

SC200/SC300 Extra Software Programming Guide

Custom Property

1. **KSPROPERTY_CUSTOM_GET_DEVICE_SERIAL_NUMBER_INFO** (0) (READ ONLY)

1. **KSPROPERTY_CUSTOM_GET_DEVICE_BUS_NUMBER_INFO** (2) (READ ONLY)

The property **KSPROPERTY_CUSTOM_GET_DEVICE_SERIAL_NUMBER_INFO** allows you to get Vendor ID (VID) and Product ID (PID) for the capture card. Vendor ID and product ID are 16-bit numbers used to identify PCI devices to a computer. The VID and PID are embedded in the capture card and communicated to the computer.

EXAMPLE#01: TO GET THE VENDER ID AND PRODUCT ID FROM THE CAPTURE CARD.

```
ULONG dwSerialNumber = 0x00000000;  
AMESDK_GET_CUSTOM_PROPERTY( hDevice, 0, &dwSerialNumber);
```

The property **KSPROPERTY_CUSTOM_GET_DEVICE_BUS_NUMBER_INFO** allows you to get current PCI bus number on the capture card. For example, the capture card on the first PCI slot, on the second PCI slot, or on the third PCI slot, etc.

EXAMPLE#02: TO GET THE BUS NUMBER ON THE CAPTURE CARD.

```
ULONG dwBusNumber = 0x00000000;  
AMESDK_GET_CUSTOM_PROPERTY( hDevice, 2, &dwBusNumber);
```

2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SIGNAL_LOCK_STATUS (230) (READ ONLY)
2. KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_MACROVISION (202) (READ ONLY)

The property (230) 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;
```

```
AMESDK_GET_CUSTOM_PROPERTY( hDev, 230, &nLock );
```

The property (202) 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.

```
AMESDK_GET_CUSTOM_PROPERTY( hDev, 202, &HDCP );
```

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

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

- 3. **KSPROPERTY_CUSTOM_GET_ANALOG_VIDEO_SINGAL_DEBUG_INFO** (271) (READ ONLY)
- 3. **KSPROPERTY_CUSTOM_GET_PREVIEW_VIDEO_STARAM_FRAME_NUMBER_INFO** (351) (READ ONLY)
- 3. **KSPROPERTY_CUSTOM_GET_PREVIEW_AUDIO_STARAM_FRAME_NUMBER_INFO** (361) (READ ONLY)
- 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;  
AMESDK_GET_CUSTOM_PROPERTY( hDevice, 271, &dwSingalDebugInfo);
```

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;  
AMESDK_GET_CUSTOM_PROPERTY( hDev, 351, &dwPreviewVideoFrameNumber );
```

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;  
AMESDK_GET_CUSTOM_PROPERTY( hDev, 361, &dwPreviewAudioFrameNumber);
```

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;
```

```
AMESDK_GET_CUSTOM_PROPERTY( hDev, 430, &dwEncoderVideoFrameNumber);
```

- 4. **KSPROPERTY_CUSTOM_GET_DEVICE_VIDEO_INPUT_CONFIG_INFO** (8) (READ ONLY)
- 4. **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT** (201)
- 4. **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT_AUTO_SCAN_ENABLED** (232)

The property **KSPROPERTY_CUSTOM_GET_DEVICE_VIDEO_CONFIG** 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.

SUPPORT VALUE: 0: COMPOSITE
1: SVIDEO

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

```
ULONG nInput = 0xFFFFFFFF;  
AMESDK_GET_CUSTOM_PROPERTY( hDevice, 8, &nInput);
```

The property **KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_INPUT** allows you to get/change current video input source. We can support two kinds of video input sources, COMPOSITE and SVIDEO.

SUPPORT VALUE: 0: COMPOSITE
1: SVIDEO

EXAMPLE#02: SET INPUT TO SVIDEO.

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 201, 1 );
```

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;  
AMESDK_SET_CUSTOM_PROPERTY( hDev, 232, enable );
```

- 5. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_DEINTERLACE_TYPE (200)
- 5. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_VERTICAL_MIRROR (244)
- 5. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_HORIZONTAL_MIRROR (245)

The property offers one software-based de-interlace on interleaved video frame buffer. There are 4 methods to de-interlace video that can be controlled by you. After de-interlacing video, the incoming video frame buffer will become one progressive frame.

SUPPORT METHOD: 0: BOB
1: WEAVE (OFF)
2: LOW MOTION
3: HIGH MOTION

EXAMPLE#01: SET DEINTERLACE METHOD TO WEAVE.

