JIPEncoder User's Guide

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1. Overview

JIPEncoder is a powerful SD and HD SDI encoding and streaming solution. It accepts SDI, HDMI, Component and Composite inputs. AVC/H.264, HEVC/H.265 and MPEG-2 video encoding, AAC and MPEG audio encoding, MPEG Transport and Program Stream multiplex are supported. UDP, RTP and HLS (HTTP Live Streaming) are the supported output network protocols for live streaming. The Bitrate monitor provides the current output multiplex bit rate. Multi-channel audio volume monitoring and control. The video PSNR monitor provides real-time video encoding quality monitoring. The product is suitable for automation through the scheduler module. The CPU monitor provides a system processing load overview.

1.1 General Features

- Vast variety of output format resolutions and frame rates, from SD up to Full HD, including 3D
- Input interfaces: SD-SDI, HD-SDI, 6G-SDI, HDMI, Composite, Component
- Output: IP – UDP, RTP, HLS (HTTP Live Streaming), DASH (Dynamic Adaptive Streaming over HTTP)
- Stream container: MPEG Transport Stream
- Video compressions supported: MPEG-1/2, AVC/H.264, HEVC/H.265
- Audio compressions supported: MPEG Audio Layer I/II, AAC
- Audio volume metering and control
- Bitrate preview module
- CPU load preview module
- Video encoding PSNR preview module
- Automation: single daily and weekly encoding through a schedule module
- Manual encoding mode
- Timer

1.2 Supported Output Stream Formats

Supported multiplex formats:

- MPEG-2 Transport Stream
- HLS – HTTP Live Streaming
- DASH – Dynamic Adaptive Streaming over HTTP

Supported video compression formats:

- AVC/H.264 Video
- QuickSync AVC/H.264
- HEVC/H.265 Video
- MPEG-2 Video

Supported audio compression formats:

- AAC Audio
- MPEG Audio Layer I/II/III

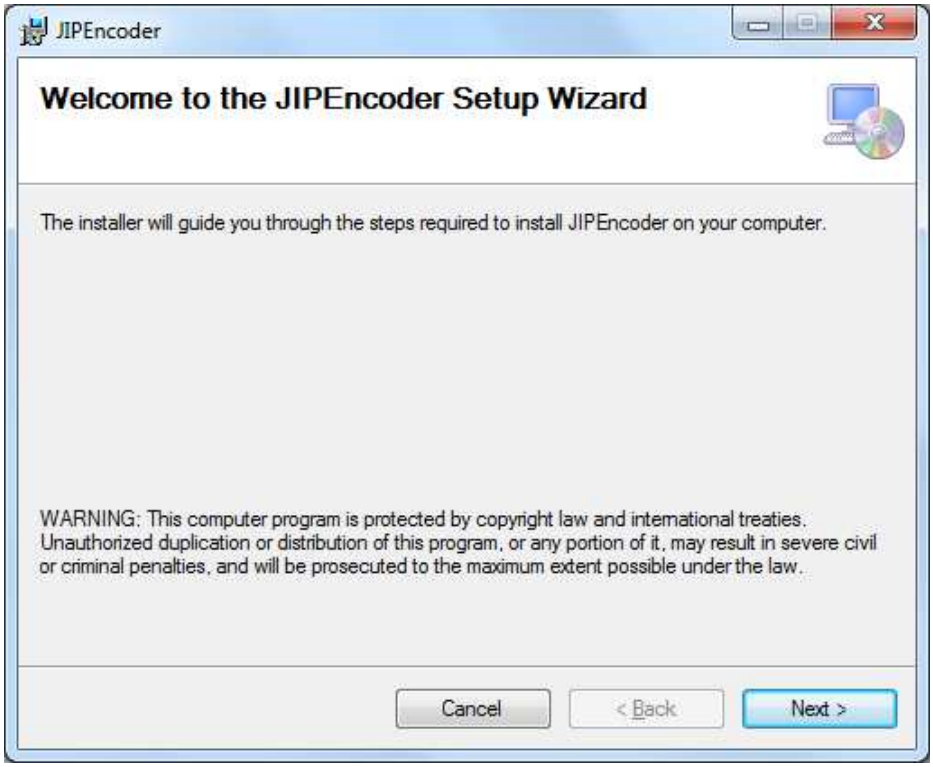
2. Installation

2.1 Installing JIPEncoder

Before installing the **JIPEncoder** solution, make sure that any previous version of the product has been uninstalled refer 2.2.

The installation package of **JIPEncoder** is distributed in msi file. After downloading the file from the official Jongate web site – www.jongate.com, execute the installation by starting the msi file.

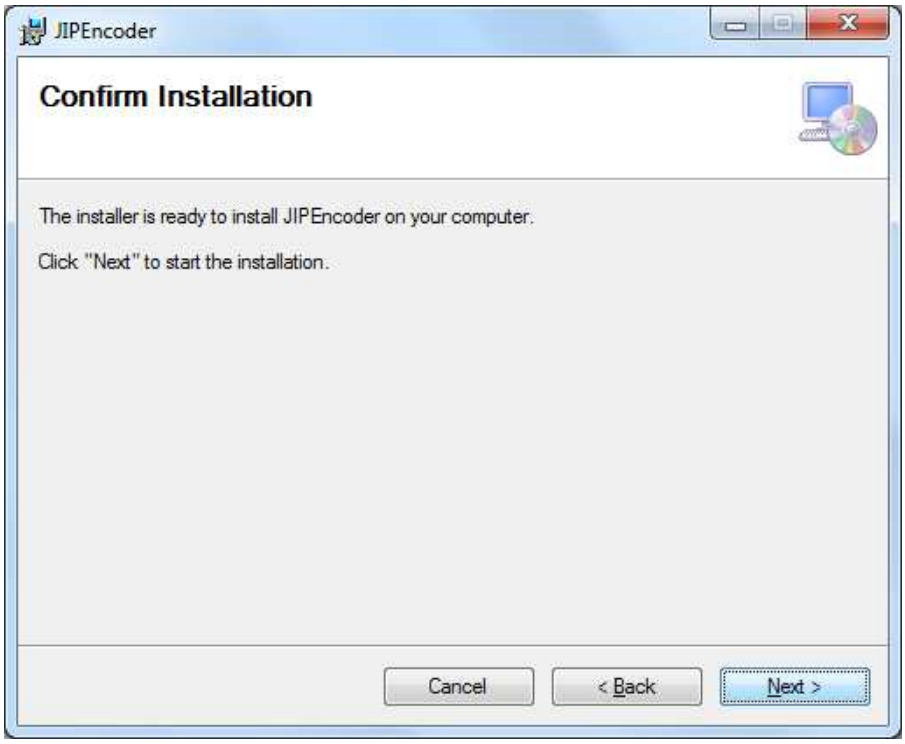
First a Welcome dialog pops up. Click "Next" in order to proceed.



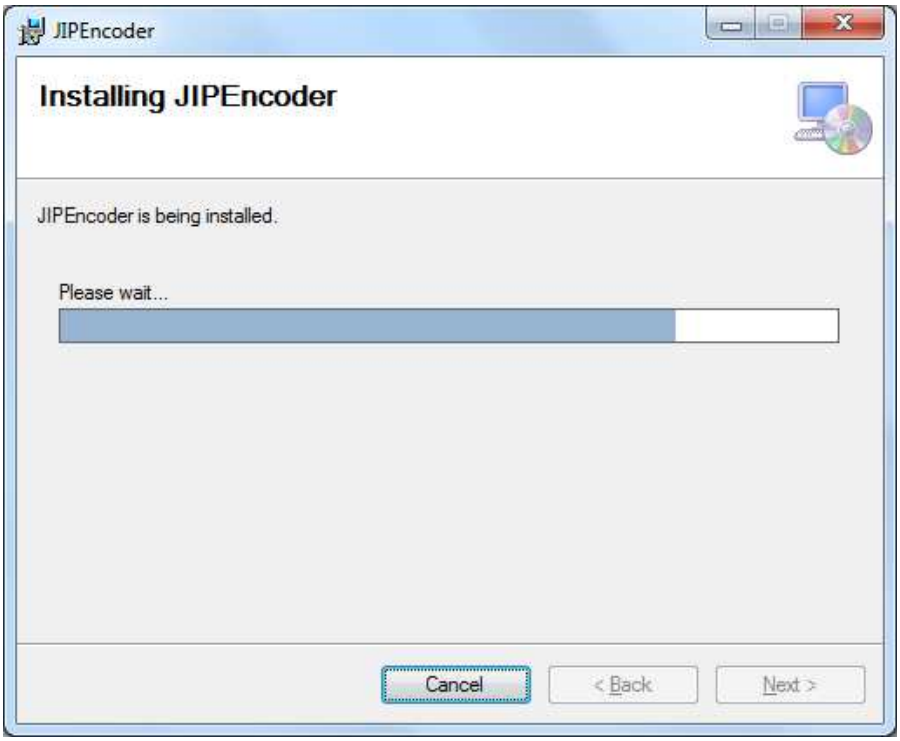
After this a License Agreement dialog pops up. Read the agreement carefully, select "I Agree" if you agree all the terms and click "Next" to proceed.

The next window shown specifies the installation product location and user access to the product. Change the destination product folder and user access if needed and click "Next" to proceed.

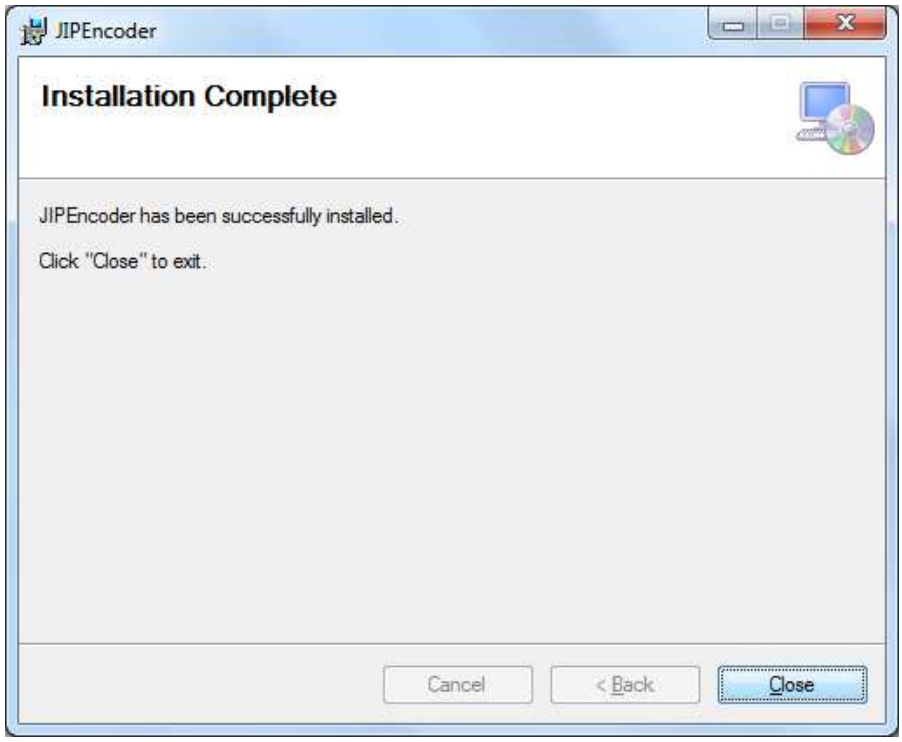
The next dialog is a confirmation dialog. Confirm by clicking "Next" in order to start the installation procedure.



While the product is being installed an "Installing" window shows the installation progress. Wait until the product is being installed.



At the end an "Installation Complete" dialog pops up, which denotes the successful **JIPEncoder** installation. Click "Close" to finalize the process.



