



MPEG Encoding Overview: Using the MainConcept MPEG-2 plug-in

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What is not covered in this document?

MPEG-1 or Video CD creation
DVD authoring
DVD burning

About the MainConcept MPEG-2 Plug-In

This MainConcept MPEG plug-in was developed by Sony Pictures Digital and first shipped with Vegas 3.0. It was based on the software development kit (SDK) licensed from MainConcept (<http://www.MainConcept.com>). Both Sony Pictures Digital and MainConcept continue to devote significant engineering and support resources to this plug-in. Both companies closely monitor Sony Pictures Digital forums and technical support inquiries in the interest of improving the MPEG technologies in Sony Pictures Digital products.

Development priorities

While it is possible to use the MainConcept MPEG-2 plug-in to produce good quality MPEG-2 files for SVCD or other purposes, our goal is to provide the highest possible quality MPEG-2 files for use in DVD-authoring programs. Engineering and support priority has been, and will continue to be, devoted to MPEG-2 for DVD.

You can also use the MainConcept MPEG plug-in to create MPEG-1 files for VideoCD (VCD). If you wish to know more about MPEG-1 or Video CD, please use the documentation included with your Sony Pictures Digital product, or search the Sony Pictures Digital forums:

<http://mediasoftware.sonypictures.com/forums/default.asp?siteid=1>.

Technical Support

Sony Pictures Digital provides support for the MainConcept MPEG-2 plug-in (and any other component of any Sony Pictures Digital application). You can use the Sony Pictures Digital online technical support forums, or you can post to the Sony Pictures Digital forums at <http://mediasoftware.sonypictures.com/forums/default.asp?siteid=1> and get fast feedback from your peers.

Updates

Updates to the MainConcept MPEG plug-in will be posted periodically. Frequently, updates will be included as part of an update to a Sony Pictures Digital application. Whenever an update to the MainConcept MPEG plug-in is released, a notice will be posted in the Sony Pictures Digital forums at

<http://mediasoftware.sonypictures.com/forums/default.asp?siteid=1>.

Basic Questions and Answers

What is MPEG?

MPEG (Motion Picture Expert Group) is a group formed under the International Standards Organization (ISO) to define a standard for the compression of digital video and audio data. For more information, visit www.mpeg.org/.

What is the difference between the basic and the professional MainConcept MPEG plug-in?

The basic version of the MainConcept MPEG plug-in uses templates only. Good quality MPEG-1 and MPEG-2 files can be created with the basic version. If you get a pop-up purchase message when you click on the **Custom** button in the Render As dialog, you have the consumer version of the plug-in. If you need access to the custom controls, you will need to purchase the professional version.

How do I know what version (build) of the MainConcept MPEG-2 plug-in I have?

From the File menu, choose **Render As**, and choose **MainConcept MPEG-2** from the **Save as type** drop-down list. Click the **About** button. The version and build number are displayed.

Why can I view MPEG-2 files on some computers but not others?

MPEG-2 files require an MPEG-2 decoder in order to view them in the Windows Media Player and other applications. Windows does not install an MPEG-2 decoder by default, but you can download MPEG-2 decoders at www.vcdhelp.com. Sony Pictures Digital does not endorse or support any third-party MPEG-2 decoders.

Can I use MPEG-2 files for streaming movies off my Web site?

No. MPEG-2 files must be downloaded in their entirety before playback begins.

Can I use MPEG-2 files as a source format and edit them?

Yes, but this is not ideal. MPEG-2 files are heavily compressed, and when re-encoded, quality will decrease significantly. Whenever possible, use .avi or QuickTime source material of the highest possible quality.

What should I use MPEG-2 files for?

MPEG-2 files are best used for disc-based delivery, such as SVCD (consumer quality) or DVD (professional quality). See www.vcdhelp.com for extensive coverage.

What are the exact render settings I need to use for my DVD authoring tool?

It is strongly recommended that you check your DVD authoring tool's documentation before rendering a MPEG-2 file. There are often very specific requirements that can vary widely. Additionally, some authoring tools will accept MPEG-2 files and then re-encode them, resulting in lower quality. You should try to avoid re-encoding MPEG files whenever possible.

Why do commercial DVDs look better than the DVDs I am making myself?

Commercially produced DVDs usually start with very high-quality source footage, and are often encoded on a scene-by-scene basis using expensive encoding hardware. Sony Pictures Digital does MPEG-2 encoding for the motion picture and television industry, and we have used our experience with high-end equipment and source material to improve the encoding capabilities of our software products. Periodic updates of the MainConcept MPEG plug-in will be released when future quality breakthroughs are achieved.

