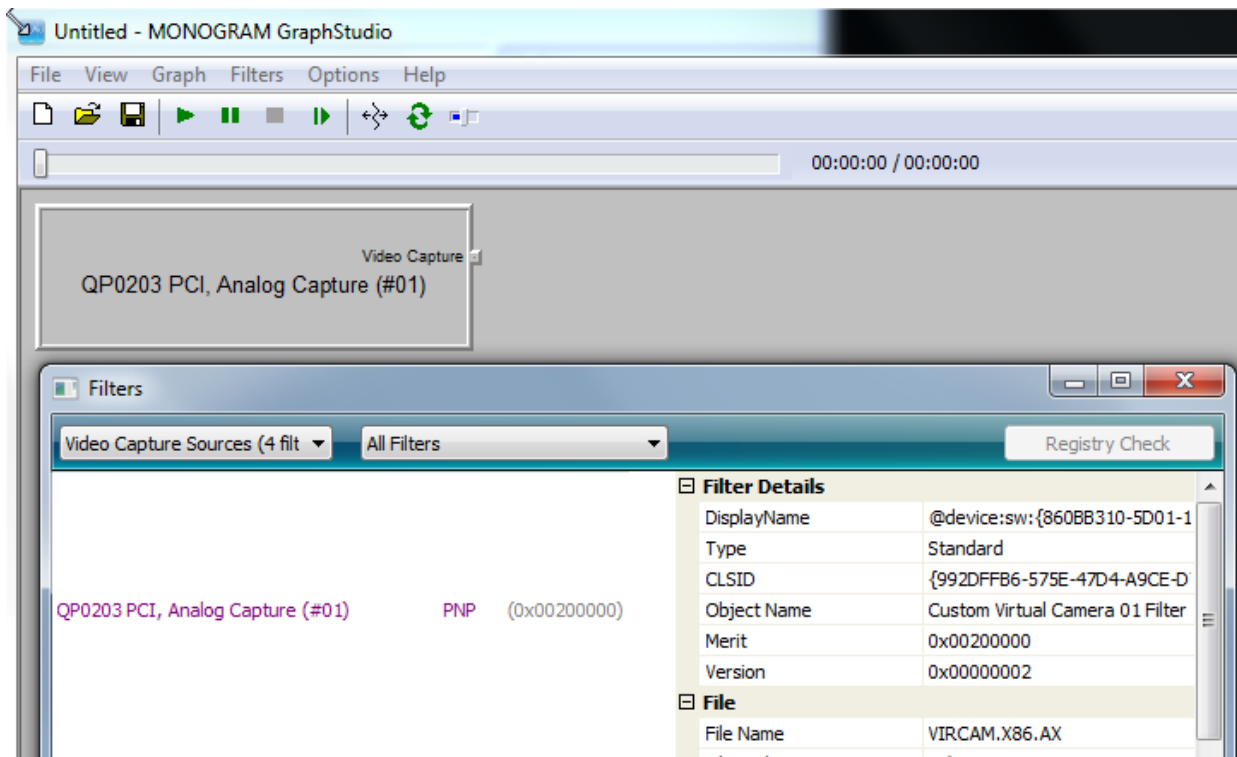


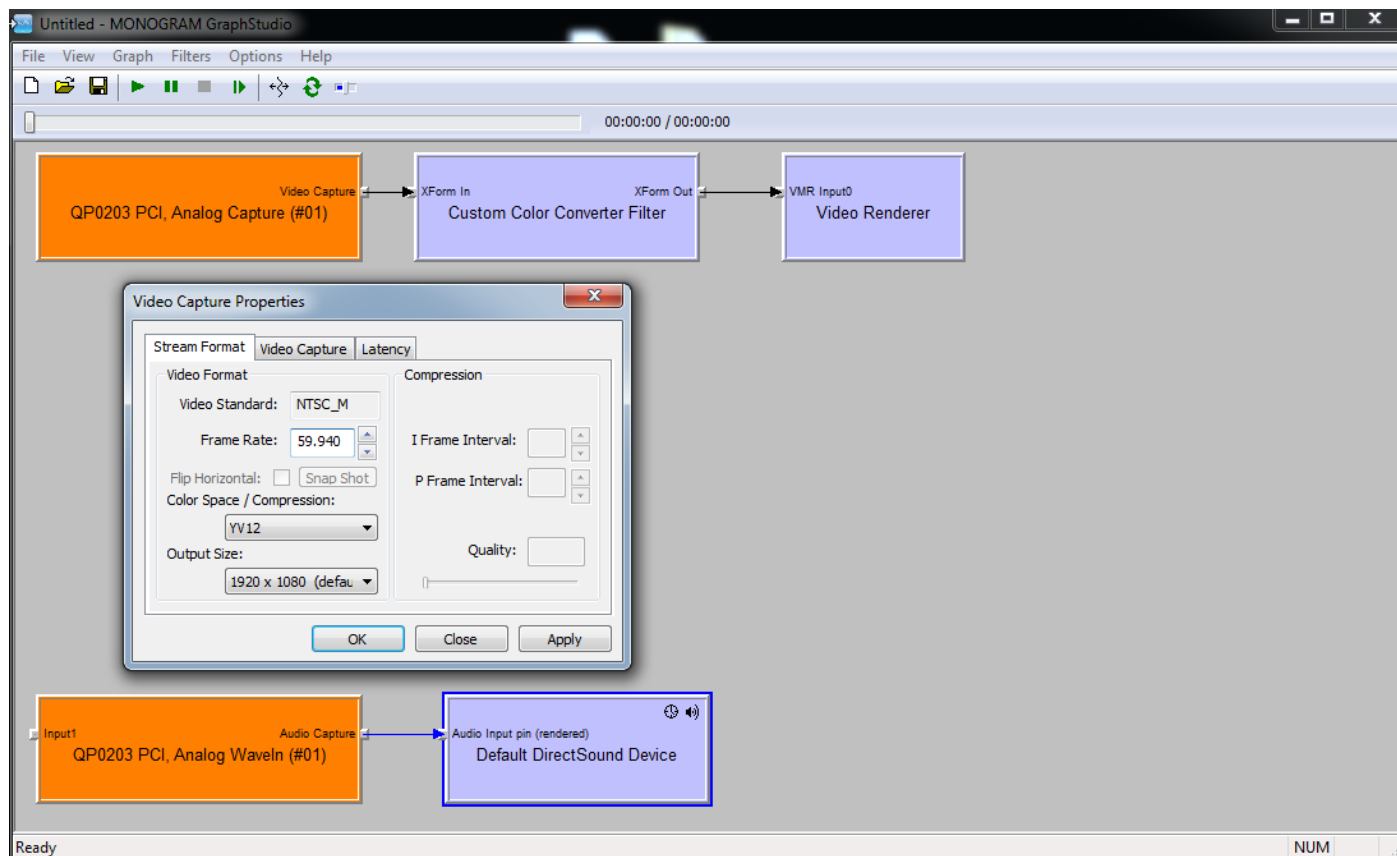
SC540 DirectShow Software Programming Guide

Customer uses DirectShow to develop software can bypass our SDK to access QP0203 directly. Majority of device properties is implemented by Microsoft DirectShow standard interface. Software developer can refer to Section 1 and Section 2 to control them. Other custom properties are implemented by IKsPropertySet interface. The interface can be queried from our capture source filter. Section 3 will describe how to access them in detail.