```
ULONG nDeinterlaceMethod = 1;  
AMESDK_SET_CUSTOM_PROPERTY( hDev, 200, nDeinterlaceMethod);
```

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#02: ENABLE THE VERTICAL MIRROR FUNCTION ON DISPLAY WINDOW

```
LONG enable = 0x01;  
AMESDK_SET_CUSTOM_PROPERTY( hDev, 244, enable);
```

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

```
LONG enable = 0x01;  
AMESDK_SET_CUSTOM_PROPERTY( hDev, 245, enable);
```

6. KSPROPERTY_CUSTOM_XET_ANALOG_AUDIO_VOLUME (251)

The property allows you to adjust hardware's audio volume. The support range is from 0 to 255. 0 is mute.

SUPPORT VALUE: 0 ~ 255 - 0% ~ 100%

EXAMPLE#01:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 251, 0 );
```

EXAMPLE#02:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 251, 128 );
```

7. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_AGC (204)

The property allows you to enable or disable TW6805's AGC loop circuit. When the AGC loop function is disabled, the AGC gain can be decided by your software manually. The range of AGC gain is from 0 to 511. If MSB bit.31 is set, the AGC loop function will be enabled.

SUPPORT VALUE: 0x00000000 ~ 0x000001FF - DISABLE AGC LOOP & SET AGC GAIN
SUPPORT VALUE: 0x80000000 - ENABLE AGC LOOP

EXAMPLE#01:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 204, 0x80000000 );
```

EXAMPLE#02:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 204, 0x00000100 );
```


8. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_IS_BLACKING_BOUNDARY_REMOVED (209)

The property allows you to check whether the video blanking data is removed. If it is enabled, the video blanking data is displayed on the screen. If it is disabled, the video blanking data is removed from the incoming data stream.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#01:

```
AMESDK_GET_CUSTOM_PROPERTY( hDev, 209, &BLANKING_REMOVED );
```

9. 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.

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 218, 1 );
```

10. 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 704x480 and capture output pin's resolution is 352x240.

SUPPORT VALUE: 0 ~ 1 - DISABLE ~ ENABLE

EXAMPLE#01: TO ENABLE RESOLUTION SCALER.

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 220, 1 );
```

11. 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.

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 350, &RESOLUTION );
```

12. KSPROPERTY_CUSTOM_XET_PREVIEW_VIDEO_STREAM_POST_SKIP_FRAMERATE (246)

12. KSPROPERTY_CUSTOM_XET_PREVIEW_VIDEO_STARAM_POST_AVG_FRAMERATE (247)

The property (246) allows you to adjust current video skip frame rate dynamically. The range of the property is from 1 to 255. It is identical to the skip number of frame. For example, the value 1 will generate the preview frame rate, 15.000fps.

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

EXAMPLE#01: TO SET PREVIEW VIDEO SKIP FRAMERATE DYNAMICALLY.

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 246, &FRAMERATE );
```

The property (247) allows you to adjust current video 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.

SUPPORT VALUE: 0: DISABLE
 1 ~ 85 FPS

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

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 247, &FRAMERATE );
```

14. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_QUEUE_BUFFER_SIZE (216)

The property allow you to specify the number of the rendered video frame in the queue buffer for a preview stream. By the default, the queue size of the corresponding a preview stream is set 10. 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 nBfferSize = 10;
```

```
AMESDK_SET_CUSTOM_PROPERTY( hPreviewDevice, 216, nBfferSize );
```

15. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_SWITCH_SPEED (205)

Software programmer can use this property to control the switching speed under switching mode(*). Currently, there are 3 level speeds that can be controlled by you. Please reference this table as below: Here, the total fps means the total output frames per second for one chip under switching mode. For example, the total fps is 20fps. If you split one chip into four sub-channels, the every sub-channel's fps will be 5fps.

(*) Here, the switching mode means that one TW6805 chip is spitted to 2, 3 or 4 channels. We call these channels as sub-channel. SC300Q16 owns 4 chips and max 16 sub-channels.

RESOLUTION		SPEED	TOTAL FPS	COMMENT
D1	720×480	2	20FPS	
	704×480			
	640×480	1	20FPS	
	720×576			
	704×576	0	12FPS	
	640×576			
HALF D1	720×240	2	20FPS	
	704×240			
	640×240	1	30FPS	TO OBTAIN PERFECT OUTPUT RESULT, BUT TO CAUSE ONE LEFT-RIGHT SHIFTING SIDE EFFECT.
	720×288			
	704×288	0	15FPS	
	640×288			
CIF	360×240	2	20FPS	
	352×240			
	320×240	1	30FPS	TO OBTAIN PERFECT OUTPUT RESULT, BUT TO CAUSE ONE LEFT-RIGHT SHIFTING SIDE EFFECT.
	360×288			
	352×288	0	15FPS	
	320×288			

SUPPORT VALUE: 0, 1, 2

EXAMPLE#01:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 205, 0 );
```