2.2 Uninstalling JIPEncoder

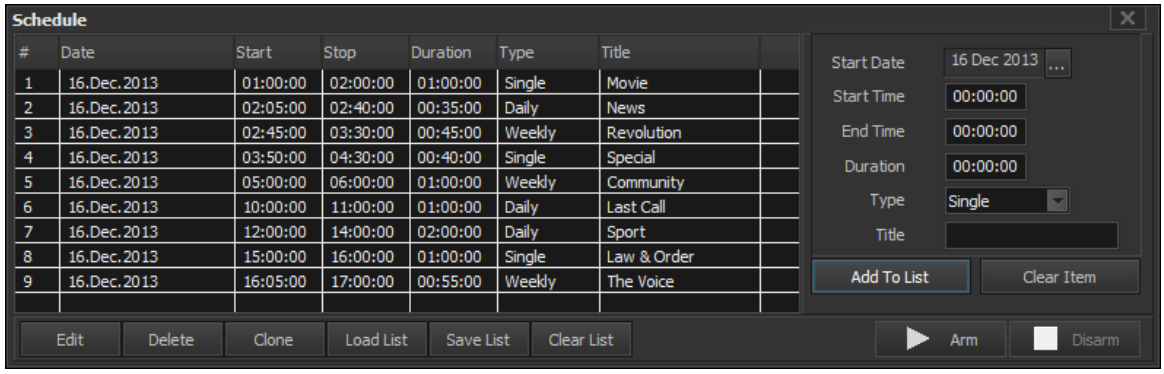
The application can be removed opening the Control Panel – Programs and Features. Select the **JIPEncoder** application and click Uninstall.

3. General

JIPEncoder is an encoding and streaming solution, working on Windows OS systems. The solution supports all BlackMagic Design video capture cards, which accept SD SDI, HD SDI, 6G, Component, HDMI and composite as a source for the encoding and streaming process. The output of the solution is an IP UDP or RTP stream.

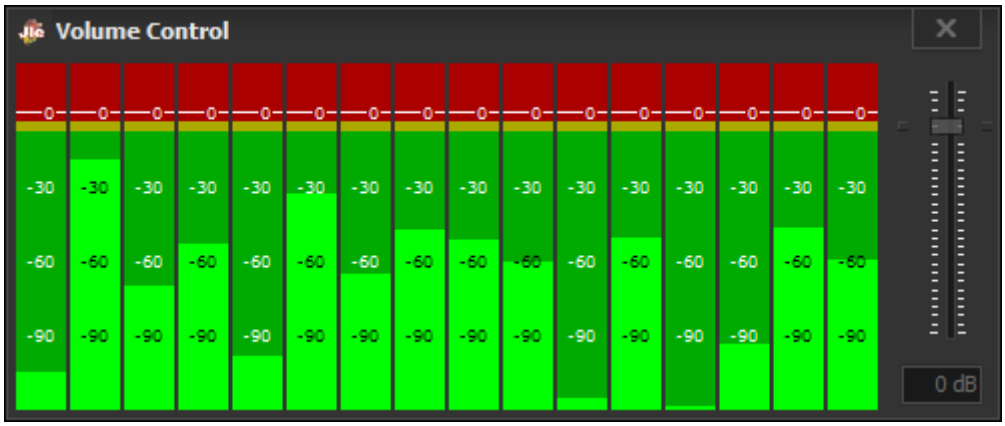
The encoding and multiplexing is multi-threaded / multi-processor optimized. Multiple instances can run at the same time, with different inputs, encoding settings, destination files and schedules, enabling the solution for multi-channel workflows. A highly professional product wrapped in easy-to-use graphical user interface.

Along with the manual encoding and streaming, the solution allows time-automated encoding and streaming through its Scheduler module, which can be used in any automated workflow. Each schedule item can be of a "Single", "Daily" or "Weekly" type, with a start date, start time and end time or clip duration.



Easy to build, edit, export and import schedule lists. The schedule lists are exchangeable with the lists created by the scheduler of **JCapture**.

JIPEncoder is multi-channel audio enabled. It supports from 1 to 16 input mono audio streams. The audio streams can be embedded SDI, AES/EBU or balanced analog audio. The Audio Volume module provides audio volume monitoring and control.



The audio levels are represented in "dB" scale from +20 dB to -120 dB. The volume level can be altered precisely in preview mode, before and during the encoding and streaming process.

4. Functions

4.1. File Functions

The following functions are available from the application's **File** menu.

Device Select – The input device of the solution can be selected from this menu.

Exit – Closes the JIPEncoder solution.

4.2. Control Functions

The following functions are available from the application's **Control** menu.

Start Encoding – Starts the encoding process with the selected video capture input device, encoding, multiplexing and streaming settings. The function is also available as a button at the bottom of the main form.

Stop Encoding – Stops the encoding process. The function is also available as a button at the bottom of the main form.

Setup – Opens the main settings dialog for encoding, multiplexing and streaming configuration. The configuration form is described in details below.

4.3. View Functions

The following functions are available from the application's **View** menu.

Volume Control – Shows/hides the Volume Control form. The form shows the current volume in dB of all input audio mono channels. It is possible to control the volume level of all the channels before being encoded and streamed.

Timer – Shows/hides the Timer form, which displays the current time of the system.

CPU – Shows/hides the CPU monitor form, which displays each CPU load. It is also possible to monitor only one CPU core or the average CPU load level of all the cores on the system.

Bitrate – Shows/hides the bitrate monitor, showing the current output bitrate of the multiplex, when the solution is encoding and streaming.

Video PSNR – Shows/hides the video PSNR measuring form, showing the current PSNR value between the input raw video signal and the compressed video elementary stream, when the solution is encoding and streaming.

Schedule – Shows/hides the scheduler form, which is used to automate the streaming process.

Arrange Windows – Arranges all shown windows in predefined positions.

4.4. Tools Functions

The following functions are available from the application's **Tools** menu.

Change Style – Opens the visual style form, which allows the user to change visual style of the solution.

Enable Graphics – Enables the graphics module, integrated into the JIPEncoder solution. Once enabled it is possible to access the graphics through the graphcis designer.

Graphics Designed – Opens the integrated graphics designed form, which allows design of different graphics presets and configurations and manually apply or remove them from graphics overlay. For more details about the graphics designer please refer to the JGraphics documentation.

Use Fast Shortcuts – Enables the fast keyboard shortcuts mode.

Logger – Opens the logger of the solution.

Detection Settings – Opens the detection settings configuration dialog. From here it is possible to configure detection of black and freeze frames, audio silence and noise and network loss detection.

4.5. Help Functions

The following functions are available from the application **Help** menu.

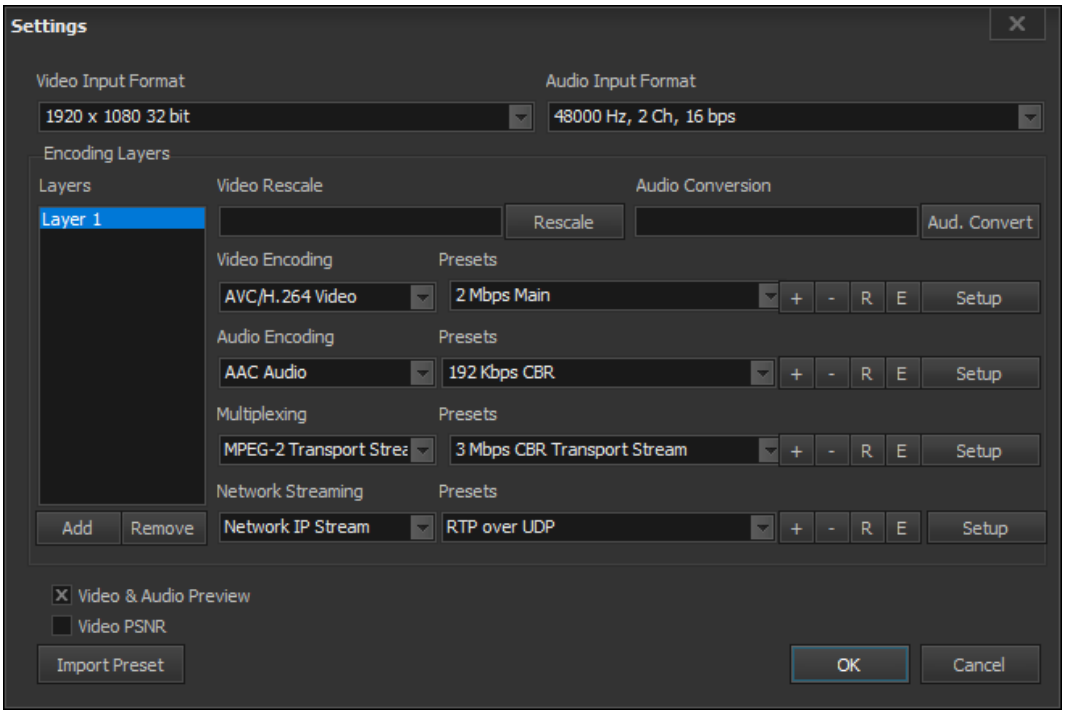
Registration – Opens the product registration form. This function is available only in the full licensed version of the product.

Check For Updates – Enables/Disables automatic check for updates.

About – Opens the About dialog box of the product.

5. Setting up the encoder

JIPEncoder can be configured from the Control menu, selecting Setup. The following form shows the main solution settings.



Video Input Format holds the list of the available input video formats of the selected capture video device, and shows the currently selected input video format.

Audio Input Format holds the list of the available input audio formats of the selected capture video device, and shows the currently selected input audio format.

Layers section contains the currently created layers. The source stream is split and passed to each layer with its own video rescaling and compression type, audio conversion and compression type, multiplex, etc. Layers can be created with the bottom left buttons Add and Remove. Selecting a layer

from the left 'Layer' section will refresh the current layer settings on the right panel.

Video Rescale section denotes the video rescaling for the current layer.

Audio Conversion section denotes the audio conversion for the current layer.

Video Encoding shows the selected video compression. The available compressions are MPEG-2, AVC/H.264 and HEVC/H.265. The Setup button opens a configuration dialog of the selected video compression.

Audio Encoding shows the selected audio compression. The available compressions are MPEG Audio and AAC. The Setup button opens a configuration dialog of the selected audio compression.

Multiplexing shows the selected multiplex type. Currently only MPEG-2 multiplex is available. The Setup button opens a configuration dialog of the selected multiplex.

Network Streaming shows the selected streaming type. Currently Network IP Streaming is available for UDP and RTP streaming and HLS & DASH for HTTP Streaming. The Setup button opens a configuration dialog of the network streaming.

Presets holds the corresponding video, audio, multiplex and network streaming presets. All the compressions, multiplex and network streaming have predefined some of the most popular format presets.

"+" button, located on the right of each compression, multiplex and network streaming preset, can be used to add new custom preset. The preset is added to the corresponding preset list having the last component settings. It is then possible to edit the new preset settings hitting the "Setup" button.

"-" button, located on the right of each compression, multiplex and network streaming preset, can be used to remove the currently selected preset from the preset list. The preset is deleted permanently.

"R" button, located on the right of each compression, multiplex and network streaming preset, can be used to rename the currently selected preset.

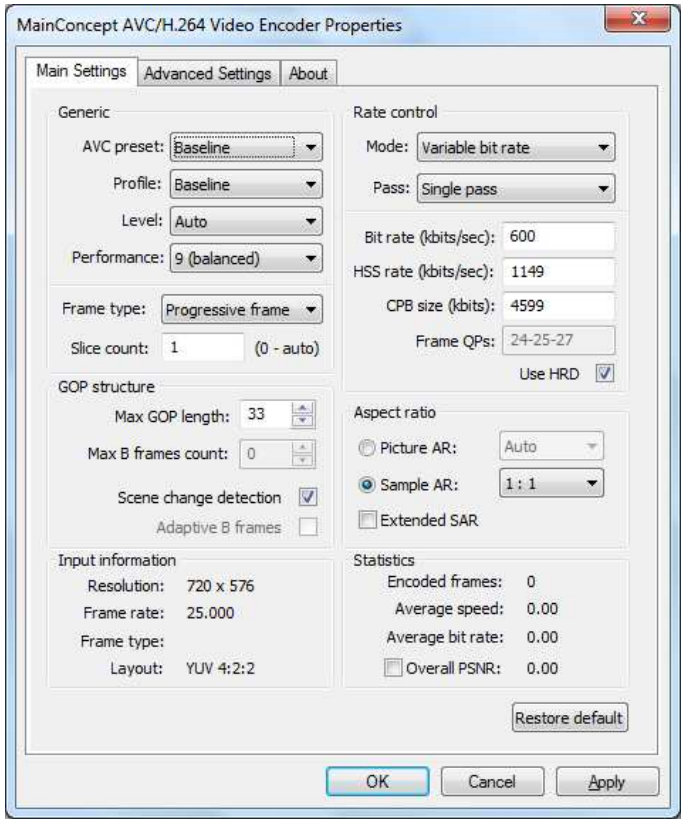
"E" button, located on the right of each compression, multiplex and network streaming preset, can be used to export all the presets of the corresponding component to an external registry file. The file can be imported to a different system or used later after pre-installation.

Video & Audio Preview enables/disables the video and audio preview.