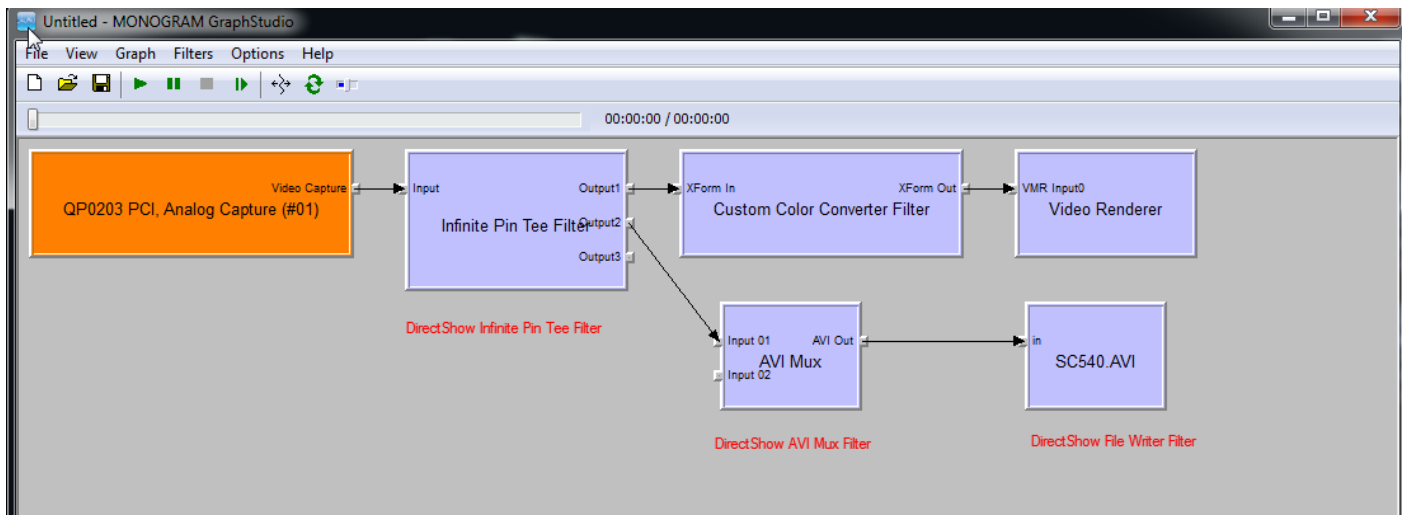
All filter names are "QP0203 PCI, Analog Capture (#XX)" for video, and "QP0203 PCI, Analog WaveIn (#XX)" for audio. They are registered at "WDM Streaming Captures Devices" category.



For the preview output, here, the video format is YV12 and audio format is PCM. The connection of filters is as:



Moreover, customer wants to use graphedit to save raw video stream into AVI can reference as below:



1. ACCESS VIDEO STANDARD (IAMAnalogVideoDecoder)

The video standard is implemented by IAMAnalogVideoDecoder interface. Customer must to setup the correct standard before accessing video format. For example, the 720X480@30fps format is only implemented under NTSC, and the 720x576@25fps format is only implemented under PALB.

EXAMPLE#01: SET STANDARD TO NTSC.

```
m_pCommonCaptureGraphBuilder2->FindInterface( NULL,
                                                NULL,
                                                m_pVideoCaptureSourceBaseFilter,
                                                IID_IAMAnalogVideoDecoder,
                                                (VOID **) (&m_pAMAnalogVideoDecoder) );
m_pAMAnalogVideoDecoder->put_TVFormat( AnalogVideo_NTSC_M );
```

2. ACCESS OUTPUT FORMAT OF CAPTURE PIN (IAMStreamConfig)

To get/set output format of capture pin, customer can use IAMStreamConfig interface.

EXAMPLE#01: SET VIDEO OUTPUT FORAMT TO 1920X1080 AT 60 FPS.

```
m_pCommonCaptureGraphBuilder2->FindInterface( &LOOK_DOWNSTREAM_ONLY,
                                                NULL,
                                                m_pVideoCaptureSourceBaseFilter,
                                                IID_IAMStreamConfig,
                                                (VOID **)( &m_pAMStreamConfig ) );

AM_MEDIA_TYPE * pmt = NULL;
m_pAMStreamConfig->GetFormat( &pmt );
((VIDEOINFOHEADER *) (pmt->pbFormat))->bmiHeader.biCompression = MAKEFOURCC('Y', 'V', '1', '2');
((VIDEOINFOHEADER *) (pmt->pbFormat))->bmiHeader.biHeight = 1920;
((VIDEOINFOHEADER *) (pmt->pbFormat))->bmiHeader.biWidth = 1080;
((VIDEOINFOHEADER *) (pmt->pbFormat))->bmiHeader.biBitCount = 12;
((VIDEOINFOHEADER *) (pmt->pbFormat))->bmiHeader.biSizeImage = 1920 * 1080 * 12 / 8;
((VIDEOINFOHEADER *) (pmt->pbFormat))->AvgTimePerFrame = (ULONG) (INT) (10000000.0 / 60.000);
((VIDEOINFOHEADER *) (pmt->pbFormat))->dwBitRate = (ULONG) (INT) (1920 * 1080 * 12 * 60.000);
m_pAMStreamConfig->SetFormat( pmt );
DeleteMediaType( pmt );
```

EXAMPLE#02: SET AUDIO OUTPUT FORAMT TO SETERO, 16BITS, AND 48000HZ.

```
m_pCommonCaptureGraphBuilder2->FindInterface( &LOOK_DOWNSTREAM_ONLY,
                                                NULL,
                                                m_pAudioCaptureSourceBaseFilter,
                                                IID_IAMStreamConfig,
                                                (VOID **)( &m_pAMStreamConfig ) );

AM_MEDIA_TYPE * pmt = NULL;
m_pAMStreamConfig->GetFormat( &pmt );
((WAVEFORMATEX *) (pmt->pbFormat))->nChannels = (USHORT) (2);
((WAVEFORMATEX *) (pmt->pbFormat))->wBitsPerSample = (USHORT) (16);
((WAVEFORMATEX *) (pmt->pbFormat))->nSamplesPerSec = (ULONG) (48000);
((WAVEFORMATEX *) (pmt->pbFormat))->nBlockAlign = (USHORT) (2 * 16 / 8);
((WAVEFORMATEX *) (pmt->pbFormat))->nAvgBytesPerSec = (ULONG) (2 * 16 * 48000 / 8);
m_pAMStreamConfig->SetFormat( pmt );
DeleteMediaType( pmt );
```

3 Customer Property Access

Customer can access all custom properties by IKsPropertySet, the parameter rguidPropSet of IKsPropertySet::Set/Get function, is defined as below:

```
GUID PROPSETID_AMEBDAD_CUSTOM_PROP =  
{ 0xD1E5209F, 0x68FD, 0x4529, 0xBE, 0xE0, 0x5E, 0x7A, 0x1F, 0x47, 0x92, 0x21 };
```