EXAMPLE#02:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 205, 1 );
```

16. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_SWITCH_CHANNEL_TABLE (206)

In default setting, our switching algorithm uses one averaged channel table to control the channel switching sequence. The table size is 12 items length. Every item can be 0, 1, 2 or 3 to correspond to its sub-channels. For example, the split number is 4. The default switching channel table will be as { 0, 1, 2, 3, 0, 1, 2, 3, 0, 1, 2, 3 }.

Now, you can control the switching table dynamically by our SDK. For example, the table can be updated to { 0, 0, 1, 2, 0, 0, 1, 2, 0, 0, 1, 2 }. The total 20fps for every sub-channel will be changed as below:

CH#01: 10fps,
CH#02: 5fps,
CH#03: 5fps, and
CH#04: 0fps.

For another example, the table is { 0, 0, 0, 1, 1, 1, 2, 2, 2, 3, 3, 3 }. The result simulates one channel jumping effect.

Moreover, the table also can support single channel switching such as { 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1 }. When the table is set, the switching mode will auto be returned to real-time mode. So, by this table, the CH#02's fps will be up to 30fps.

EXAMPLE#01: DISABLE CH#03.

```
BYTE TABLE[ 12 ] = { 0, 1, 3, 0, 1, 3, 0, 1, 3, 0, 1, 3 };  
AMESDK_SET_CUSTOM_PROPERTY_EX( hDev, 206, TABLE, 12 );
```

EXAMPLE#02: CHANNEL JUMPING.

```
BYTE TABLE[ 12 ] = { 0, 0, 0, 1, 1, 1, 2, 2, 2, 3, 3, 3 };  
AMESDK_SET_CUSTOM_PROPERTY_EX( hDev, 206, TABLE, 12 );
```

EXAMPLE#03: GET CURRENT SWITCH CHANNEL TABLE.

```
BYTE TABLE[ 12 ];  
AMESDK_GET_CUSTOM_PROPERTY_EX( hDev, 206, TABLE, 12 );
```

EXAMPLE#04: SINGLE CHANNEL OUTPUT.

```
BYTE TABLE[ 12 ] = { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 };  
AMESDK_SET_CUSTOM_PROPERTY_EX( hDev, 206, TABLE, 12 );
```


17. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_SWITCH_RESOLUTION_TABLE (207)

The custom property allows the developer to change default resolution at any time. For example, at four channel's switching mode, developer need obtain this configuration as below:

CH#01: 704x480

CH#02: 704x240

CH#03: 352x240

CH#04: 352x240

The property programming is similar to **ANALOG_VIDEO_SWITCH_CHANNEL_TABLE**. It also uses 12 bytes to setup the kernel driver's resolution table. Every item is corresponded to its channel item in the switching channel table. The parameter range is from 0 to 2.

0x00: D1

0x01: HALF.D1

0x02: CIF.

EXAMPLE#01: SETUP RESOLUTION TABLE AS BELOW:

CH#01: 704x480

CH#02: 704x240

CH#03: 352x240

CH#04: 352x240

```
BYTE CHANNEL_TABLE[ 12 ] = { 0, 1, 2, 3, 0, 1, 2, 3, 0, 1, 2, 3 };
```

```
BYTE RESOLUTION_TABLE[ 12 ] = { 0, 1, 2, 2, 0, 1, 2, 2, 0, 1, 2, 2 };
```

```
AMESDK_SET_CUSTOM_PROPERTY_EX( hDev, 206, CHANNEL_TABLE, 12 );
```

```
AMESDK_SET_CUSTOM_PROPERTY_EX( hDev, 207, RESOLUTION_TABLE, 12 );
```

18. KSPROPERTY_CUSTOM_XET_ANALOG_VIDEO_POST_FRAME_RATE (208)

Generally, the software developer can use AMESDK_SET_FORMAT to control video frame rate output. For some special applications, developer could adjust the frame rate dynamically during recording. The post frame rate is dynamically used to adjust current stream output, which is set by AMESDK_SET_FORMAT function at initialize stage. The range of the post frame rate property is from 0 to 255. It is identical to the skip number of frame (or field). The value 1 means the recording frame rate is 15.000fps in NTSC.

EXAMPLE#01: SET FRAMERATE TO 30.000FPS:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 208, 0 ); // 30FPS / (0 + 1) = 30FPS
```

EXAMPLE#02: SET FRAMERATE TO 15.000FPS:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 208, 1 ); // 30FPS / (1 + 1) = 15FPS
```

EXAMPLE#03: SET FRAMERATE TO 10.000FPS:

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 208, 2 ); // 30FPS / (2 + 1) = 10FPS
```

19. KSPROPERTY_CUSTOM_XET_GPIO_DIRECTION (940)

19. KSPROPERTY_CUSTOM_XET_GPIO_DATA (941)

The property allows you to access TW6805'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

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

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 940, 0x00FF );
```

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

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 940, 0xFFFF );
```

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 941, 0xFFFF );
```

EXAMPLE#03: TO DEFINE GPIO AS 16 INPUT PINS [0:15] THEN READ DATA FROM IT.

```
AMESDK_SET_CUSTOM_PROPERTY( hDev, 940, 0x0000 );
```

```
AMESDK_GET_CUSTOM_PROPERTY( hDev, 941, &GPIO );
```

20. 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.