Video PSNR enables/disables the video PSNR calculation while encoding and streaming. This process increases the total CPU load.

5.1. AVC/H.264 video encoder settings

The following dialog is opened when pressing the Setup button in the main configuration dialog placed beside the Video Encoding and when AVC/H.264 video encoding is selected.



Main property page fields description:

Property	Description
Generic	
AVC preset	Specifies the format of the output Video Elementary Stream. The following presets are defined: • Baseline 600 kbit/s, Baseline profile • Main 3 Mbit/s, Main profile • SVCD 1.15 Mbit/s, Main profile, interlaced • D1 3 Mbit/s, Main profile, interlaced • High 6 Mbit/s, High profile, interlaced • DVD 3 Mbit/s, High profile, interlaced • Blu-ray Blu-ray Disc SD, 8 Mbit/s, High profile, interlaced • Blu-ray HD Blu-ray Disc (Main), 20 Mbit/s, High profile, interlaced

	• Sony PSP Sony PSP compatible, 700 kbit/s, Main profile • HD 1280x720p 8 Mbit/s, High profile • HD 1440x1080i 10 Mbit/s, High profile, interlaced • Apple iPod Apple iPod, 600 kbit/s, Baseline profile • AVCHD AVCHD compatible, 20 Mbit/s, High profile, interlaced • AVCHD 2.0, 28 Mbit/s, High profile, progressive • 1seg 1seg compatible, 384 kbit/s, Baseline profile, CBR • DivX Plus DivX Plus video, 20 Mbit/s, High profile, VBR • 3GP 3GP compatible, 256 kbit/s, Baseline profile, VBR • Silverlight Microsoft Silverlight compatible, 500 kbit/s, High profile, VBR • Intra Class 50 Panasonic's AVC Intra Class 50 • Intra Class 100 Panasonic's AVC Intra Class 100 • Intra Class 50 RP2027-2012 • Intra Class 100 RP2027-2012 • Intra Class 200 RP2027-2012 • XAVC Intra CBG • XAVC Intra VBR • DASH264 • SONY XAVC Long GOP • Panasonic AVC-LongG 4:2:2 Classes G50 (50 Mbps) • Panasonic AVC-LongG 4:2:2 Classes G25 (25 Mbps) • Panasonic AVC-LongG 4:2:0 Classes G12 (12 Mbps) • Panasonic AVC-LongG 4:2:0 Classes G6 (6 Mbps)
Profile	Specifies the Profile of the encoded H.264/AVC Video Elementary Streams. The following selections are available: • Baseline Profile • Main Profile • High Profile • High 10 Profile • High 4:2:2 Profile
Level	Specifies the Level of the encoded H.264/AVC Video Elementary Streams. The following selections are available: • Level 1 • Level 1b • Level 1.1

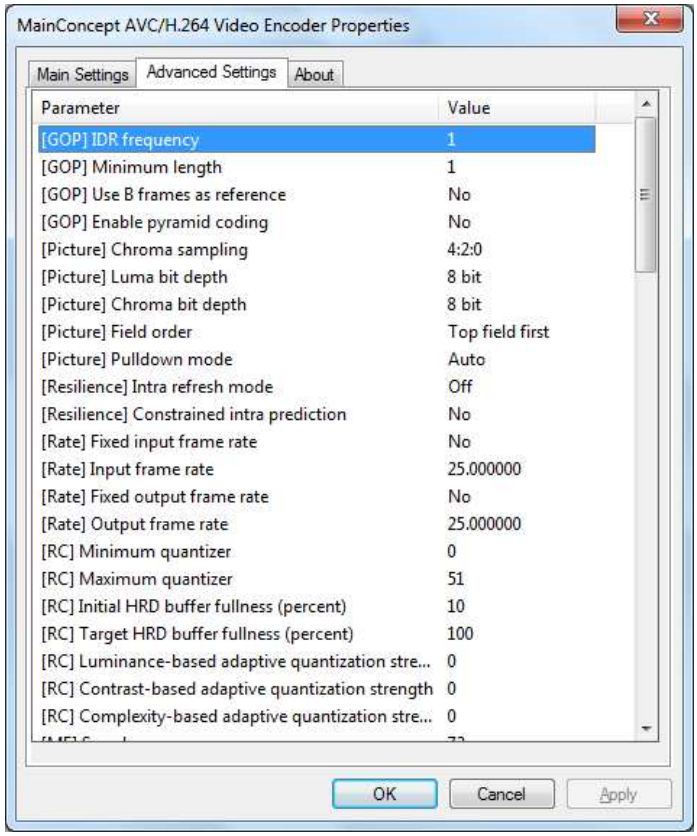
	• Level 1.2 • Level 1.3 • Level 2 • Level 2.1 • Level 2.2 • Level 3 • Level 3.1 • Level 3.2 • Level 4 • Level 4.1 • Level 4.2 • Level 5 • Level 5.1 • Level 5.2 • Level Auto (the most suitable level is selected automatically) **Note:** Level will be set to "Auto" after input pin connection. If you need a special level, it should be installed manually after connecting.
Performance preset	Specifies the performance level. There are 16 performance presets available currently: from 0 (the fastest encoding speed, the worst video quality) to 15 (the slowest encoding speed, the best video quality), default value is 9.
Frame type	Specifies the frame type. The following selections are available: • Progressive frame • Interlaced fields • Interlaced frame (MBAFF)
Slice count	Specifies the number of slices per picture.
Bit Rate Control	
Mode	Specifies the rate control modes: • Constant bit rate • Constant quantizer • Variable bit rate • Target quality mode

Pass	Specifies the multi-pass encoding modes. The following selections are available: • Single pass: regular single pass encoding • Multi pass analyze: encoding and gathering statistics for the next pass • Multi pass encode: encoding using the gathered statistics and updating it
Bit rate (kbits/sec)	Specifies the average output bit rate (in kbits/sec) of the encoded video elementary stream.
HSS rate (kbits/sec)	Specifies the hypothetical stream scheduler rate (in kbits/sec) of the encoded video elementary stream.
CPB size (kbits)	Specifies the size of the coded picture buffer (CPB) in kilobits.
Use HRD	Specifies whether HRD conformance should be maintained or not.
Bit Rate Control	
Pass	Specifies the picture aspect ratio. The following selections are available: • Auto • 1 : 1 • 1.25 : 1 • 4 : 3 • 1.5 : 1 • 16 : 9 • 1.85 : 1 • 2.00 : 1 • 2.21 : 1 • 2.35 : 1 • 2.39 : 1
Sample AR	Specifies the sample aspect ratio. The following selections are available: • Auto • 1 : 1 • 12 : 11 • 10 : 11 • 16 : 11 • 40 : 33 • 24 : 11 • 20 : 11

	• 32 : 11 • 80 : 33 • 18 : 11 • 15 : 11 • 64 : 33 • 160 : 99 • 4 : 3 • 3 : 2 • 2 : 1
GOP Structure	
Extanded SAR	Enable extended sample aspect ratio. • 1 - write real sample aspect ratio always. • 0 - round sample aspect ratio to the nearest table value from specification if the difference is less than 2 percent
Max GOP length	Specifies the maximum GOP length. Larger numbers frequently provide better compression. Smaller numbers provide better error recovery and better access to the frames for editing.
Max B-frames count	Specifies the maximum number of B frames between consecutive Pframes. In some situations such as video conferencing it is recommended setting this to 0 for providing lower communication delay.
Scene changes detection	Enables/disables inserting I-frames on scene changes.
Adaptive B frames	Enables/disables adaptive using of B frames in order to provide the best compression
Input Information	
Resolution	Specifies the resolution of the input video.
Frame rate	Specifies the frame rate of the input video.
Frame type	Specifies the input frame type: progressive or interlaced.
Layout	Specifies the input data layout. The following values are available: • YUV 4:2:0 (10 bits) • YUV 4:2:2 (10 bits) • YUV 4:4:4 (10 bits) • RGB 24 bits

	• RGB 32 bits
Input Information	
Encoded frames	Displays the number of encoded frames.
Average speed	Displays the average encoding speed.
Average bit rate	Display the average encoding bit.
Overall PSNR	Displays the overall PSNR value.
Restore default	Restores all properties to the default state for selected H.264 Preset.

Advanced property page



Advanced property page fields description:

Parameter	Available Value	Description
[GOP] IDR frequency	0, ...,limit of INT	Specifies the frequency of IDR frames, e.g. 3 means that first, fourth, seventh, etc. I frames will be IDR.
[GOP] Minimum length	1, ...,Max GOP length	Specifies the minimum GOP length.
[GOP] Use B-frame as reference	Yes No	Enables/disables marking B-frames as used for reference.
[GOP] Enable pyramid coding	Yes No	Enables/disables the pyramid coding of B frames (also "Max B frames count&quot should be 3 and "Use B frames as reference" should be "Yes").
[Picture] Chroma sampling	4:0:0 4:2:0 4:2:2	Specifies the chrominance data sampling. Note that some values are not allowed for certain profiles.
[Picture] Luma bit depth	8 10	Specifies the depth of luminance data samples. Note that more than 8 bit depth is only allowed for High 10 and higher profiles.
[Picture] Chroma bit depth	8 10	Specifies the depth of chrominance data samples. Note that more than 8 bit depth is only allowed for High 10 and higher profiles.
[Picture] Field order	Top field first Bottom field first	Specifies the field dominance within a frame.
[Picture] Pulldown mode	• No pulldown • 2:3i • 3:2i • 2:3p • 3:2p • Auto	Specifies the video pulldown mode. "Auto" denotes detection of pulldown using media sample timestamps
[Resilience] Intra refresh mode	• Off (Default) • Slow • Medium • Fast	Specifies the intra refresh mode.
[Resilience] Constrained intra prediction	Yes No	Enables/Disables the use of constrained intra prediction (whether to use adjacent inter coded macroblocks for intra prediction or not)
[Rate] Fixed input frame rate	Yes No	Enables/disables the use of the userdefined frame rate for input stream.

[Rate] Input frame rate	0.01 to 172	Specifies the input frame rate if the fixed input frame rate is enabled.
[Rate] Fixed output frame rate	Yes No	Enables/disables the use of the userdefined frame rate for output stream.
[Rate] Output frame rate	0.01, ...,172	Specifies the output frame rate if the fixed output frame rate is enabled.
[RC] Minimum quantizer	0, ...,51	Specifies the minimum quantizer the encoder is allowed to use.
[RC] Maximum quantizer	0, ...,51	Specifies the maximum quantizer the encoder is allowed to use.
[RC] Initial HRD buffer fullness (percent)	0, ...,100	Specifies the initial state of the HRD buffer.
[RC] Target HRD buffer fullness (percent)	0, ...,100	Specifies the desired state of the HRD buffer in the end of encoding.
[RC] Luminance-based adaptive quantization strength	-100, ...,100	Specifies the weight of the macroblock luminance in the process of calculation of the quantizer. Positive strength denotes coarser quantization for light macroblocks and vice versa.
[RC] Contrast-based adaptive quantization strength	-100, ...,100	Specifies the weight of the macroblock contrast in the process of calculation of the quantizer. Positive strength denotes coarser quantization for high contrast macroblocks and vice versa.
[RC] Complexity-based adaptive quantization strength	-100, ...,100	Specifies the weight of the macroblock complexity in the process of calculation of the quantizer. Positive strength denotes coarser quantization for macroblocks with a lot of small details and vice versa.
[ME] Search range	0, ...,511	Specifies the motion estimation search range in full pixels.
[ME] Allow out of picture MVs	Yes No	Enables/disables the out of picture motion vectors.
[ME] Number of reference frames	0, ...,16	Number of reference frames.
[ME] Use sub-block search	Yes No	Specifies whether to use subblock search in motion estimation or not.
[ME] Sub-pixel search depth	• Full Pel • Half Pel • Quarter Pel	Motion estimation sub-pixel depth.

[ME] Enable weighted prediction	Yes No	Enables/disables the weighted prediction for P-frames.
[ME] Sub-block ME	• Fast • Slow • Slow on reference	Specifies the sub-block motion estimation mode.
[ME] Multi-reference ME	• Fast • Slow • Slow on reference	Specifies the multi-reference motion estimation mode.
[RDO] Hadamard SATD	• Enable • Disable • Enable on reference	Enables/disables using of Hadamard SATD for coding mode decisions.
[RDO] RD optimization mode	• Fast • Slow • Slow on reference	Specifies the rate-distortion optimization mode.
[RDO] Inter decisions	• Fast • Slow • Slow on reference	Specifies the inter coding decision mode.
[RDO] Intra decisions	• Fast • Slow • Slow on reference	Specifies the intra coding decision mode.
[RDO] Quantization mode	• Off (ref quant) • Mode1	Specifies the quantization method.