All custom properties are defined as below:

```
typedef enum {  
    KSPROPERTY_CUSTOM_GET_DEVICE_SERIAL_NUMBER_INFO = 0,  
    KSPROPERTY_CUSTOM_GET_DEVICE_BUS_NUMBER_INFO = 2,  
    KSPROPERTY_CUSTOM_GET_DEVICE_VIDEO_CONFIG = 8,  
    KSPROPERTY_CUSTOM_GET_DEVICE_AUDIO_CONFIG = 9,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DEINTERLACE_TYPE = 200,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT = 201,  
    KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_MACROVISION = 202,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FRAME_RATE = 208,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RESOLUTION = 210,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_IS_SINGLE_FOMART_OUTPUT = 215,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_QUEUE_BUFFER_SIZE = 216,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DENOISE_TYPE = 217,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FLEXIBLE_FPS_PATCH = 218,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_PHASE = 219,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FLEXIBLE_RESOLUTION_PATCH = 220,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_OFFSET_X = 221,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_OFFSET_Y = 222,  
    KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_INTERLEAVED = 223,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_ASPECT_RATIO = 224,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_HACTIVE_PIXELS = 225,  
    KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_LOCK_STATUS = 230,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_COLOR_RANGE = 231,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_AUTO_SCAN = 232,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_CUSTOMIZED_OUTPUT_RESOLUTION = 233,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_SOG = 234,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DVI_YCBCR = 235,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_EQ = 240,  
    KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_FRACTION_1000_1001 = 241,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_MAXIMAL_OUTPUT_RESOLUTION = 242,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_VERTICAL_MIRROR = 244,  
    KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_HORIZONTAL_MIRROR = 245,  
    KSPROPERTY_CUSTOM_XET_PREVIEW_VIDEO_STREAM_POST_SKIP_FRAMERATE = 246,  
    KSPROPERTY_CUSTOM_XET_PREVIEW_VIDEO_STARAM_POST_AVG_FRAMERATE = 247,  
}
```

KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_BANDWIDTH	= 248,
KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_VOLUME	= 251,
KSPROPERTY_CUSTOM_GET_ANALOG_AUDIO_SAMPLE_FREQUENCY	= 253,
KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_INPUT	= 255,
KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SINGAL_DEBUG_INFO	= 271,
KSPROPERTY_CUSTOM_XET_DRIVER_VIDEO_IS_DIRECT_DMA_ENABLED	= 272,
KSPROPERTY_CUSTOM_XET_PREVIEW_VIDEO_STERAM_POST_RESOLUTION	= 350,
KSPROPERTY_CUSTOM_GET_PREVIEW_VIDEO_STARAM_FRAME_NUMBER_INFO	= 351,
KSPROPERTY_CUSTOM_XET_PREVIEW_AUDIO_SAMPLE_POST_FREQUENCY	= 360,
KSPROPERTY_CUSTOM_GET_PREVIEW_AUDIO_STARAM_FRAME_NUMBER_INFO	= 361,
KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_COLORIMETRY	= 370,
KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_COLORRANGE	= 371,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_POST_RESOLUTION	= 401,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STREAM_POST_SKIP_FRAMERATE	= 402,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_BITRATE	= 403,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_QUALITY	= 404,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_GOP	= 405,
KSPROPERTY_CUSTOM_SET_ENCODER_VIDEO_STERAM_FORCE_KEY_FRAME	= 406,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_MODE	= 407,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_MAX_BITRATE	= 409,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_MIN_BITRATE	= 410,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_PROFILE	= 412,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_ASPECT_RATIO	= 413,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_LEVEL	= 414,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_ENTROPY	= 415,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STARAM_POST_AVG_FRAMERATE	= 422,
KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_FRAME_QUEUE_LENGTH	= 424,
KSPROPERTY_CUSTOM_GET_ENCODER_VIDEO_DEFAULT_FRAME_NUMBER_INFO	= 430,
KSPROPERTY_CUSTOM_XET_GPIO_DIRECTION	= 940,
KSPROPERTY_CUSTOM_XET_GPIO_DATA	= 941,
KSPROPERTY_CUSTOM_XET_GPIO_SUPPORT	= 942

} KSPROPERTY_AMEBDAD_CUSTOM;

- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_LOCK_STATUS (230) (READ ONLY)
- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_RESOLUTION (210) (READ ONLY)
- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_INTERLEAVED (223) (READ ONLY)
- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_FRAME_RATE (208) (READ ONLY)
- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_FRACTION_1000_1001 (241) (READ ONLY)
- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_COLORIMETRY (370) (READ ONLY)
- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_COLORRANGE (371) (READ ONLY)
- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_MACROVISION (202) (READ ONLY)
- 3.2. KSPROPERTY_CUSTOM_GET_ANALOG_AUDIO_SAMPLE_FREQUENCY (253) (READ ONLY)

The property **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_LOCK_STATUS** is used to determine whether the signal is locked.

SUPPORT VALUE: 0 ~ 1 - UNLOCK ~ LOCK

EXAMPLE#01: TO GET THE CURRENT SIGNAL STATUS.

```
LONG nLock = 0x00;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_LOCK_STATUS, NULL, 0,
                        &nLock, sizeof(LONG) );
```

These properties (210/223/208/241) can auto detect video format and can report the current input format to your software. The both properties can help to obtain current video format's resolution and frame rate. Some supported formats are described in the table. The format table keeps on increasing into the new driver. Please check our sales to obtain the latest one.

FORMAT	RESOLUTION	FRAME RATE	
1920×1080p@60fps	0x07800438	60 / 59.94	* ₁
1920×1080p@50fps	0x07800438	50 / 49.95	* ₁
1920×1080p@30fps	0x07800438	30 / 29.97	
1920×1080p@25fps	0x07800438	25 / 24.97	
1920×1080p@24fps	0x07800438	24 / 23.97	
1920×1080i@60fps	0x0780021C	60 / 59.94	
1920×1080i@50fps	0x0780021C	50 / 49.95	
1280×720P@60fps	0x050002D0	60 / 59.94	
1280×720P@50fps	0x050002D0	50 / 49.95	
1280×720P@30fps	0x050002D0	30 / 29.97	
1280×720P@25fps	0x050002D0	25 / 24.97	
1280×720P@24fps	0x050002D0	24 / 23.97	
720×480P@60fps	0x02D001E0	60 / 59.94	
720×576P@50fps	0x02D00240	50 / 49.95	

720×480i@60fps	0x02D000F0	60 / 59.94	
720×576i@50fps	0x02D00120	50 / 49.95	
720×240P@60fps	0x05A001E0	60 / 59.94	* ₂
720×288P@50fps	0x05A00240	50 / 49.95	* ₂
1440×900p@60fps	0x05A00384	60 / 59.94	
1280×1024p@60fps	0x05000400	60 / 59.94	
1280×960p@60fps	0x050003C0	60 / 59.94	
1280×800p@60fps	0x05000320	60 / 59.94	
1280×768p@60fps	0x05000300	60 / 59.94	
1024×768p@60fps	0x04000300	60 / 59.94	
800×600p@60fps	0x03200258	60 / 59.94	
640×480p@60fps	0x028001E0	60 / 59.94	* ₃
640×400p@60fps	0x02800190	60 / 59.94	* ₄
640×384p@60fps	0x02800180	60 / 59.94	* ₄

*₁ THE FORMAT WILL BE DOWN SPEED TO 1080P@30FPS/1080P@25FPS.

*₂ THE FORMAT IS USED BY SONY PS1/PS2 GAME MACHINE.

*₃ THE FORMAT IS USED BY MICROSOFT XBOX360 GAME MACHINE (640×480p@60fps).

*₄ THE FORMAT IS USED BY NEC IPC MACHINE (640×400p@56.4fps).

Note!! Developer should design one polling operation in one background thread to obtain/update current input format.

