfort disparity adjustment

Syntax

```
HRESULT    GetComfortDisparityAdjustment(int32_t* comfortDisparityAdjustment)
```

Parameters

Name	Direction	Description
comfortDisparityAdjustment	out	Returns comfort disparity adjustment in range [-10000 - +10000].

IBlackmagicRawClipImmersiveVideo: :GetHorizontalFieldOfView method

Returns horizontal field of view

Syntax

HRESULT `GetHorizontalFieldOfView(uint32_t* horizontalFieldOfView)`

Parameters

Name	Direction	Description
horizontalFieldOfView	out	Returns horizontal field of view in unit of millidegrees.

IBlackmagicRawClipImmersiveVideo::GetImmersiveAttribute method

Get the attribute

Syntax

HRESULT
```
GetImmersiveAttribute(BlackmagicRawImmersiveAttribute attribute,
                      Variant* value)
```

Parameters

Name	Direction	Description
attribute	in	Attribute to query
value	out	Variant to store the queried value in

IBlackmagicRawClipResolutions Interface

Supports querying of resolutions and/or scales for processed image results

Public Member Functions	
Method	**Description**
GetResolutionCount	Returns the number of resolutions at which the clip may be processed
GetResolution	Returns a resolution at which the clip may be processed
GetRecordedResolution	Returns a resolution at which the clip was recorded, allowing a mapping between recorded and processed resolutions (processed resolutions may be limited by the current hardware)
GetClosestResolutionForScale	Returns a resolution which most closesly matches the given scale
GetClosestScaleForResolution	Returns a **BlackmagicRawResolutionScale** which most closesly matches the given resolution

IBlackmagicRawClipResolutions::GetResolutionCount method

Returns the number of resolutions at which the clip may be processed

Syntax

```
HRESULT    GetResolutionCount(uint32_t* resolutionCount)
```

Parameters

Name	Direction	Description
resolutionCount	out	Returned number of resolutions at which the clip may be processed.

IBlackmagicRawClipResolutions::GetResolution method

Returns a resolution at which the clip may be processed

Syntax

```
HRESULT    GetResolution(uint32_t resolutionIndex,
                         uint32_t* resolutionWidthPixels,
                         uint32_t* resolutionHeightPixels)
```

Parameters

Name	Direction	Description
resolutionIndex	in	The resolution index to query
resolutionWidthPixels	out	Returned resolution width in pixels.
resolutionHeightPixels	out	Returned resolution height in pixels.

IBlackmagicRawClipResolutions::GetRecordedResolution method

Returns a resolution at which the clip was recorded, allowing a mapping between recorded and processed resolutions (processed resolutions may be limited by the current hardware)

Syntax

```
HRESULT    GetRecordedResolution(uint32_t resolutionIndex,
                                 uint32_t* recordedResolutionWidthPixels,
                                 uint32_t* recordedResolutionHeightPixels)
```

Parameters

Name	Direction	Description
resolutionIndex	in	The resolution index to query
recordedResolutionWidthPixels	out	Returned recorded width in pixels.
recordedResolutionHeightPixels	out	Returned recorded height in pixels.

IBlackmagicRawClipResolutions: :GetClosestResolutionForScale method

Returns a resolution which most closesly matches the given scale

Syntax

```
HRESULT    GetClosestResolutionForScale(BlackmagicRawResolutionScale
                                        resolutionScale,
                                        uint32_t* resolutionWidthPixels,
                                        uint32_t* resolutionHeightPixels)
```

Parameters

Name	Direction	Description
resolutionScale	in	Desired resolution scale
resolutionWidthPixels	out	Returned resolution width in pixels.
resolutionHeightPixels	out	Returned resolution height in pixels.

IBlackmagicRawClipResolutions: :GetClosestScaleForResolution method

Returns a **BlackmagicRawResolutionScale** which most closesly matches the given resolution

Syntax

```
HRESULT    GetClosestScaleForResolution(uint32_t resolutionWidthPixels,
                                        uint32_t resolutionHeightPixels,
                                        BlackmagicRawResolutionScale*
                                        resolutionScale)
```

Parameters

Name	Direction	Description
resolutionWidthPixels	in	Desired resolution width in pixels.
resolutionHeightPixels	in	Desired resolution height in pixels.
resolutionScale	out	Returned resolution scale