	• Mode2	
[LF] Use deblocking filter	Yes No	Enables/disables the in-loop deblocking filter.
[LF] Deblocking alpha c0 offset	-6, ...,6	In-loop deblocking alpha c0 offset.
[LF] Deblocking beta offset	-6, ...,6	In-loop deblocking beta offset.
[IP] Enable I_16x16 mode in intra slices	Yes No	Enables/disables the Intra 16x16 mode in intra slices.
[IP] Enable I_8x8 mode in intra slices	Yes No	Enables/disables the Intra 8x8 mode in intra slices.
[IP] Enable I_4x4 mode in intra slices	Yes No	Enables/disables the Intra 4x4 mode in intra slices.
[IP] Enable I_PCM mode in intra slices	Yes No	Enables/disables using of PCM macroblocks in intra slices.
[IP] Enable I_16x16 mode in inter lices	Yes No	Enables/disables the Intra 16x16 mode in inter slices.
[IP] Enable I_8x8 mode in inter slices	Yes No	Enables/disables the Intra 8x8 mode in inter slices.
[IP] Enable I_4x4 mode in inter slices	Yes No	Enables/disables the Intra 4x4 mode in inter slices.
[IP] Enable I_PCM mode in inter slices	Yes No	Enables/disables using of PCM macroblocks in inter slices.
[Misc] Timestamp pass through mode	Keep input AVI compatible	Specifies whether to keep original DirectShow timestamps (from input samples) or not
[Misc] Output mediatype	• Original • VSS	Specifies the fourCC for the encoder to use for the output mediatype.
[Misc] Output stream type	• Type I • Type I + SEI • Type II • Type II without SEI	Specifies the stream type.
[Misc] Full range colors	Yes No	Specifies whether the input stream has the full range colors or not.

[Misc] Write access unit delimiters	Yes No	Enables/disables writing of access unit delimiters.
[Misc] Write end of sequence code	Yes No	Enables/disables writing the end of sequence code.
[Misc] Write frame timecode	Yes No	Enables/disables writing the frame timecode in picture timing SEI.
[Misc] Timestamp offset	0..MAX_INT	Frame offset (in #frames) for timestamps (default = 0).
[Misc] Enable drop frame timecode	Yes No	Enables/disables NTSC drop frame timecode notation for 29.97 and 59.94 target frame rates
[Misc] Frame packing arrangement mode	Disable Checkboard Column interleaving Row interleaving Side-by-side Top-Buttom	Define mode for Frame packing arrangement SEI message writing
[Misc] CPU optimization	• Auto • Plain C • Up-to MMX • Up-to MMX+ • Up-to SSE • Up-to SSE2 • Up-to SSE3	Selects the optimization CPU instruction set.
[Misc] Max number of threads	0 (Auto), ..., 16	Specifies the maximum number of threads to be used.
[Misc] Film grain optimization strength	0, ...,100	Specifies the film grain optimization strength.
[Misc] Cb QP offset	-12, ...,12	Specifies the chroma Cb quantization offset. Used only for High profiles.
[Misc] Cr QP offset	-12, ...,12	Specifies the chroma Cr quantization offset. Used only for High profiles.
[Misc] Video format	• Auto • PAL • NTSC • SECAM • MAC	Specifies the representation of the pictures of the input video.

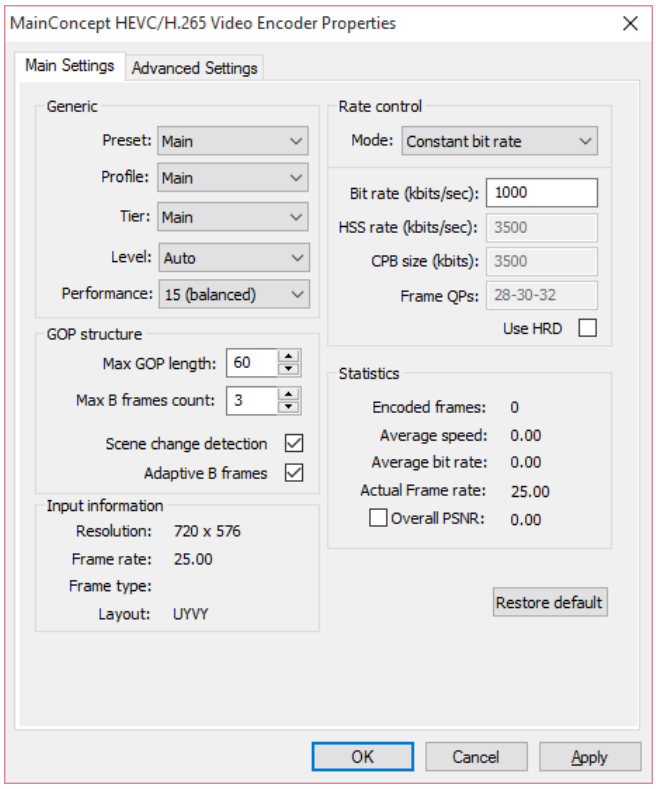
	• Unspecified	
[Misc] log2_max_frame_num_minus4 in SPS	4, ...,16	Specifies the value of log2_max_frame_num_minus4 of the sequence parameter set
[Misc] pic_order_cnt_type in SPS	0 or 2	Specifies the value of pic_order_cnt_type of the sequence parameter set
[Misc] fixed_frame_rate_flag in SPS	0 or 1	Specifies the value of fixed_frame_rate_flag of the sequence parameter set
[Misc] pic_order_present_flag in PPS	0 or 1	Specifies the value of pic_order_present_flag of the picture parameter set
[Misc] Frame rate based num_units_in_tick / time_scale	0 or 1	Specifies whether num_units_in_tick/time_scale ratio represents the frame or field rate
[Misc] Write HRD parameters	• None • NAL • VCL • both NAL and VCL	Specifies which HRD parameters should be written to the output stream.
[Misc] Write picture structure info	Yes No	Enables/disables writing the picture structure information in picture timing SEI.
[Misc] Write picture timing SEI message	Yes No	Enables/disables writing the picture timing SEI.
[Misc] Enable HRD Preview	Yes No	Enables/disables HRD prewiev feature
[Misc] Maximum number of seconds to source buffer	0, ...,20	Specifies number of seconds to source buffer
[Misc] Maximum number of seconds to encoding buffer	0, ...,20	Enables/disables writing the product version stamp in SEI
[Misc] Write product version stamp in SEI messages	Yes No	Specifies number of seconds to encoding buffer
[Misc] Write color information in VUI	Yes No	Enables writing color description information in stream
[Misc] Colour primaries	0, ..., 255	Specifies the chromaticity coordinates of the source primaries: • 0 - Reserved (Auto).

		• 1 - ITU-R Rec. BT.709-5. • 2 - Auto. • 3 - Reserved (Auto). • 4 - ITU-R Rec. BT.470-6 System M. • 5 - ITU-R Rec. BT.601-6 625. • 6 - ITU-R Rec. BT.601-6 525. • 7 - SMPTE 240M. • 8 - Generic film (colour filters using Illuminant C). • 9..255 - Reserved (Auto).
[Misc] Transfer characteristics	0, ..., 255	Specifies transfer characteristics of the source primaries: • 0 - Reserved (Auto). • 1 - BT.709-5. • 2 - Reserved (Auto). • 3 - Reserved (Auto). • 4 - BT.470-6 System M. • 5 - BT.470-6 System B G. • 6 - BT.709-5. • 7 - SMPTE 240M. • 8 - Linear. • 9..255 - Reserved (Auto).
[Misc] Matrix coefficients	0, ..., 255	Specifies matrix coefficients of the source primaries: • 0 - Reserved (Auto). • 1 - BT.709-5 System 1125. • 2 - Reserved (Auto). • 3 - Reserved (Auto). • 4 - BT.709-5 System 1250 (not exactly the same like (5), but ok). • 5 - BT.709-5 System 1250. • 6 - BT.709-5 System 1250 (same like (5)). • 7 - SMPTE 240M. • 8..255 - Reserved (Auto).

[SI] Write sequance parameter set	SPS once per IDR SPS once per I-frame	Specifies how SPS should be written (only for Intra RP2027, SPS once per I picture by default)
[SI] Write picture parameter set	• PPS once per IDR • PPS once per I picture • PPS once per picture	Specifies how PPS should be written (only for Intra RP2027, PPS once per I picture by default)

5.2. HEVC/H.265 video encoding settings

The following dialog is opened when pressing the Setup button in the main configuration dialog placed beside the Video Encoding and when HEVC/H.265 video encoding is selected.



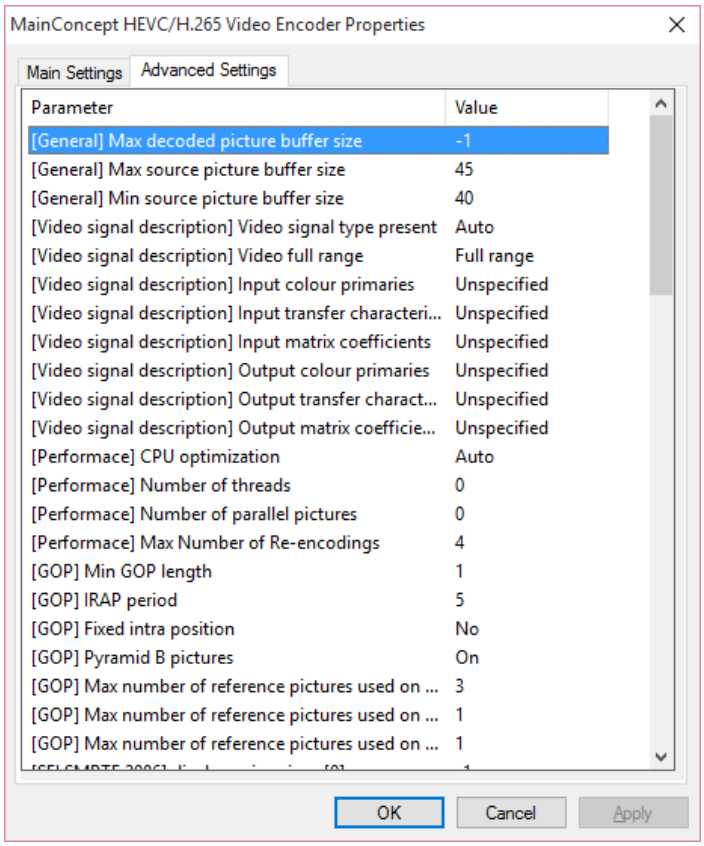
Main property page fields description:

Property	Description
Generic	
HEVC preset	Specifies the format of the output Video Elementary Stream. The following presets are defined: • Main, Corresponds to Main profile of ITU-T H.265 • Main 10, Corresponds to Main 10 profile of ITU-T H.265 • Divx HEVC 720p Profile, Main Profile, VBR • Divx HEVC 1080p Profile, Main Profile, VBR • Divx HEVC 4k Profile, Main Profile, VBR
Profile	Specifies the Profile of the encoded H.265/HEVC Video Elementary Streams. The following selections are available: • Main Profile • Main 10 Profile
Tier	Specifies the Tier of the encoded H.265/HEVC Video Elementary Streams. The following selections are available: • Main Tier • High Tier
Level	Specifies the Level of the encoded H.265/HEVC Video Elementary Streams. The following selections are available: • Level 1 • Level 2 • Level 2.1 • Level 3 • Level 3.1 • Level 4 • Level 4.1 • Level 5 • Level 5.1 • Level 5.2 • Level 6

	• Level 6.1 • Level 6.2 • Level Auto (the most suitable level is selected automatically)
Performance preset	Specifies the performance level. There are 32 performance presets available currently: from 0 (the fastest encoding speed, the worst video quality) to 31 (the slowest encoding speed, the best video quality), default value is 15.
Bit Rate Control	
Mode	Specifies the rate control modes: • Constant bit rate • Constant quantizer • Variable bit rate • Constant rate factor
Bit rate (kbits/sec)	Specifies the average output bit rate (in kbits/sec) of the encoded video elementary stream.
HSS rate (kbits/sec)	Specifies the hypothetical stream scheduler rate (in kbits/sec) of the encoded video elementary stream.
CPB size (kbits)	Specifies the size of the coded picture buffer (CPB) in kilobits.
Use HRD	Specifies whether HRD conformance should be maintained or not.
Aspect Ratio Control	
GOP Structure	
Max GOP length	Specifies the maximum GOP length. Larger numbers frequently provide better compression. Smaller numbers provide better error recovery and better access to the frames for editing.
Max B-frames count	Specifies the maximum number of B frames between consecutive Pframes. In some situations such as video conferencing it is recommended setting this to 0 for providing lower communication delay.
Scene changes detection	Enables/disables inserting I-frames on scene changes.
Adaptive B frames	Enables/disables adaptive using of B frames in order to provide the best compression
Input Information	
Resolution	Specifies the resolution of the input video.