The resolution property **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_RESOLUTION:**

SUPPORT VALUE: RESOLUTION = (WIDTH << 16) | (HEIGHT << 0)

The interleaved property **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_INTERLEAVED:**

SUPPORT VALUE: 0: PROGRESSIVE

1: INTERLACED

The frame rate property **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_FRAME_RATE:**

SUPPORT VALUE: 24 / 25 / 30 / 50 / 60 FPS

EXAMPLE#02: GET CURRENT VIDEO FORMAT.

```
ULONG resolution = 0, framerate = 0, interlaced = 0;
```

```
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_RESOLUTION,
                        NULL, 0,
                        &resolution, sizeof(ULONG), &temp );
```

```
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
```

```

        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_FRAME_RATE,
        NULL, 0,
        &framerate, sizeof(ULONG), &temp );
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_INTERLEAVED,
        NULL, 0,
        &interlaced, sizeof(ULONG), &temp );

```

To obtain a more precise frame rate, combined with fraction property.
The **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_FRACTION_1000_1001**:

SUPPORT VALUE: 23.97 / 24.97 / 29.97 / 49.95 / 59.94 FPS

```

23.97 = 24 * (1000/1001)
24.97 = 25 * (1000/1001)
29.97 = 30 * (1000/1001)
49.95 = 50 * (1000/1001)
59.94 = 60 * (1000/1001)

```

EXAMPLE#03: TO GET MORE ACCURATE VIDEO FRAME RATE.

```

DWORD dw_framerate_fraction_property = 0;
double d_video_framerate_property = 0.0;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_FRAME_RATE,
        NULL, 0,
        &framerate, sizeof(ULONG), &temp );
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_FRACTION_1000_1001,
        NULL, 0,
        &dw_framerate_fraction_property, sizeof(ULONG), &temp );

d_video_framerate_property = framerate;

if ( dw_framerate_fraction_property == 1 ){
    d_video_framerate_property *= 1000;
    d_video_framerate_property /= 1001; }

```

The two properties **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_COLORIMETRY** / **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_COLORRANGE** allows you to get the YCbCr transfer matrix and RGB color range for incoming signal. For example, suppose the device converts from RGB to YCbCr. If it gets the YCbCr matrix is 2 and the RGB color range is 1, the device converts full range RGB to ITU-R

BT.709 YCbCr.

SUPPORT VALUE: 0: UNKNOWN
1: BT601
2: BT709

EXAMPLE#04: GET CURRENT COLORIMETRY.

```
ULONG nColorIMETRY = 0;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_COLORIMETRY,
                        NULL, 0,
                        &nColorIMETRY, sizeof(ULONG), &temp );
```

SUPPORT VALUE: 0: UNKNOWN
1: FULL RANGE (0 ~ 255)
2: LIMITED RANGE (16 ~ 235)

EXAMPLE#05: GET CURRENT RGB COLOR RANGE.

```
ULONG nColorRange = 0;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_COLORRANGE,
                        NULL, 0,
                        &nColorRange, sizeof(ULONG), &temp );
```

The property **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_MACROVISION** allows you to detect if the input's media content owns HDCP or MarcoVision protection.

Note!! To protect the content license, all behaviors in software porting should be complied with HDCP rules. Detect in any registered content of HDCP or MarcoVision, please disable the recording function in software.

SUPPORT VALUE: 0, 1 - NO ~ YES

EXAMPLE#06: GET HDCP PROTECT.

```
ULONG nHDCP = 0;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_MACROVISION,
                        NULL, 0,
                        &nHDCP, sizeof(ULONG), &temp );

if( HDCP == 1 ) { RECORD_FUNCTION = DISABLE; }
if( HDCP == 0 ) { RECORD_FUNCTION = ENABLE; }
```

The property **KSPROPERTY_CUSTOM_GET_ANALOG_AUDIO_SAMPLE_FREQUENCY** can auto detect current audio format and can report it to upper software. Currently, all audio formats are stereo and 16bits quality. The only difference is their sample frequency, so you can use the property to obtain the input's sample frequency.

SUPPORT VALUE: 48000 - STEREO / 16BITS / 48000HZ
44100 - STEREO / 16BITS / 44100HZ
32000 - STEREO / 16BITS / 32000HZ

EXAMPLE#07: GET CURRENT AUDIO SAMPLE FREQUENCY.

```
ULONG nFrequency = 0;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_ANALOG_AUDIO_SAMPLE_FREQUENCY,
                        NULL, 0,
                        &nFrequency, sizeof(ULONG), &temp );
```

- 3.3. **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SINGAL_DEBUG_INFO** (271) (READ ONLY)
- 3.3. **KSPROPERTY_CUSTOM_GET_PREVIEW_VIDEO_STARAM_FRAME_NUMBER_INFO** (351) (READ ONLY)
- 3.3. **KSPROPERTY_CUSTOM_GET_PREVIEW_AUDIO_STARAM_FRAME_NUMBER_INFO** (361) (READ ONLY)
- 3.3. **KSPROPERTY_CUSTOM_GET_ENCODER_VIDEO_DEFAULT_FRAME_NUMBER_INFO** (430) (READ ONLY)

The property **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SINGAL_DEBUG_INFO** is used to get the debug information in capture card running state. The output information is 32-bit error numbers. If the number is 0, the device is working properly. You can call it in timer function to get current signal status regularly.

SUPPORT VALUE: 0: GOOD

OTHERS: ERROR BITS

EXAMPLE#01: TO GET CURRENT SINGAL DEBUG STATUS.

```
ULONG dwSingalDebugInfo = 0x00000000;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SINGAL_DEBUG_INFO,
                        NULL, 0,
                        &dwSingalDebugInfo, sizeof(ULONG), &temp );
```

The property **KSPROPERTY_CUSTOM_GET_PREVIEW_VIDEO_STARAM_FRAME_NUMBER_INFO** allows you to get the total number of frames in preview video. The property reads frame number information from video stream. You can call it in timer function to get current frame number regularly.

SUPPORT VALUE: FRAME NUMBER

EXAMPLE#02: TO GET VIDEO PREVIEW STREAM'S FRAME NUMBER.

```
ULONG dwPreviewVideoFrameNumber = 0;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_PREVIEW_VIDEO_STARAM_FRAME_NUMBER_INFO,
                        NULL, 0,
                        &dwPreviewVideoFrameNumber, sizeof(ULONG), &temp );
```

The property **KSPROPERTY_CUSTOM_GET_PREVIEW_AUDIO_STARAM_FRAME_NUMBER_INFO** allows you to get the total number of frames in preview audio. The property reads frame number information from audio stream. You can call it in timer function to get current frame number regularly.

SUPPORT VALUE: FRAME NUMBER

EXAMPLE#03: TO GET AUDIO PREVIEW STREAM'S FRAME NUMBER.

```
ULONG dwPreviewAudioFrameNumber = 0;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_PREVIEW_VIDEO_STARAM_FRAME_NUMBER_INFO,
                        NULL, 0,
                        &dwPreviewAudioFrameNumber, sizeof(ULONG), &temp );
```

The property **KSPROPERTY_CUSTOM_GET_ENCODER_VIDEO_DEFAULT_FRAME_NUMBER_INFO** allows you to get the total number of frames in video encoder. The property reads frame number information from compressed video stream. You can call it in timer function to get current frame number regularly.

SUPPORT VALUE: FRAME NUMBER

EXAMPLE#04: TO GET VIDEO ENCODER STREAM STREAM'S FRAME NUMBER.

```
ULONG dwEncoderVideoFrameNumber = 0;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_ENCODER_VIDEO_DEFAULT_FRAME_NUMBER_INFO,
                        NULL, 0,
                        &dwEncoderVideoFrameNumber, sizeof(ULONG), &temp );
```

- 3.4. **KSPROPERTY_CUSTOM_GET_DEVICE_VIDEO_INPUT_CONFIG_INFO** (8) (READ ONLY)
- 3.4. **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT** (201)
- 3.4. **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_AUTO_SCAN_ENABLED** (232)
- 3.4. **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DVI_YCBCR** (235)
- 3.4. **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_SOG** (234)

The property **KSPROPERTY_CUSTOM_GET_DEVICE_VIDEO_INPUT_CONFIG_INFO** allows you to get an OR combination of flag bits. This value shows what types of video sources you can set are supplied on one capture card.