Should I use the templates, or should I modify the custom settings?

The preset templates work well in most situations, and if possible you should not modify the custom settings, as an invalid file could result. If you do wish to experiment with the custom settings, try changing one control at a time, and keep good notes. Once you find custom settings that work for your purposes, you can save them as a custom template and recall those settings for subsequent renders.

Are MPEG-2 files generated with Sony Pictures Digital products guaranteed to work with my authoring application?

No. It is possible to create files that will not work in any third-party application, especially if you modify the custom settings. However, if you follow the requirements specified in your DVD authoring tool's documentation, you should be able to create compliant files. There are many helpful discussions related to MPEG-2 and DVD authoring in the Sony Pictures Digital forums (<http://mediasoftware.sonypictures.com/forums/default.asp?siteid=1>) and this should be your first resource.

My encoded MPEG-2 files are blocky and/or are not sharp. How do I fix this?

Generally, higher bitrates will produce higher-quality results. However, bitrates that are too high may result in invalid files or files that do not properly play back. After experimenting with bitrate settings, you may want to experiment with DC Coefficient settings.

There are many discussions about optimizing quality in the Sony Pictures Digital forums (<http://mediasoftware.sonypictures.com/forums/default.asp?siteid=1>). Feel free to start your own thread if you do not find a solution in an existing thread.

Can I create both NTSC and PAL files?

Yes, the MainConcept MPEG plug-in can produce NTSC and PAL MPEG-2 files.

I have a software MPEG-2 player on my computer. Will this give me an accurate representation of how the files will look when played back on a television set?

No. Software emulation of DVD playback is not a reliable method of verifying audio/video synchronization, color accuracy, noise, or safe area, among other parameters. You are advised to burn the files to a DVD (preferably re-writable) and watch them on a television — this is the only reliable method of evaluating MPEG-2 files destined for DVD.

I want the highest possible quality. What is the maximum allowed bitrate for DVD?

The MPEG-2 format allows very high bitrates, but if you are creating MPEG-2 files destined for DVD, the maximum allowed video bitrate is 9.8 Mbps, and 10.08 Mbps for the entire file. If you exceed (and or in some case closely approach) this limit, your files will be invalid for DVD. Please check your DVD authoring tool's documentation for specific requirements.

What is DVD widescreen?

Although letterboxing and 16:9 anamorphic are often called *widescreen*, there is a critical difference between the two.

With letterboxing, the widescreen effect is accomplished by resizing the widescreen image in a 4:3 frame. This leaves black bars across the top and the bottom of the 4:3 screen.

16:9 anamorphic is squeezed horizontally and looks skinny on a 4:3 screen, but will fill a 16:9 screen. You have two options for 16:9 anamorphic: you can use an anamorphic lens adapter (the image will appear stretched in the camera's viewfinder), or you can shoot in 16:9 and change the pixel aspect ratio of the footage. The recorded image will require a monitor with a 16:9 setting to look correct.

You don't need a widescreen monitor to view anamorphic DVDs. Anamorphic DVDs can be decoded by the player for 4:3 televisions by vertically scaling the image and adding black bars. On a 4:3 television, you can't really tell the difference between a 4:3 image that is letterboxed or an anamorphic image that is letterboxed by the player. However, if you have a 16:9 set, the anamorphic version is far superior in quality, as you are only stretching the image horizontally, and not zooming both horizontally and vertically.

More information about anamorphic widescreen can be found at www.thedigitalbits.com/articles/anamorphic/index.html

Do I have to worry about field order?

If your source footage is being interpreted correctly in your Sony Pictures Digital application (in most cases the footage is correctly auto-interpreted and requires no adjustments), the MainConcept encoder will encode it correctly, and it will play back correctly from DVD. Consult the documentation that came with your Sony Pictures Digital product to learn more about field order.

If I want to experiment with custom settings to improve the quality of my MPEG-2 files, where should I start?

Adjusting the video bitrate is a good place to start. Be careful not to set the bitrate too high or you may wind up with an invalid file (or a file your authoring tool will not accept). Be aware that as bitrate increases, the file size will increase. If you use the unmodified DVD template, you will be able to fit approximately 1.5 hours of program on a single-sided, single-layer, 4.7GB DVD, so plan accordingly. Experiment and keep good notes as you learn.

Why are so there many controls exposed in the MainConcept encoder?

There are certain, highly specialized production situations where precise adjustment of certain parameters is required. If you do not specifically know why you are changing a custom control, do not change it.

Using the MainConcept MPEG-2 Plug-In

The MPEG-2 format is extremely complex and we are not attempting to explain every aspect of MPEG compression, but if you read through this document, you should be able to create high-quality MPEG-2 files for DVD.