Frame rate	Specifies the frame rate of the input video.
Frame type	Specifies the input frame type: progressive or interlaced.
Layout	Specifies the input color spaces
Statistics	
Encoded frames	Displays the number of encoded frames.
Average speed	Displays the average encoding speed.
Average bit rate	Display the average encoding bit.
Overall PSNR	Displays the overall PSNR value.
Actual framerate	Displays the output frame rate.
Restore default	
Restore default button	Restores all properties to the default state for selected Preset.

Advanced property page



Parameter	Available Value	Description
[General] Max decoded picture buffer size	-1, ..., 16	Specifies the maximum number of pictures in decoded picture buffer.
[General] Max source picture buffer size	0, ..., 100	Specifies the maximum number of pictures in source picture buffer.
[General] Min source picture buffer size	0, ..., 100	Specifies the minimum number of pictures in source picture buffer.
[Video signal description] Video signal type present	• Auto • Yes • No	Specifies that video signal type is present or not
[Video signal description] Video full range	• Full range • Clipped range	Specifies the black level and range of the luma and chroma signals
[Video signal description] Input colour primaries	• BT.709 • Unspecified • BT.470-6 System M • BT.601-6 625 • BT.601-6 525 • SMPTE 240M • BT.2020	Specifies colour primaries of input picture.
[Video signal description] Input transfer characteristics	• BT.709 • Unspecified • ITU-R Rec. BT.470-6 System M • ITU-R Rec. BT.470-6 System B, G • ITU-R Rec. BT.601-6 525 or 625 • SMPTE 240M • BT.2020 for 10 bit • SMPTE ST 2084 for 10, 12, 14 and 16-bit systems	Specifies Transfer characteristics of input picture.

[Video signal description] Input matrix coefficients	• BT.709 • Unspecified • BT.601-6 625 • BT.601-6 525 • SMPTE 240M • BT.2020 • BT.2020 non-constant luminance	Matrix coefficients of input picture.
[Video signal description] Output colour primaries	• BT.709 • Unspecified • BT.470-6 System M • BT.601-6 625 • BT.601-6 525 • SMPTE 240M • BT.2020	Specifies colour primaries of input picture.
[Video signal description] Output transfer characteristics	• BT.709 • Unspecified • ITU-R Rec. BT.470-6 System M • ITU-R Rec. BT.470-6 System B, G • ITU-R Rec. BT.601-6 525 or 625 • SMPTE 240M • BT.2020 for 10 bit • SMPTE ST 2084 for 10, 12, 14 and 16-bit systems	Specifies Transfer characteristics of input picture.
[Video signal description] Output matrix coefficients	• BT.709 • Unspecified • BT.601-6 625 • BT.601-6 525 • SMPTE 240M • BT.2020 • BT.2020 non-constant luminance	Matrix coefficients of input picture.
[Performace] CPU optimization	• Auto	Selects the optimization CPU instruction set.

	• Plain-C • SSE2 • SSE4 • AVX2	
[Performace] Number of threads	0, ..., 64	Specifies the maximum number of threads to be used.
[Performace] Number of parallel pictures	0, ..., 8	Specifies the number of parallel coding pictures.
[GOP] Min GOP length	1, ..., 360	Specifies the min GOP length
[GOP] IDR period	1, ..., 300	Specifies the IDR period in GOP units
[GOP] Fixed intra position	Yes No	Enables/disables the fixed position of I pictures
[GOP] Pyramid B pictures	• Off • On • Adaptive	Specifies the pyramid B pictures
[GOP] Max number of reference pictures used on P pictures from list0	1, ..., 16	Specifies the maximum number of reference pictures used on P pictures from list0
[GOP] Max number of reference pictures used on B pictures from list0	1, ..., 16	Specifies the maximum number of reference pictures used on B pictures from list0
[GOP] Max number of reference pictures used on B pictures from list1	1, ..., 16	Specifies the maximum number of reference pictures used on B pictures from list1
[SEI SMPTE 2086] display_primaries_x[0]	-1, ..., 50000	Specifies the normalized x-coordinate chromaticity of the mastering display in increments of 0.00002 for component 0
[SEI SMPTE 2086] display_primaries_x[1]	-1, ..., 50000	Specifies the normalized x-coordinate chromaticity of the mastering display in increments of 0.00002 for component 1
[SEI SMPTE 2086] display_primaries_x[2]	-1, ..., 50000	Specifies the normalized x-coordinate chromaticity of the mastering display in increments of 0.00002 for component 2

[SEI SMPTE 2086] display_primaries_y[0]	-1, ..., 50000	Specifies the normalized y-coordinate chromaticity of the mastering display in increments of 0.00002 for component 0
[SEI SMPTE 2086] display_primaries_y[1]	-1, ..., 50000	Specifies the normalized y-coordinate chromaticity of the mastering display in increments of 0.00002 for component 1
[SEI SMPTE 2086] display_primaries_y[2]	-1, ..., 50000	Specifies the normalized y-coordinate chromaticity of the mastering display in increments of 0.00002 for component 2
[SEI SMPTE 2086] white point x	-1, ..., 50000	Specifies the normalized x-coordinate chromaticity of the white point of the mastering display in normalized increments of 0.00002
[SEI SMPTE 2086] white point y	-1, ..., 50000	Specifies the normalized y-coordinate chromaticity of the white point of the mastering display in normalized increments of 0.00002
[SEI SMPTE 2086] max luminance	-1, ..., 2147483647	Specifies the nominal maximum display luminance of the mastering display in units of 0.0001 candelas per square metre
[SEI SMPTE 2086] min luminance	-1, ..., 2147483646	Specifies the nominal minimum display luminance of the mastering display in units of 0.0001 candelas per square metre
[SEI CLL] Max CLL	-1, ..., 65535	Specifies the maximum content light level
[SEI CLL] Max PALL	-1, ..., 65535	Specifies the maximum picture average light level
[Layer] WPP	• Off • On	Enables/disables Wavefront Parallel Processing
[Layer] Number of Slices	1, ..., 256	Number of independent slices segments per picture
[Layer][CTU] Min CU Size	• 8x8 • 16x16 • 32x32 • 64x64	Minimum size of a coding block of luma samples

[Layer][CTU] Max CU Size	• 16x16 • 32x32 • 64x64	Specifies the maximum size of a coding block of luma samples
[Layer][CTU] Min TU Size	• 4x4 • 8x8 • 16x16 • 32x32	Specifies the minimum size of a transfrom block of luma samples
[Layer][CTU] Max TU Size	• 4x4 • 8x8 • 16x16 • 32x32	Specifies the maximum size of a transfrom block of luma samples
[Layer][CTU] Max TU depth intra	1, ..., 4	Specifies the maximum hierarchy depth for transform units of coding units coded in inter prediction mode
[Layer][CTU] Max TU depth inter	1, ..., 4	Specifies the maximum hierarchy depth for transform units of coding units coded in intra prediction mode
[Layer][Intra] Intra partitioning	Yes No	Enables/disables the intra partitioning
[Layer][Intra] Strong intra smoothing	Yes No	Enables/disables the strong intra smoothing
[Layer][ME] Motion search range	16, ..., 2048	Search range in quarter pixel units
[Layer][ME] Motion search precision	• Quarter pixel • Half pixel • Full pixel	Sub-pel motion search accuracy
[Layer][ME] Out of picture MV	Yes No	Out of picture motion vectors
[Layer][ME] Number of merge candidates	0, ..., 5	Maximum number of merge candidates
[Layer][ME] Inter partitioning	• Asymmetric	Inter partitioning

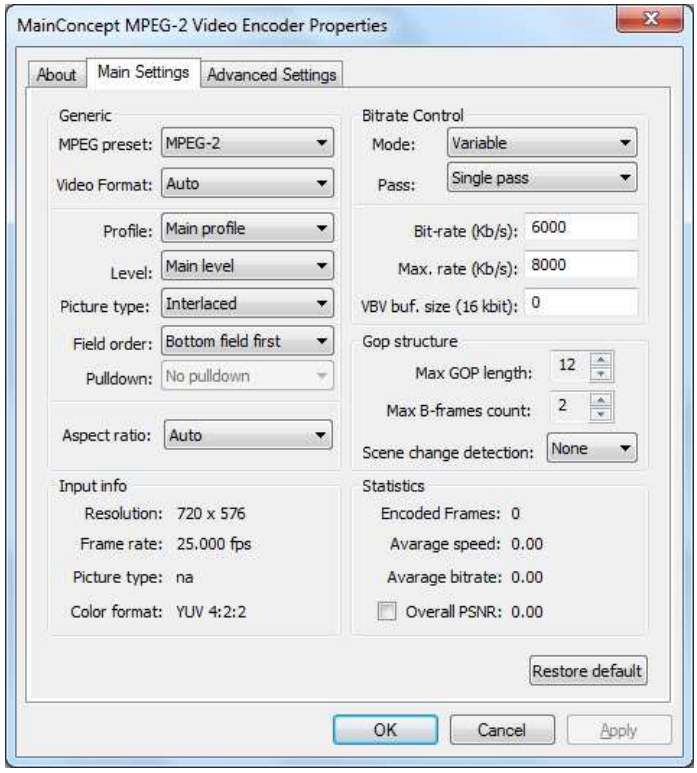
	• Symmetric • Off	
[Layer][ME] Temporal MV prediction	Yes No	Temporal motion vector prediction
[Layer][Loop Filter] Deblocking	Yes No	Deblocking filter
[Layer][Loop Filter] Beta offset	-6, ..., 6	Deblocking filter beta offset
[Layer][Loop Filter] TC offset	-6, ..., 6	Deblocking filter tc offset
[Layer][Loop Filter] SAO luma	Yes No	SAO filter for luma samples
[Layer][Loop Filter] SAO chroma	Yes No	SAO filter for chroma samples
[Layer][Loop Filter] Filter across slices	Yes No	Filtering across slice
[Layer][RC] Min quantizer	0, ..., 51	Minimum QP
[Layer][RC] Max quantizer	0, ..., 51	Maximum QP
[Layer][RC] Initial CPB fullness	0, ..., 99	Initial CPB fullness in %
[Layer][Transform] Sign data hiding	Yes No	Sign hide quantization
[Layer][Transform] Transform skip	Yes No	Transform skip
[Layer][Transform] Chroma Cb QP offset	-12, ..., 12	Chroma Cb qp offset
[Layer][Transform] Chroma Cr QP offset	-12, ..., 12	Chroma Cr qp offset
[Layer][Transform] RDOQ	Yes No	RDO quantization
[Layer][VUI] Sample AR	• Auto • 1 : 1 • 12 : 11 • 10 : 11 • 16 : 11	Specifies the sample aspect ratio

	• 40 : 33 • 24 : 11 • 20 : 11 • 32 : 11 • 80 : 33 • 18 : 11 • 15 : 11 • 64 : 33 • 160 : 99 • 4 : 3 • 3 : 2 • 2 : 1	
[Layer][VUI] Extanded SAR	• 1 - write real sample aspect ratio always. • 0 - round sample aspect ratio to the nearest table value from specification if the difference is less than 2 percent	Enable extended sample aspect ratio
[Layer][VUI] Horz size of sample aspect ratio	1, ..., 4096	The horizontal size of the sample aspect ratio
[Layer][VUI] Vert size of sample aspect ratio	1, ..., 4096	The vertical size of the sample aspect ratio
[Layer][Stream] Annex B	Yes No	Annex B
[Layer][Stream] Stream type	• Type I • Type I with SEI • Type II • Type II without SEI	Output stream type
[Layer][Stream] Access Unit Delimeters	Yes No	Access Unit Delimeters (AUD)
[Layer][Stream] End Of Sequence code	Yes No	End Of Sequence code (EOS)
[Layer][Stream] Single SEI per NALU	Yes No	Single SEI per NALU

[Layer][Stream] SEI timing info	Yes No	VUI timing info
[AQ] Enable	Yes No	Allows adaptive quantization with internal VAM
[AQ][VAM] Number of spatial levels	1, ..., 8	Number of spatial levels for VAM
[AQ][VAM] Number of temporal levels	1, ..., 6	Number of temporal levels for VAM
[AQ][VAM] Filter size	1, ..., 10	Filter size used to generate VAM
[AQ][VAM] Temporal weight of mix parameter	1, ..., 10	Weight of mix parameter for temporal VAM

5.3. MPEG-2 video encoder settings

The following dialog is opened when pressing the Setup button in the main configuration dialog placed beside the Video Encoding and when MPEG-2 video encoding is selected.