EXAMPLE#01: TO GET THE SUPPORT INPUTS OF THE VIDEO SOURCE ON ONE CAPTURE CARD.

```
ULONG nInput = 0xFFFFFFFF;
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_GET_DEVICE_VIDEO_INPUT_CONFIG_INFO,
                        NULL, 0,
                        &nInput, sizeof(ULONG), &temp );
```

```
SUPPORT VALUE: 0: COMPOSITE
                1: SVIDEO
                2: HDMI
                3: DVI-D
                4: COMPONENTS (YCBCR)
                5: DVI-A (RGB) (VGA)
                6: SDI
```

The property **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT** allows you to get/change current video input source. We can support total 7 kinds of video input sources, HDMI, DVI-D, Components, DVI-A, SDI, COMPOSITE and SVIDEO.

```
SUPPORT VALUE: 0: HDMI
                1: DVI-Digital
                2: Components (YCbCr)
                3: DVI-Analog (RGB) (VGA)
                4: SDI
                5: COMPOSITE
                6: SVIDEO
```

EXAMPLE#02: SET INPUT TO HDMI.

```
ULONG nInput = 0;
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT,
                        NULL, 0,
```



```
&nInput, sizeof(ULONG), &temp );
```

EXAMPLE#03: CHANGE TO SDI INPUT.

```
ULONG nInput = 4;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT,  
                        NULL, 0,  
                        &nInput, sizeof(ULONG), &temp );
```

EXAMPLE#04: GET CURRENT INPUT SOURCE.

```
ULONG nInput = 0;
```

```
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                      KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT,  
                      NULL, 0,  
                      &nInput, sizeof(ULONG), &temp );
```

The property **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_AUTO_SCAN** allows you to enable or disable the automatic scan video input signal source. If this function detects the actual video input source and format on capture card, it will automatically set the correct video input source and format.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#05 ENABLE THE AUTO INPUT SCAN FUNCTION

```
LONG enable = 0x01;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                      KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_AUTO_SCAN,  
                      NULL, 0,  
                      &enable, sizeof(LONG), &temp );
```

The property **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DVI_YCBCR** allows you to use the DVI-I connector for component incoming signals.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#06: TO ENABLE THE FUNCTION

```
LONG enable = 0x01;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                      KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DVI_YCBCR,  
                      NULL, 0,  
                      &enable, sizeof(LONG), &temp );
```

If your input supports SOG (Sync on Green), you can use the property **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_SOG** to enable or disable it.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#07: TO ENABLE SYNC ON GREEN

```
LONG enable = 0x01;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_SOG,  
                        NULL, 0,  
                        &enable, sizeof(LONG), &temp );
```

3.5. KSPROPERTY_CUSTOM_GET_DEVICE_AUDIO_CONFIG (9)

3.5. KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_INPUT (255)

The property **KSPROPERTY_CUSTOM_GET_DEVICE_AUDIO_CONFIG** allows you to get an OR combination of flag bits. This value shows what types of audio sources you can set are supplied on one capture card.

EXAMPLE#01: TO GET THE SUPPORT INPUTS OF THE AUDIO SOURCE ON ONE CAPTURE CARD.

```
LONG nInput = 0xFFFFFFFF;
```

```
Preview->m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                                KSPROPERTY_CUSTOM_GET_DEVICE_AUDIO_CONFIG, NULL, 0,  
                                &nInput, sizeof(LONG) );
```

The property allows you to get/change current audio input source. You can select audio from embedded audio data or from extra line-in cable.

SUPPORT VALUE: 0: Embedded Audio
 1: Line In

Note!! The property is enabled only by HDMI, DVI-D, and SDI input mode.

EXAMPLE#02: CHANGE TO EMBEDDED AUDIO INPUT.

```
ULONG input = 0;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                      KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_INPUT,  
                      NULL, 0,  
                      &input, sizeof(ULONG) );
```

EXAMPLE#03: CHANGE TO LINE-IN INPUT.

```
ULONG input = 1;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                      KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_INPUT,  
                      NULL, 0,  
                      &input, sizeof(ULONG) );
```

EXAMPLE#04: GET CURRENT AUDIO INPUT SOURCE.

```
ULONG input = 0;
```

```
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                      KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_INPUT,  
                      NULL, 0,  
                      &input, sizeof(ULONG), &temp );
```

3.6. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DEINTERLACE_TYPE (200)
3.6. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_VERTICAL_MIRROR (244)
3.6. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_HORIZONTAL_MIRROR (245)

QP0203 offers one hardware-based deinterlacer on chip. The property (200) will allow you to access it. You can call the function, AMESDK_SET_CUSTOM_PROPERTY, to enable/disable this function.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#01: TO TURN ON HARDWARE DEINTERLACE FUNCTION.

```
ULONG enable = 1;
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DEINTERLACE_TYPE,
                        NULL, 0,
                        &enable, sizeof(ULONG), &temp );
```

Note!! The function, AMESDK_SET_DEINTERLACE, is used for software-based deinterlacer only. If you enable the hardware-based deinterlance function, you don't need call AMESDK_SET_DEINTERLACE again.

The two properties (244/245) are used to set mirror function. When mirror function is enabled, the vertical or horizontal video frame is inverted on display window. Same as deinterlacing, the property is used for display engine only.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#03: ENABLE THE VERTICAL MIRROR FUNCTION ON DISPLAY WINDOW

```
LONG enable = 0x01;
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_VERTICAL_MIRROR,
                        NULL, 0,
                        &enable, sizeof(ULONG), &temp );
```

EXAMPLE#04: ENABLE THE HORIZONTAL MIRROR FUNCTION ON DISPLAY WINDOW

```
LONG enable = 0x01;
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_HORIZONTAL_MIRROR,
                        NULL, 0,
                        &enable, sizeof(ULONG), &temp );
```

3.7. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DENOISE_TYPE (217)

QP0203 offers one hardware-based de-noise function on chip. The property will allow you to access it. You can use this property to enable/disable this function. Currently, we offer 3 levels de-noise methods to your application. The value 0 will turn off it.

SUPPORT VALUE: 0 ~ 3 - OFF ~ LEVEL 3

EXAMPLE#01: TO TURN OFF HARDWARE DENOISE FUNCTION.

```
ULONG input = 0;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DENOISE_TYPE,  
                        NULL, 0,  
                        &input, sizeof(ULONG) );
```

EXAMPLE#02: TO TURN ON HARDWARE DENOISE FUNCTION AT LEVEL 3.

```
ULONG input = 3;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DENOISE_TYPE,  
                        NULL, 0,  
                        &input, sizeof(ULONG) );
```

3.8. KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_VOLUME (251)

The property is used to control the current audio ADC's volume on the capture card.

SUPPORT VALUE: 0 (Mute): ~ 255 (Full)

Note!! The property is enabled only by HDMI, DVI-D, and SDI input mode.

EXAMPLE#01: TO SET THE AUDIO VOLUME AMPLITUDE.

```
LONG volume = 128;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_VOLUME,  
                        NULL, 0,  
                        &volume, sizeof(ULONG), &temp );
```

EXAMPLE#02: TO GET THE AUDIO VOLUME AMPLITUDE.

```
LONG volume;
```

```
m_pKsPropertySet->Get( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_VOLUME,  
                        NULL, 0,  
                        &volume, sizeof(ULONG), &temp );
```

- 3.9. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_OFFSET_X (221)
- 3.9. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_OFFSET_Y (222)
- 3.9. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_ASPECT_RATIO (224)
- 3.9. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_HACTIVE_PIXELS (225)

If input is in VGA or YCbCr, these properties (221/222/224/225) allow you to adjust the hardware receiver's property.

The offset property (221/222) allows you to adjust the horizontal and vertical offset for signal. Moreover, our driver will do auto memorize for setting value in next detection.

SUPPORT VALUE: -127 ~ +128

EXAMPLE#01: TO SET HORIZONTAL OFFSET FOR VGA.

```
LONG offset = -8;
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_OFFSET_X,
                        NULL, 0,
                        &offset, sizeof(LONG), &temp );
```

EXAMPLE#02: TO SET VERTICAL OFFSET FOR VGA.

```
LONG offset = -8;
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_OFFSET_Y,
                        NULL, 0,
                        &offset, sizeof(LONG), &temp );
```

The aspect ratio property (224) allows you to adjust signal's aspect ratio during displaying. The boundary will be filled by black image.

SUPPORT VALUE: 0 (4 : 3) , 1 (5 : 4) , 3 (16 : 9) ,
 4 (16 : 10) , 5 (3 : 2) , 6 (1 : 1) ,
 7 (HACTIVE PIXELS)

EXAMPLE#3: TO SET 16:9 ASPECT RATIO FOR VGA.

```
LONG aspectratio = 3;
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_ASPECT_RATIO,
                        NULL, 0,
                        &aspectratio, sizeof(LONG), &temp );
```

The horizontal active pixel property (225) allows you to set the total number of active pixels on a horizontal line. The horizontal component of timing consists of the horizontal active and horizontal blanking periods.

SUPPORT VALUE: PIXELS

EXAMPLE#4: TO SET HORIZONTAL ACTIVE PIXELS FOR VGA.

```
LONG pixels = 1920;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_HACTIVE_PIXELS,  
                        NULL, 0,  
                        &aspectratio, sizeof(LONG), &temp );
```


3.10. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_PHASE (219)

If input is in VGA or YCbCr, the property allows you to adjust the hardware receiver's property. If your monitor is on a VGA or YCbCr cable, you need to set the phase right. The property has values from 0 to 63. You can increase or decrease the value until the display clears up, no more fuzziness or shakiness.

The auto phase property can be set as below:

SUPPORT VALUE: 0 ~ 63 - MANUAL PHASE DEGREE

SUPPORT VALUE: 0x80000000 - AUTO PHASE

EXAMPLE#01: TO SET VGA PHASE AUTOMATICALLY.

```
ULONG phasevalue = 0x80000000;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_RX_VGA_PHASE,  
                        NULL, 0,  
                        &phasevalue, sizeof(ULONG), &temp );
```

3.11. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_EQ (240)

3.11. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_BANDWIDTH (248)

The property (240) allows you to set a suitable distance in meter when using the DVI and HDMI signal. Basically, the quality of signal can vary widely based on the cable's materials, but here can adjust the settings through the property.

SUPPORT VALUE: 0 ~ 2 - **2m, 10m, 10~15m (METER)**

EXAMPLE#01: TO SET THE CABLE LENGTH IN 2 METER

```
LONG input = 0x00;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_EQ,  
                        NULL, 0,  
                        &input, sizeof(LONG), &temp );
```

EXAMPLE#02: TO SET THE CABLE LENGTH IN 10 METER

```
LONG input = 0x01;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_EQ,  
                        NULL, 0,  
                        &input, sizeof(LONG), &temp );
```

EXAMPLE#03: TO SET THE CABLE LENGTH IN 10~15 METER

```
LONG input = 0x02;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_EQ,  
                        NULL, 0,  
                        &input, sizeof(LONG), &temp );
```

The property (248) allows you to get/set current video input bandwidth for the HDMI or DVI input. We can support total 6 kinds of video input bandwidth, 50%, 75%, 100%, 125%, 150%, and 200%. By default, the bandwidth is 75%.

SUPPORT HDMI/DVI BANDWIDTH: 0: 50%

1: 75%

2: 100%

3: 125%

4: 150%

5: 200%

3.12. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_COLOR_RANGE (231)

The property allows you to control each input (HDMI, COMPONENT, VGA) to different scale rang. You should choose proper mode because it makes you achieve the most accurate color.

We can use a 32-bit number (4 byte) as input value:

A 2-bit **operation code** can be set as below to specify the conversion operation:

- 0: Keep the color range unchanged. (Default)
- 1: Shrink the input from full range to limited range. (16-235 level)
- 2: Expand the input from limited range to full range. (0-255 level)

Other bit fields are used to represent as below:

- [1:0] Operation code for HDMI input when register reveals 0 "Default (depend on video format)"
- [5:4] Operation code for HDMI input when register reveals 1 "Limited range"
- [9:8] Operation code for HDMI input when register reveals 2 "Full range"
- [13:12] Operation code for Component input
- [17:16] Operation code for VGA input

NOTE: Normally it is recommended to set operation code to default. If the displayed black or white color in the video input is not enough true. You can use the mode adjustment to change the color quality for video input.

EXAMPLE#01: TO CHANGE HDMI INPUT LIMITED RANGE TO FULL RANGE

```
LONG input = 0x00020;  
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_COLOR_RANGE, NULL, 0,  
                        &input, sizeof(LONG) );
```

EXAMPLE#02: TO CHANGE HDMI INPUT FULL RANGE TO LIMITED RANGE

```
LONG input = 0x00100;  
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_COLOR_RANGE, NULL, 0,  
                        &input, sizeof(LONG) );
```

EXAMPLE#03: TO CHANGE ALL INPUT TO LIMITED RANGE

```
LONG input = 0x11100;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_COLOR_RANGE, NULL, 0,  
                        &input, sizeof(LONG) );
```

EXAMPLE#04: TO EXPAND ALL INPUT COLOR RANGE NO MATTER WHAT

```
LONG input = 0x22222;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_COLOR_RANGE, NULL, 0,  
                        &input, sizeof(LONG) );
```

3.13. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FLEXIBLE_FPS_PATCH (218)

The property allows you to control the output format from one video capture filter. It allows you to adjust the video's frame rate from driver side. If it is disabled, the output frame rate is equal to input signal's frame rate.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#01: TO ENABLE FRAMERATE SCALER.

```
LONG enable = 0x01;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FLEXIBLE_FPS_PATCH, 0,  
                        &enable, sizeof(LONG) );
```

3.14. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FLEXIBLE_RESOLUTION_PATCH (220)

The property allows you to adjust the video's resolution from hardware board. If it is disabled, the output resolution is equal to input signal's resolution. If it is enabled, we will enable one auto scalar to output customized format. For example, input resolution is 1920x1080 and capture output pin's resolution is 720x480.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#01: TO ENABLE RESOLUTION SCALER.

```
LONG enable = 0x01;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FLEXIBLE_RESOLUTION_PATCH, 0,  
                        &enable, sizeof(LONG) );
```

3.15. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_IS_SINGLE_FOMART_OUTPUT (215)

To configure a capture filter's output format, the property can expose all range of output formats or expose only single format. If it is disabled, the capture filter exposes all output formats. If it is enabled, we can only expose one format on the video capture filter output.

SUPPORT VALUE: 0: EXPOSE ALL FORMATS
1: SINGLE FORMAT

We can combine these three properties (215/218/220) to remove image scale function.