Main property page fields description:

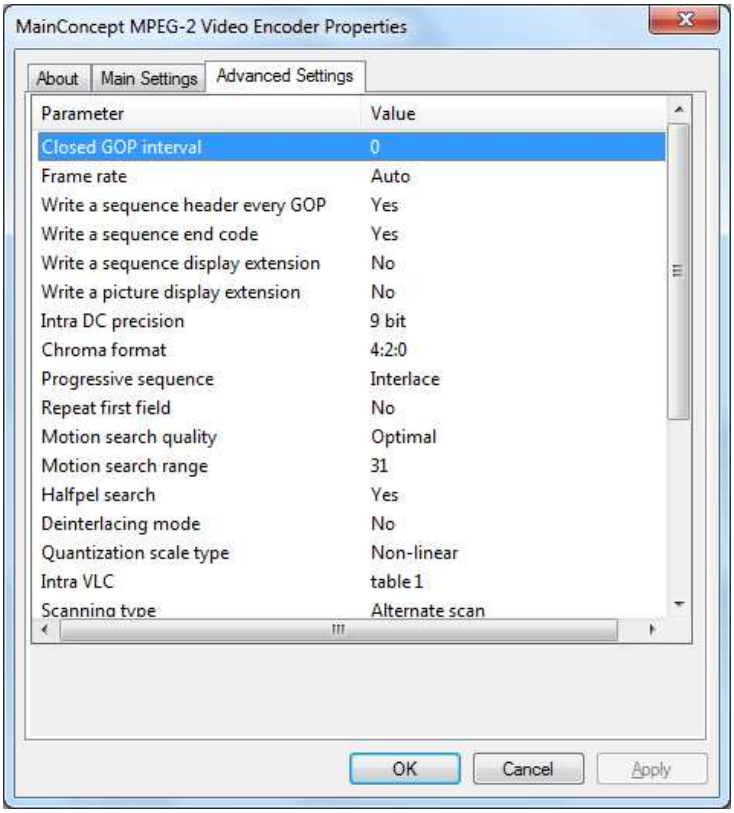
Property	Description
Generic	
MPEG Type	Specifies the format of the output Video Elementary Stream. The following presets are defined: • MPEG-1 - general MPEG-1 video. • MPEG-1 VCD - VCD compatible MPEG-1 video. • MPEG-1 DVD - DVD-Video compatible MPEG-1 video. • MPEG-2 - general MPEG-2 video. • MPEG-2 SVCD - SVCD compatible MPEG-2 video. • MPEG-2 DVD - DVD-Video compatible MPEG-2 video. • MPEG-2 DVB - DVB compatible MPEG-2 video. • MPEG-2 MicroMV - MicroMV compatible MPEG-2 video. • MPEG-1/2 DVHS - DVHS compatible MPEG-1/2 video. • MPEG-2 HD DVD - HD DVD compatible MPEG-2 video. • MPEG-2 HDV HD1 - HDV HD1 compatible MPEG-2 video. • MPEG-2 HDV HD2 - HDV HD2 compatible MPEG-2 video. • MPEG-2 ATSC - ATSC compatible MPEG-2 video. • MPEG D10_25 - D10 compatible MPEG-2 video, 25 Mbit/s.

	• MPEG D10_30 - D10 compatible MPEG-2 video, 30 Mbit/s. • MPEG D10_40 - D10 compatible MPEG-2 video, 40 Mbit/s. • MPEG D10_50 - D10 compatible MPEG-2 video, 50 Mbit/s. • XDCAM 1080 CBR 25 - XDCAM compatible MPEG-2 video (1440x1080, 25 Mbit/s CBR). • XDCAM 1080 VBR 17.5 - XDCAM compatible MPEG-2 video (1440x1080, 17.5 Mbit/s VBR). • XDCAM 1080 VBR 35 - XDCAM compatible MPEG-2 video (1440x1080, 35 Mbit/s VBR). • XDCAM 540 CBR 12.5 - XDCAM compatible MPEG-2 video (1440x540, 12.5 Mbit/s CBR). • XDCAM 540 VBR 8.75 - XDCAM compatible MPEG-2 video (1440x540, 8.75 Mbit/s VBR). • XDCAM 540 VBR 17.5 - XDCAM compatible MPEG-2 video (1440x540, 17.5 Mbit/s VBR). • XDCAM HD 420 1280 - XDCAM HD MP compatible MPEG-2 video (4:2:0, 1280x720, 35 Mbit/s VBR) • XDCAM HD 422 1920 - XDCAM HD 422P compatible MPEG-2 video (4:2:2, 1920x1080, 50 Mbit/s CBR) • XDCAM HD 422 1280 - XDCAM HD 422P compatible MPEG-2 video (4:2:2, 1280x720, 50 Mbit/s CBR) • XDCAM EX 1920 - XDCAM EX MP compatible MPEG-2 video (4:2:0, 1920x1080, 35 Mbit/s VBR) • XDCAM EX 440 - XDCAM EX MP-14 compatible MPEG-2 video (4:2:0, 1440x1080, 25 Mbit/s CBR) • XDCAM EX1280 - XDCAM EX MP compatible MPEG-2 video (4:2:0, 1280x720, 35 Mbit/s VBR)
Video Format	Indicates the representation of pictures before being coded in accordance with MPEG-2 video specification (ISO/IEC 13818-2). It sets the video_format flag in the Sequence display extension header and does not affect the encoding and decoding processes. The following selections are available: • PAL • NTSC • SECAM • MAC • Unspecified • Auto

Profile	Specifies Profile of the encoded MPEG-2 video elementary streams.
Level	Specifies the Level of the encoded MPEG-2 video elementary streams.
Picture Type	Specifies whether the frames are interlaced or progressive.
Field Order	Specifies which of the two fields of an interlaced frame comes earlier - the top (odd) field or the bottom (even) one. If NTSC pull down is in effect, this option is set automatically.
Pulldown	This parameter specifies the NTSC pulldown generated in the video stream.
Aspect Ratio	Specifies the display aspect ratio code and depends on the MPEG type.
Bit Rate Control	
Mode	Specifies the rate control mode: • VBR - Variable Bit Rate mode. The average, maximum and minimum bitrates can be specified. The maximum bitrate is written in the sequence header. • CBR - Constant Bit Rate mode. The average bitrate can be specified and is written in the sequence header. • CQ_strict - Constant quantization parameter mode. All frames in the stream is encoded with specified quantization parameters. • CQ adaptive - Average quantization parameter is specified, but quantization parameters for macroblocks are generated due to adaptive algorithm.
Pass	Specifies the use of two-pass rate control mode: • Single pass - Two-pass rate control mode is disabled. • Multi-Pass Analyze - The first pass is performed (statistics gathering). • Multi-Pass Encode - The second pass is performed (statistics gathered on the first pass is used).
Bit-rate	Specifies the average bitrate (Kbits/sec) of the encoded video elementary stream.
Max. rate	Specifies the maximum bitrate (Kbits/sec) of the encoded video elementary stream.
VBV buf. Size (bits)	Specifies the VBV buffer size of the encoded video elementary stream in bits.
GOP Structure	
Max GOP length	Specifies the number of frames between I frames or the number of frames in a group of pictures.

Max B-frames count	Specifies the number of B frames between consecutive I and P frames.
Scene change detection	Specifies the scene change detection (SCD) algorithm. This flag causes the encoder to insert I-frames when new scenes are detected: • None - Do not use SCD. • Fast - Automatically create new GOPs when appropriate, according to the source content. This setting does not incur any speed penalty but if an application specifies chapter points, some of the specified chapter points may be ignored. • Refined - The same function as Fast, only the auto GOP placement is more refined (and a bit slower). This setting honors all of the application defined chapter points. • Regular
Input Info	
Resolution	Displays the resolution.
Frame rate	Displays the frame rate.
Picture type	Displays the picture type.
Color format	Display the color format.
Statistics	
Encoded frames	Show the number of encoded frames.
Average speed	Shows the average encoding speed.
Average bitrate	Show the average bitrate.
Overall PSNR	Calculates the overall PSNR value if enabled.
General	
Restore Default	Restores all properties provided by this property page to the default state for selected MPEG Type.

Advanced property page



Advanced property page fields description:

Parameter	Available Value	Description
Closed GOP interval	0, 1, 2, ..., n	Specifies the closed_gop periodicity: • 0 - no closed GOP • 1 - every GOP is closed • 2 - every second GOP is closed • 3 - every third GOP is closed .... • n - every n-th GOP is closed
Frame rate	Auto, 23.97, 24, 25, 29.97, 30, 50, 59.94, 60	Specifies the frame rate code of the encoded video elementary stream.
Write a sequence header every GOP	Yes No	Specifies whether the sequence header is contained in every GOP or just once at the beginning of the stream. Note that for VCD, SVCD and DVD this option should be turned on.
Write a sequence end code	Yes No	Specifies whether the encoder writes a sequence end code at the end of the stream.
Write a sequence	Yes	Specifies whether the sequence display extension should be contained in

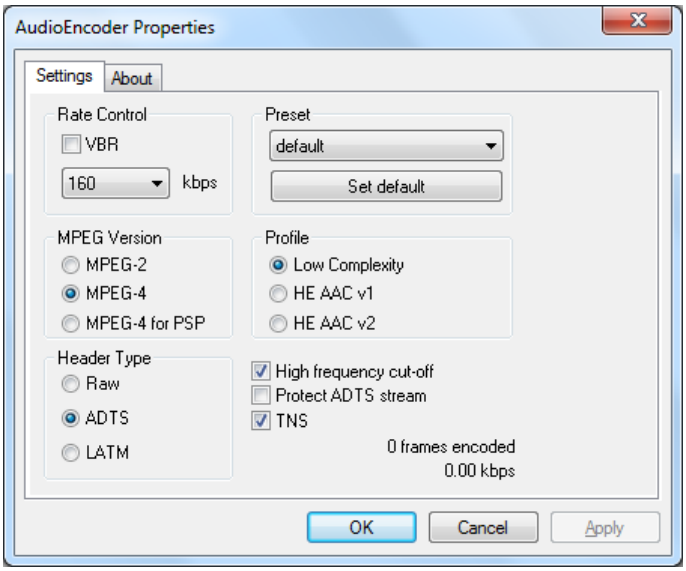
display extensions	No	every GOP. Some players have problems playing SVCDs that are encoded with extensions. So this option allows users to turn the extensions off if needed.
Write a picture display extensions	Yes No	Specifies whether the picture display extensions should be contained in the video stream. This option must be enabled to use the frame_centre_horizontal_offset and frame_centre_vertical_offset fields. It does not affect the encoding process.
Intra DC precision	8 bit 9 bit 10 bit 11 bit	Specifies the effective precision of the DC coefficient in MPEG-2 intra coded macroblocks. Usually, 10-bits is enough for the good saturation quality. This value must be 0 for MPEG-1 video. • 8 bit - Default for SVCD, must be fixed for MPEG-1. • 9 bit - Default for all other MPEG-2 presets. • 11 bit - Valid for High Profile only.
Chroma format	Chroma 4:2:0 Chroma 4:2:2	Specifies the resolution of chrominance data. • 4:2:0 - Half resolution in both dimensions (default for all presets). • 4:2:2 - Valid for the MPEG2 High and 4:2:2 Profiles only.
Progressive sequence	Yes (Progressive) No (Interlaced)	Specifies whether the frames are interlaced or progressive. This option must be "Yes" for MPEG-1 video.
Repeat first field	Yes No	Specifies whether the first field of a frame must be repeated after the two fields displaying. The exact action depends on the progressive_sequence and top_field_first flags. This option signals to decoder to perform 2:3 or 3:2 NTSC pull down. If pull down is in effect, it is set automatically.
Motion search quality	1,2, ..., 15	Specifies the motion search mode: • 0 - no motion search (fast) • .. 7 - middle motion search method, medium quality • .. 15 - best motion search method, high quality
Motion search range	0,1, ..., 31	Specifies the motion search range.
Halfpel search	Yes No	Specifies whether the half pel motion search is used.
Deinterlacing mode	Yes No	Specifies the deinterlacing mode. • No - Deinterlacing is disabled.