EXAMPLE#01: TO REMOVE IMAGE SCALER.

```
LONG enable = 0x00;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_IS_SINGLE_FOMART_OUTPUT, 0,  
                        &enable, sizeof(LONG) );
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FLEXIBLE_FPS_PATCH, 0,  
                        &enable, sizeof(LONG) );
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_FLEXIBLE_RESOLUTION_PATCH, 0,  
                        &enable, sizeof(LONG) );
```

Note, to enable them (218, 220, 215), you need reboot the system.

3.18. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_QUEUE_BUFFER_SIZE (216)

The property allows you to specify the number of the rendered video frame in the queue buffer for a preview or hardware-encoded stream. By the default, the queue size of the corresponding a preview and hardware-encoded stream is set 10 and 16. Here we recommended use the size by default because this is implicated in many resource issues. For example, the unexpected signal error may occur if the total buffer sizes you want to set exceed the system capabilities.

Note: Setting queue buffer size will involve in dynamically allocated memory.

EXAMPLE#01: TO SET THE PREVIEW QUEUE SIZE TO 10 FRAMES

```
LONG bufferSize = 10;
```

[illegible]

EXAMPLE#02: TO SET THE HARDWARE-ENCODED QUEUE SIZE TO 16 FRAMES

```
LONG nBufferSize = 16;
```

[illegible]

3.19. KSPROPERTY_CUSTOM_XET_PREVIEW_VIDEO_STERAM_POST_RESOLUTION (350)

The property allows you to adjust current video resolution dynamically. The driver will re-allocate memory during changing video format on capture card running state.

SUPPORT VALUE: RESOLUTION = (WIDTH << 16) | (HEIGHT << 0)

EXAMPLE#01: TO SET PREVIEW VIDEO RESOLUTION DYNAMICALLY.

```
LONG resolution = (WIDTH << 16) | (HEIGHT << 0);
```

[illegible]

3.20. KSPROPERTY_CUSTOM_XET_DRIVER_VIDEO_IS_DIRECT_DMA_ENABLED (272)

The property allows you to enable video direct memory access channels on capture card. Direct memory access (DMA) allows a capture device to send/receive data directly to/from the main memory, bypassing the CPU to speed up the system performance. Without the DMA channels, the CPU copies data using PCI bus. During the CPU read/write tasks, it does not allow other work to be performed until the operation is completed.

SUPPORT VALUE: 0: DISABLE
 1: ENABLED

EXAMPLE#01: TO ENABLE VIDEO DIRECT MEMORY ACCESS CHANNELS.

```
ULONG enable = 1;
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                        KSPROPERTY_CUSTOM_XET_DRIVER_VIDEO_IS_DIRECT_DMA_ENABLED, 0,
                        &enable, sizeof(ULONG) );
```

3.21. KSPROPERTY_CUSTOM_XET_PREVIEW_VIDEO_STARAM_POST_AVG_FRAMERATE (247)

```
SUPPORT VALUE:  0: DISABLE
                  1, 2, 3, 4, ... SKIP
```

[illegible]

```
SUPPORT VALUE:  0: DISABLE
                1 ~ 85 FPS
```

[illegible]

3.22. KSPROPERTY_CUSTOM_XET_GPIO_DIRECTION (940)

3.22. KSPROPERTY_CUSTOM_XET_GPIO_DATA (941)

3.22. KSPROPERTY_CUSTOM_GET_GPIO_SUPPORT (942) (READ ONLY)

The property allows you to access QP0203's GPIO interface. The property KSPROPERTY_CUSTOM_XET_GPIO_DIRECTION allows you to control its direction. Here, writing 1 to bit enables this pin as output pin. Usually, the GPIO is controlled by the first chipset in one board.

SUPPORT VALUE: 0 ~ 1 - INPUT ~ OUTPUT

The property KSPROPERTY_CUSTOM_XET_GPIO_DATA allows you to access GPIO's data.

SUPPORT VALUE: 0 ~ 1 - LOW ~ HIGH

The property KSPROPERTY_CUSTOM_XET_GPIO_SUPPORT allows you to obtain GPIO's information (pin size) on hardware board. Developer can use it to check if the device can support GPIO access.

SUPPORT VALUE: 0 IS NON-SUPPORT

EXAMPLE#01: TO DEFINE GPIO AS 8 OUTPUT PINS [0:7] AND 8 INPUT PINS [8:15].

```
ULONG input = 0x00FF;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_GPIO_DIRECTION, NULL, 0,  
                        &input, sizeof(ULONG) );
```

EXAMPLE#02: TO DEFINE GPIO AS 16 OUTPUT PINS [0:15] THEN PULL HIGH FOR ALL.

```
ULONG input = 0xFFFF;
```

```
ULONG data = 0xFFFF;
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_GPIO_DIRECTION, NULL, 0,  
                        &input, sizeof(ULONG) );
```

```
m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,  
                        KSPROPERTY_CUSTOM_XET_GPIO_DATA, NULL, 0,  
                        &data, sizeof(ULONG) );
```


- 3.23. **KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_MODE** (407)
- 3.23. **KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_QUALITY** (404)
- 3.23. **KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_BITRATE** (403)
- 3.23. **KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_MAX_BITRATE** (409)
- 3.23. **KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_MIN_BITRATE** (410)

The property **KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_MODE** allows you to get/set record mode on hardware-compressed capture device. There are 3 kinds of encoder mode: variable bitrate (VBR), constant bitrate (CBR) and average bitrate (ABR).

SUPPORT VALUE: 0: VBR
 1: CBR
 2: ABR

In the VBR mode, you choose the desired quality going from 0 (lowest quality) to 1000 (highest quality). The encoder tries to maintain the given quality for your video file. The main advantage is that you are able to specify the quality level that you want to reach, but the disadvantage is that the video size is unpredictable.

The property **KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_QUALITY** allows you to set a suitable quality in VBR mode.

SUPPORT VALUE: 0 ~ 10000

EXAMPLE#01: TO SET VIDEO ENCODER QUALITY.

```
ULONG RecordMode = 0;
Encoder->m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                                KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_MODE, 0,
                                &RecordMode, sizeof(ULONG) );

ULONG Quality = 8000;
Encoder->m_pKsPropertySet->Set( PROPSETID_AMEBDAD_CUSTOM_PROP,
                                KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_QUALITY, 0,
                                &Quality, sizeof(ULONG) );
```

In the CBR mode, the bitrate will be the same for the whole video file. The quality of your video is variable. The main advantage is that final video size can be accurately predicted, but the disadvantage is that the complex video parts will be a lower quality.

The property **KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_RECORD_BITRATE**

[illegible]

```
ULONG RecordMode = 2;
```

```
ULONG Bitrate = 1 * 1024 *1024;
```

[illegible]

3.24. KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STARAM_POST_AVG_FRAMERATE (422)

```
SUPPORT VALUE:  0: DISABLE
                  1, 2, 3, 4, ... SKIP
```

```
ULONG FrameRate = 1;
```

The property (422) allows you to adjust encoding average frame rate dynamically. The range of the property is from 1 to 85. To enable it, our driver will follow the setting value to output one average fps. For example, 9 mean 9.00fps.

EXAMPLE#02: TO SET VIDEO ENCODING AVERAGE FRAMERATE DYNAMICALLY.

```
ULONG FrameRate = 9;
```

[illegible]

3.25. KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_POST_RESOLUTION (401)

The property allows you to adjust video encoding resolution dynamically. The driver will re-allocate memory during changing video format on capture card running state.