		• Yes - Deinterlacing is enabled.
Quantization scale type	Non-linear Linear	Specifies the quantization scale types. • Linear - Default for all MPEG-1 presets. • Non-linear - Default for all MPEG-2 presets.
Intra VLC	Table 0 Table 1	Specifies which of the two variable length coding tables is used for the intra coded blocks. • Table 0 - Default for all presets, must be fixed for MPEG-1. • Table 1 - Is considered to be statistically optimized for Intra coded pictures coded within the sweet spot range (e.g. 0.3 to 0.6 bit/pixel) of MPEG-2.
Scanning type	Alternate scan Zig-Zag scan	Specifies one of two entropy scanning patterns defining the order in which quantized DCT coefficients are run-length coded. The alternate scanning pattern is considered to be better suited for interlaced video if the encoder does not employ sophisticated forward quantization. • Zig-Zag scan - Must be fixed for MPEG-1. • Alternate scan - Default for all MPEG-2 presets.
Out sample size	0, ...	Specifies the output samples size.
Pad skipped frames	Yes No	Specifies whether the mode of skipped frames padding is enabled or disabled. • Yes - Encoder detects gaps in the frame time stamps and inserts the skipped frames. • No - Skipped frames padding is disabled.
ClosedCaption	No, ATSC format, SCTE format, CCUBE format, Passthrough mode	Specifies the use of closed caption data. If the certain CC data format is selected, the encoder accepts CC data as a byte pairs and writes them into the frames User data fields according to the selected format. If the "pass-through" mode is selected, the encoder writes the received CC data into the User data fields without any changes. • No - Closed caption data is not used. • ATSC format - Closed caption data is used in ATSC format. • SCTE format - Closed caption data is used in SCTE format. • CCUBE format - Closed caption data is used in CCUBE format.

		• Pass-through mode - Passthrough mode is on.
Skip Mode	Skip frames if required, Skip only in underflow case	Parameter is used, in order to change the mode for skipping frames.
Prefiltering	0 - disabled, 1 - 15	Parameter is used for blurring video out, which can be useful for complex content with low bitrate.
Pixel range conversion	No conversion Conversion to short range Keep short range Conversion to full range	Pixel range conversion, changes the range of pixels values • 0 - No conversion - Indicates what input stream is full range [0..255] and encoded stream should be full range. • 1 - Conversion to short range - Indicates what input stream is full range and encoded stream should be convert to short range [16..235]. • 2 - Keep short range - No conversion, but doesn't allow to go beyond short range when use color resampling (for example when convert from 4:2:0 to 4:2:2 format). • 3 - Conversion to full range - Indicates what input stream is short range and encoded stream should be convert to full range [0..255].

5.4. AAC audio encoder settings

The following dialog is opened when pressing the Setup button in the main configuration dialog placed beside the Audio Encoding and when AAC audio encoding is selected.



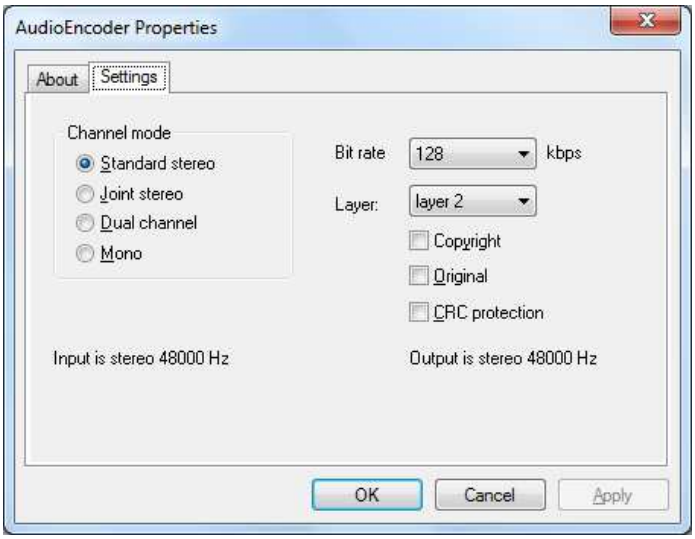
Main property page fields description:

Property	Action
Preset	The following presets are defined: • default - Default settings • PSP - Settings compatible with PlayStation Portable by Sony • iPod - Settings compatible with iPod by Apple • 3GPP - Settings compatible with 3GPP specification • 3GPP2 - Settings compatible with 3GPP2 specification • ISMA - Settings compatible with ISMA specification • Flash low resolution - Settings for Adobe Flash (Low Resolution WebContent) • Flash high resolution - Settings for Adobe Flash (High Resolution Web Content) • Silverlight - Microsoft Silverlight compatible settings • fMP4 IIS Smooth Streaming - fMP4 IIS Smooth Streaming compatible settings • DivX Plus Streaming - DivX Plus Streaming compatible settings • DivX Plus Streaming 5.1 - DivX Plus Streaming 5.1 compatible settings • DASH264 - DASH264 compatible settings
Rate control	Sets rate control mode and average output bit rate or average quality.
Profile	Sets the encoding profile.
MPEG Version	Sets the output format.

Header Type	Sets the output bit stream format (raw, LATM or with ADTS headers).
High frequency cut-off	Enables/disables high frequency cut-off.
Protect ADTS stream	Specifies if audio stream contains CRC protection.
TNS	Enables/disables Temporal Noise Shaping (TNS) algorithm.

5.5. MPEG audio encoder settings

The following dialog is opened when pressing the Setup button in the main configuration dialog placed beside the Audio Encoding and when MPEG audio encoding is selected.



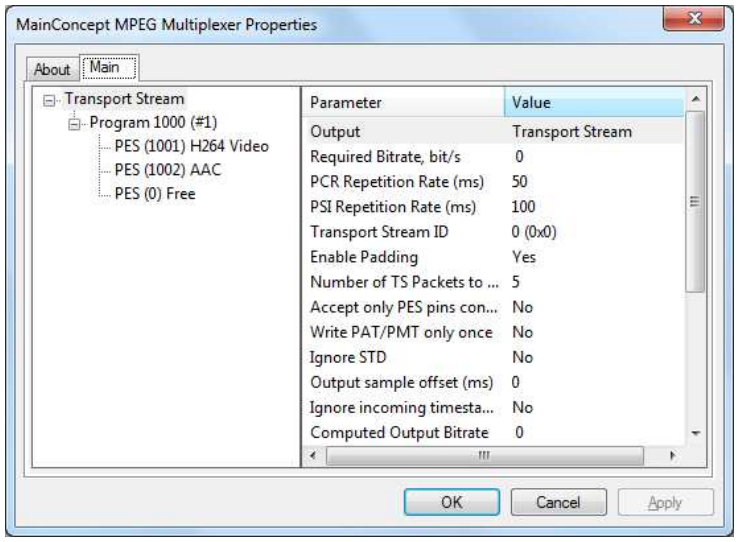
Main property page fields description:

Property	Action
Channel Mode	Sets the output channel mode. This parameter allows the joint coding mode setting for stereo input audio streams (or downmix it to mono), for mono input audio streams this parameter doesn't affect encoding process.
Bit Rate	Sets output bitrate.
Layer	Specifies the MPEG audio layer to use for encoding.

Copyright	Sets the Copyright flag.
Original	Sets the Original flag.
CRC protection	Enables CRC protection.
Swap channels	Activates input channel swapping (left and right channels change places).
Pad frames	Activates frame padding (allows the encoder to use the padding slot in order to maintain output bit rate precisely).

5.6. MPEG multiplexer settings

The following dialog is opened when pressing the Setup button in the main configuration dialog placed beside the Multiplex and when MPEG Transport Stream is selected.



Main property page fields description:

Parameter	Value	Description
Output	Program Stream	The multiplexer generates the Program Stream.
	Transport Stream	The multiplexer generates the Transport Stream.
	MPEG1 System	The multiplexer generates an MPEG-1 System stream.
	VCD	The multiplexer generates a VCD-compliant stream.
	SVCD	The multiplexer generates a SVCD-compliant stream.
	DVD	The multiplexer generates a DVD-compliant stream.
	DVD_MPEG1	The multiplexer generates a DVD MPEG-1-compliant stream.
	DVB	The multiplexer generates an DVB stream, including the corresponding SI tables set.
	ATSC	The multiplexer generates an ATSC stream.
	HDV1	The multiplexer generates a HDV1 compliant stream.
	AVCHD	The multiplexer generates an AVCHD-compatible stream.
	HDMV	The multiplexer generates a Blu-ray HDMV compatible stream.
	CABLELABS	The multiplexer generates a CABLELABS stream.
	1SEG	The multiplexer generates a 1Seg stream.
Required Bitrate, bits/s	Numerical value, Bits per Second	This option is available only for Transport Streams (incl. DVB, ATSC, AVCHD etc.). You can specify this value to achieve the necessary TS bitrate. If the value is equal to zero, the TS bitrate is calculated from the bitrates of multiplexed streams.
PCR Repetition	Numerical Value,	This option is available only for Transport Stream. Allows the user to

Rate (ms)	Milliseconds	specify a time distance between two consecutive Program Clock Reference fields. This value is automatically assigned for the profiles which have strict requirements on this.
PSI Repetition Rate		This option is available only for Transport Streams. Allows the user to specify a time distance between two consecutive PSI tables sets. This value is automatically assigned for the profiles which have strict requirements on this.
Transport Stream ID	Numerical value, automatically corrected	This is a 16-bit field that identifies the Transport Stream among other streams in a network. The value is defined by the user. (ISO/IEC 13818-1)
Enable Padding	Yes or No	Enables/disables the padding packets sending to meet the STD restrictions. The 0x1FFF padding packets are sent in Transport Streams, PES padding packets are sent in Program Streams.
Number of TS packets to deliver	Numerical value, number of packets	This option specifies the number of transport packets accumulated on the output pin's buffer to be sent at once by the single media sample.
Compatibility	None	Obsolete. Consider to set the Output instead.
	DVD	
	SVCD	
Compute Output Bitrate	Numerical value, Bits per Second	The TS / PS rate which is used by the multiplexer in case if **Required Bitrate** is not set. The value is automatically calculated by the multiplexer basing on the input streams' bitrates. (Statistical, read only).
Muxer Time	Time value, `&#65533;`hh:mm:ss:mss`&#65533;`	The current PCR or SCR value (Statistical, read only).
Graph Time	Time value, `&#65533;`hh:mm:ss:mss`&#65533;`	Statistical value (read only). Indicates the time interval (in 100 ns units) which has left since the multiplexing process run. The value is derived using the DirectShow Graph clocks. If clocks are unavailable, the parameter has 0 value. This value is updating in real-time each time when data is sent to the multiplexer's output. For real-time multimedia streaming systems, this value should go on closely to the **Muxer Time** value. The increasing difference between these two values indicates that the streaming fails to achieve real-time conditions, and the playback on the receiver's side can be faster or slower than intended. Such effect can be observed, e.g., if the encoding PC performance is

		not enough and an encoder generates less frames per second than needed.
Padding, packets	Numerical value	This option is available for Transport Stream, if the **Enable Padding** option is on. Indicates the number of padding packets in the Transport Stream (Statistical, read only).
Allow missing Input Streams	Yes or No	Not supported in SDK 8.0.
192-byte TS packets	Yes or No	Obsolete. The multiplexer automatically use the proper TS packet size for each given Output profile. The 192- byte TS packets are generated for AVCHD and Blu-ray HDMV.
Write PES Length for Video	Yes or No	This option is only available for Transport Stream. If this parameter is enabled, the multiplexer writes a certain value of video PES packet length, instead of writing of zero value.