SUPPORT VALUE: RESOLUTION = (WIDTH << 16) | (HEIGHT << 0)

EXAMPLE#01: TO SET VIDEO ENCODING RESOLUTION DYNAMICALLY.

```
ULONG RESOLUTION = (WIDTH << 16) | (HEIGHT << 0);
```

[illegible]

3.26. KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_PROFILE (412)

The property allows you to adjust video encoder profile on hardware-compressed capture device. There are 3 kinds of profile value.

```
SUPPORT  VALUE:      0: DEFAULT  (HIGH)
                     1: BASELINE
                     2: MAIN
                     3: HIGH
```

EXAMPLE#01: TO SET VIDEO ENCODER PROFILE.

```
ULONG PROFILE = 3;
```

[illegible]

3.28. KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_ENTROPY (415)

The property allows you to adjust video encoder entropy on hardware-compressed capture device. There are 2 kinds of entropy value.

```
SUPPORT VALUE:    0: DEFAULT  (CABAC)
                  1: CAVLC
                  2: CABAC
```

EXAMPLE#01: TO SET VIDEO ENCODER ENTROPY.

```
ULONG ENTROPY = 2;
```

[illegible]

3.29. KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_BFRAMES (411)

The property allows you to set video encoder B frames on hardware-compressed capture device. If the number of B-Frames is 2, the encoder will insert two B-frames between each I-frame and P-frame. For example, using the value of 2, you will create a Group of Pictures that looks like this: IBBPBBPBBPBB... Note that B-frames are not available when using Baseline Profile.

SUPPORT VALUE: 0, 1, 2

EXAMPLE#01: TO SET VIDEO ENCODER B-FRAMES.

```
ULONG BFRAMES = 2;
```

[illegible]

3.31. KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_ASPECT_RATIO (413)

The property allows you to set video encoder aspect ratio on hardware-compressed capture device. The property can maintain aspect ratio when resizing your video. Aspect ratio is expressed as the relation of the width and height.

SUPPORT VALUE: ASPECT RATIO = (WIDTH << 16) | (HEIGHT << 0)

EXAMPLE#01: TO SET VIDEO ENCODER ASPECT RATIO.

```
ULONG ASPECT_RATIO = (WIDTH << 16) | (HEIGHT << 0);
```

[illegible]

3.32. KSPROPERTY_CUSTOM_SET_ENCODER_VIDEO_STERAM_FORCE_KEY_FRAME (406)

The property allows you to set video encoder force key frame on hardware-compressed capture device. The property puts key frame on the next frame or forcing a key frame at specified timestamp.

SUPPORT VALUE: 1: FROCE KEYFRAME

EXAMPLE#01: TO SET VIDEO ENCODER FORCE KEYFRAME.

```
ULONG FROCE KEYFRAME = 1;
```

[illegible]

3.33. KSPROPERTY_CUSTOM_XET_ENCODER_VIDEO_STERAM_FRAME_QUEUE_LENGTH (424)

The property allows you to specify the number of the rendered video frame in the queue buffer for video encoded stream. By the default, the queue size of the corresponding video encoded stream is set 16. Here we recommended use the size by default because this is implicated in many resource issues. For example, the unexpected signal error may occur if the total buffer sizes you want to set exceed the system capabilities.

Note: Setting queue buffer size will involve in dynamically allocated memory.

EXAMPLE#01: TO SET THE VIDEO ENCODER QUEUE SIZE TO 16 FRAMES.

```
ULONG QUEUE_FRAMES = 16;
```

[illegible]

3.34. Video Encoder Property:

Please reference the two functions to get/set all video encoder's parameters.

```
static const GUID GUID_KPS_QP0203 = { 0xD1E5209F, 0x68FD, 0x4529, 0xBE, 0xE0, 0x5E, 0x7A, 0x1F, 0x47, 0x92, 0x21 };
```

```
BOOL OnGetVideoCompressionProperty( ULONG nProperty, ULONG * pValue )
{
    if( NULL == m_pAMVideoCompression ) { FALSE; }

    if( NULL == m_pKsPropertySet ) { FALSE; }

    if( nProperty == 0x00000000 ) { // KEY.FRAME.RATE (GOP)

        if( S_OK != m_pAMVideoCompression->get_KeyFrameRate( (LONG *) (pValue) ) ) { return FALSE; }
    }
    if( nProperty == 0x00000001 ) { // QUALITY

        double fQuality = 0.0f;

        if( S_OK != m_pAMVideoCompression->get_Quality( &fQuality ) ) { return FALSE; }

        *pValue = (ULONG) (fQuality * 10000.0f);
    }
    if( nProperty == 0x00000003 ) { // BIT.RATE.MODE

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 407, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
    if( nProperty == 0x00000004 ) { // BIT.RATE

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 403, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
    if( nProperty == 0x00000008 ) { // POST.RESOLUTION

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 401, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
    if( nProperty == 0x00000009 ) { // POST.SKIP.FRAME.RATE

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 402, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
    if( nProperty == 0x0000000D ) { // POST.AVG.FRAME.RATE

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 422, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
    if( nProperty == 0x0000000A ) { // B.FRAME

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 411, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
    if( nProperty == 0x0000000B ) { // PROFILE

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 412, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
    if( nProperty == 0x0000000C ) { // ASPECT.RATIO

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 413, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
    if( nProperty == 0x0000000E ) { // LEVEL

        if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 414, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {

            return FALSE;
        }
    }
}
```

```
if( nProperty == 0x0000000F ) { // ENTROPY
    if( S_OK != m_pKsPropertySet->Get( GUID_KPS_QP0203, 415, NULL, 0, pValue, sizeof(ULONG), &cbBytes ) ) {
        return FALSE;
    }
    return TRUE;
}
```

```

BOOL OnSetVideoCompressionProperty( ULONG nProperty, ULONG nValue )
{
    if( NULL == m_pAMVideoCompression ) { return FALSE; }

    if( NULL == m_pKsPropertySet ) { return FALSE; }

    if( nProperty == 0x00000000 ) { // KEY.FRAME.RATE (GOP)
        if( S_OK != m_pAMVideoCompression->put_KeyFrameRate( nValue ) ) { return FALSE; }
    }
    if( nProperty == 0x00000001 ) { // QUALITY
        double fQuality = nValue;

        fQuality /= 10000.0f;

        if( S_OK != m_pAMVideoCompression->put_Quality( fQuality ) ) { return FALSE; }
    }
    if( nProperty == 0x00000002 ) { // OVERRIDE.KEY.FRAME
        if( S_OK != m_pAMVideoCompression->OverrideKeyFrame( nValue ) ) { return FALSE; }
    }
    if( nProperty == 0x00000003 ) { // BIT.RATE.MODE
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 407, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x00000004 ) { // BIT.RATE
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 403, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x00000008 ) { // POST.RESOLUTION
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 401, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x00000009 ) { // POST.SKIP.FRAMERATE
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 402, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x0000000D ) { // POST.AVG.FRAMERATE
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 422, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x0000000A ) { // B.FRAME
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 411, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x0000000B ) { // PROFILE
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 412, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x0000000C ) { // ASPECT.RATIO
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 413, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x0000000E ) { // LEVEL
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 414, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    if( nProperty == 0x0000000F ) { // ENTROPY
        if( S_OK != m_pKsPropertySet->Set( GUID_KPS_QP0203, 415, NULL, 0, &nValue, sizeof(ULONG) ) ) {
            return FALSE;
        }
    }
    return TRUE;
}

```


4. Application Note for DirectShow Developer

The developer who uses DirectShow to access our capture source filter need check the frame size in the callback function of your SampleGrabber class. If the frame size is 0 bytes, it means the frame is one bad frame. You should drop it. More detail, please check with our engineer team directly.