Properties on program level:

Parameter	Value	Description
Program ID	Numerical value, automatically corrected	**program_map_PID** is a 13-bit field specifying the PID of the Transport Stream packets, which will contain the program_map_section applicable for the program as specified by the program_number. No program_number shall have more than one program_map_PID assignment. The value of the program_map_PID is defined by the user, but shall take only the values that are specified in table 2-4 on page 23. (ISO/IEC 13818-1 document).
Program #	Numerical value, automatically corrected	**program_number** is a 16-bit field. It specifies the program to which the program_map_PID is applicable. If this is set to 0x0000, then the following PID reference will be the network PID. For all other

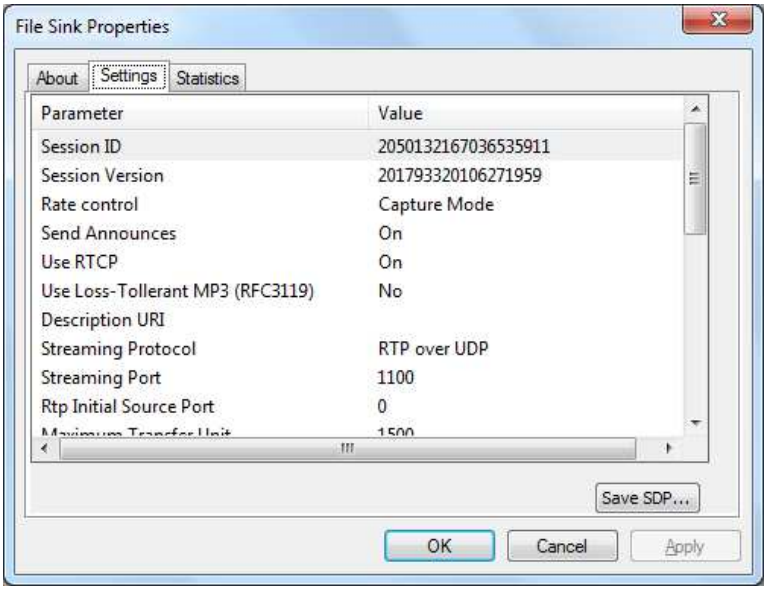
<table>
<tr><td></td><td></td><td>cases, the value of this field is defined by the user. This field will not accept any single value more than once within one version of the program association table. The program_number may be used as a designation for a broadcast channel, for example. (ISO/IEC 13818-1 document).</td></tr>
<tr><td>PCR PID</td><td>Numerical value, automatically corrected</td><td>This option is only available for Transport Streams. This parameter specifies the PID of elementary stream that carries the Program Clock Reference (PCR) timestamps for the program. The PCR PID can be chosen among PIDs of streams belonged to the program. This parameter is effective only for Transport Streams. (ISO/IEC 13818-1 document).</td></tr>
<tr><td>User Defined PCR PID</td><td>Numerical value</td><td>This option is only available for Transport Streams. This parameter allows specifying the independent PID at which PCR will be carried. PCR timestamps only and no payload are carried, and also allows to make the PCR PID shared between the programs. Please note, that the PID values of the streams belonging to another program can be assigned for a program, referring to this stream as PCR carrier.</td></tr>
<tr><td>Stream Type</td><td>H.264 Video; MPEG-2 Video; MPEG-2 Audio; MPEG-1 Video; MPEG-1 Audio; AC-3; AAC; LPCM; PES streams; VC-1; Private data; DVD subpicture; Free</td><td>The stream type is automatically set at the connection of the input pin. It cannot be set manually.</td></tr>
<tr><td>PES Packet Size in Bytes</td><td>Numerical, bytes</td><td><table>
<tr><th>Value</th><th>Result PES packet size</th></tr>
<tr><td>0</td><td>Compatibility = None, 0 < PES packet size <= 0xFFF0</td></tr>
<tr><td>N</td><td>Compatibility = None, 0 < PES packet size <= N</td></tr>
<tr><td>Ignored</td><td>Compatibility != None, PES packet size = restrict by standard</td></tr>
</table></td></tr>
<tr><td>Padding in small packets</td><td>Yes or No</td><td>If Yes, small PES packets are padded till the specified size.</td></tr>
<tr><td>Input Buffer</td><td>Numerical value, Bytes</td><td>This parameter specifies the physical input buffer size which is used for the multiplexing process. The multiplexer tries to process and</td></tr>
</table>

Size (Byte)		send the data to the output as fast as it available at the input, so large buffering is not usually required. Please note, that the minimal buffer size should be enough to accommodate two complete access units at once.
Initial Time Shift (ms)	Numerical value, msec	This feature shifts PTS values in the stream to the specified time. It is used to synchronize audio and video (lip sync) when the streams from capture devices are multiplexed.
Stream ID	Numerical value is automatically corrected	Only for Transport Streams. The PID is a 13-bit field, indicating the type of the data stored in the packet payload. PID value 0x0000 is reserved for the Program Association Table (table 2-26 on page 47 ISO/IEC 13818-1). PID value 0x0001 is reserved for the Conditional Access Table (table 2-28 on page 49 ISO/IEC 13818-1). PID values 0x0002-0x000F are reserved. PID value 0x1FFF is reserved for null packets. (see ISO/IEC 13818-1).
Stream PES ID	Numerical value, automatically corrected	In Program Streams, the stream_id specifies the type and number of the elementary stream as defined by the stream_id table 2-19 (ISO/IEC 13818-1). In Transport Streams, the stream_id may be set to any valid value that correctly describes the elementary stream type as defined in table 2-19 (ISO/IEC 13818-1). In Transport Streams, the elementary stream type is defined in the Program Specific Information as specified in 2.4.4 on page 44 (ISO/IEC 13818-1).
Announced Bitrate	Numerical value, Bits per Second	This value indicates the stream bitrate retrieved from the pin connection information. If the stream bitrate value can not be obtained the pin connect information, the default value (2000000 bit/s) is used as announced bitrate.
Real Bitrate	Numerical value, Bits per Second	This value indicates the stream bitrate calculated from the real stream data amount and PTS values.
Correct Bitrate	Numerical value, Bits per Second	This option allows user to specify the stream bitrate, if the **Announced Bitrate** value is not correct. If the value provided in pbFormat is too high, set the accurate value using this parameter, to save the output bandwidth, or consider specifying the **Required Bitrate** of the output stream (Main setting tab).
Correct EB size	Numerical value, Bytes	Only for video streams. The size of EB buffer that is used in the T-STD or P-STD models.
Announced frame rate	Numerical value, Frames per Second	This value indicates the video stream frame rate retrieved from the pin connection information. Read only.

Sub ID	Numerical value, automatically corrected	Only for Program Streams. The value in range from 0xA0 to 0xA7 (for LPCM audio), from 0x80 to 0x87 (for AC-3 audio) or from 0x55 to 0x5C (for VC-1 video) that is set automatically depending on the stream number in program.
Frequency	Numerical value, Hz	This value indicates the sampling frequency of audio stream. Read only.

5.7. Network IP streaming settings

The following dialog is opened when pressing the Setup button in the main configuration dialog placed beside the Network Streaming and when Network IP Streaming is selected.



Main property page fields description:

Property	Description
Session ID	Specifies the current SDP session identifier.
Session Version	Specifies current SDP document version.
Rate control	Specifies rate control (send rate control) type.
Send Announces	Enable/Disable announces broadcasting
Use RTCP	Enables (true) or disables (false) RTCP sender
Use Loss-Tolerant MP3(RFC3119)	Turn on/off Loss tolerant mode for mpeg audio (RFC3119)
Description URL	Specifies Universal Resource Identifier as used by WWW clients.
Streaming Protocol	Specifies the transport type
Streaming Port	Specifies first available port for sending media data
Maximum Transfer Unit	Specifies max transfer unit size (MTU)
Burstness value(mS)	Set up burstness value in mS
Net Error Handling	Set type of network errors handling
Outgoing Network Interface	Specifies server's local network interface
Destination Address	Specifies destination address to send media data to
SAP Multicast Group	Specifies address for the SAP announcements group
TTL	Specifies Time To Live for the packets

Bandwidth	Specifies SDP bandwidth field value
Bandwidth Type	Specifies SDP bandwidth modifier described in RFC2327
Output Stream Type	Indicates which kind of media is currently streamed (muxed or elementary stream)
Origin E-mail	Specifies email address of sender
Origin Phone	Specifies sender's phone number
Session Name	Specifies SAP session name
Origin Creator Name	Specifies name of the announce creator
Session info	Specifies SAP additional information
Remote shared socket info	Specifies shared socket info from Source Component and initiates sharing process

6. HLS and DASH

The solution also supports HLS - HTTP Live Streaming and DASH – Dynamic Adaptive Streaming over HTTP, which can be configured from the Network Streaming combo box. When selecting "HLS & DASH", the solution starts an HTTP server at port 80 on the local system IP in the sub-folder "root", which can be accessed from other systems and devices, supporting HLS and DASH, including iPhone, iPad, Android phones and tablets and all DASH compliant players. The solution streams HLS and DASH live streams simultaneously.

The HLS stream can be accessed on the following address:

http://[local system IP address]/root/00/play.m3u8
, for the first encoder.

http://[local system IP address]/root/01/play.m3u8
, for the second encoder, etc..

The DASH stream can be accessed on the following address:

http://[local system IP address]/root/00/manifest.mpd
, for the first encoder.

http://[local system IP address]/root/01/manifest.mpd
, for the second encoder, etc..

If the system has and IP address 192.168.1.101 the HLS stream of the first encoder can be accessed at http://192.168.1.101/root/00/play.m3u8 and the DASH stream at http://192.168.1.101/root/00/manifest.mpd

By default the HLS and DASH output streams are created in the temporary Windows folder with subfolder "Jongbel Media Solutions". The solution allows disabling of the local HTTP server and configuring a different output local or remote folder, allowing integration with Nginx and Apache.

7. Trial and NFR version restrictions

The Trial and NFR versions of the JIPEncoder solution have the following restrictions: the encoded video has burned-in encoder demo logo. The encoded audio streams are limited to 30 seconds only. After the 30th second the audio stream is encoded with silence. The IP streaming stops after 10 minutes.

8. Shortcuts

The following shortcuts are available in JIPEncoder:

JIPEncoder	Fast Shortcuts	General
Ctrl+O	O	Device Select
Ctrl+D	D	
Ctrl+P	P	Start Encoding
Ctrl+E	E	
Ctrl+T	T	Stop Encoding
Ctrl+S	S	Setup
Ctrl+U	U	
Ctrl+Shift+V		Volume Control
Ctrl+Shift+T		Timer
Ctrl+Shift+C		CPU
Ctrl+Shift+B		Bitrate
Ctrl+Shift+P		Video PSNR
Ctrl+Shift+S		Schedule
Ctrl+Shift+A		Arrange Windows
Alt+Y		Change Style
Ctrl+Shift+Y		
Alt+R		Enable Graphics
Ctrl+Shift+R		
Alt+G		Graphics Designer
Ctrl+Shift+G		
Ctrl+Shift+F		Enable/Disable Fast Keyboard Shortcuts
Alt+O		Logger
Ctrl+Shift+O		
Ctrl+G	G	Detection Settings
Ctrl+I	I	

9. REST API

JIPEncoder can be controlled through REST API. The REST API control can be enabled from the Tools menu - Rest API. The below functions are available for externally controlling the JIPEncoder.

GET [host]

Returns the current status and position of the encoder along with the main settings. Host is the is the IP of the system, where the REST API server is started.

Example: GET http://192.168.0.103:8081/

Example result:

```
<jipencoder>
   <status='running'>
   <encoding_time='00:00:03.35'>
   <source>
          <black_video='No'>
          <freeze_video='No'>
          <silent_audio='No'>
          <noisy_audio='No'>
   </source>
   <layer id='0'>
          <video>
                 <width='720'>
                 <height='576'>
                 <fps='25.00'>
                 <encoding_type='Intel QSV AVC/H.264 Video'>
          </video>
          <audio>
                 <channels='2'>
                 <frequency='48000'>
                 <bps='16'>
                 <encoding_type='AAC Audio'>
          </audio>
          <mux>
                 <mux_type='MPEG-2 Transport Stream'>
          </mux>
          <streaming>
                 <type='Network IP Stream'/>
          </streaming>
   </layer>
</jipencoder>
```

- 'status' can be either 'running' or 'stopped' denoting the status of the encoder.

- 'encoding_time' denotes the time in hours, minutes seconds and milliseconds since the beginning of the encoding process.

- 'source' is a section where it is possible to detect if the source video is black or freeze or the input audio is silent or noisy.

- 'layer' section denotes each layer encoding settings.

-'video' section contains the video width, height, fps and encoding type.

-'audio' section contains the audio channels, frequency, bits per sample and encoding type

-'mux' section contains the muxing type.

-'streaming' section contains the streaming type.

PUT [host]\ {"command": "start"}

Starts the encoder and the returns the new state.

Example: PUT http://192.168.0.103:8081/?command=start

PUT [host]\ {"command": "Stop"}

Stops the encoder and the returns the new state.

Example: PUT http://192.168.0.103:8081/?command=stop