The MainConcept MPEG-2 professional encoder plug-in exposes a significant number of controls. It is recommended that you use the preset render templates *without modifying any of the custom parameters* — these templates have been optimized for speed/image quality/file size, as well as compliance with third-party DVD authoring applications.

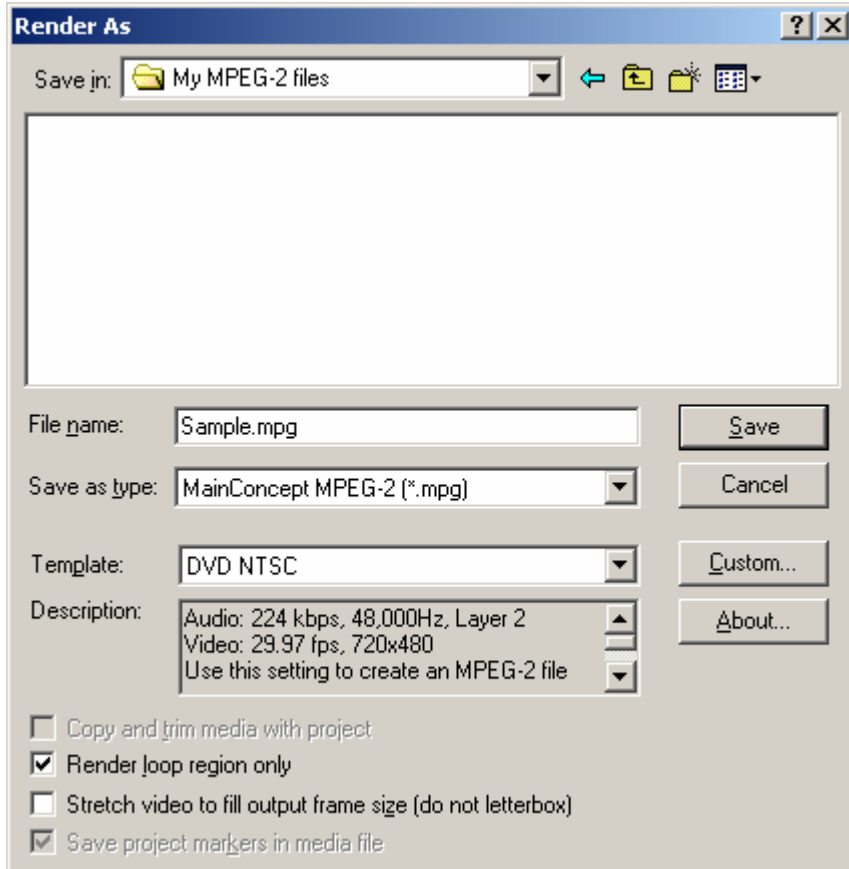
In certain circumstances, you may want to change the custom settings. Please be aware that changing the custom settings will take some research and experimentation on your part. It is certainly possible to create noncompliant files if you change the custom settings (this is true with any render format). It is worth visiting the Sony Pictures Digital forums at <http://mediasoftware.sonypictures.com/forums/default.asp?siteid=1> if you wish to modify the custom settings.

High-quality MPEG encoding is an art that requires prioritizing bits, time, and quality. Setting all of the controls to the highest possible value will result in longer render times and may not improve, or may even reduce, the quality of the rendered file. Overly high bitrates may cause frames to be dropped by the playback device, or may result in a file that cannot be played back. Please feel free to experiment with the custom settings, but be aware that we cannot guarantee that the files you create will work with your destination application device. The Sony Pictures Digital forum is a good resource for exchanging encoding information and questions with other users.

Rendering MPEG-2 Files

Important: Check the documentation of your DVD authoring tool to ensure that the MPEG-2 file you are creating with your Sony Pictures Digital application is compliant with your authoring tool's requirements. Sometimes the authoring tool may accept the MPEG-2 file but will re-encode it, resulting in a lower quality.

From the File menu, choose **Render As**, and choose **MainConcept MPEG-2** from the **Save as type** drop-down list. The Render As dialog will be displayed.



About the Templates

An explanation of each template included in both the basic and professional versions of the MainConcept MPEG-2 plug is given below.

Template name	Audio settings	Video settings	Suggested use
SVCD NTSC	224 kbps, 44,100 Hz, Layer 2	29.97 fps, 480x480	Creating an NTSC SVCD-compliant MPEG-2 file.
SVCD PAL	224 kbps, 44,100Hz, Layer 2	25 fps, 480x576	Creating a PAL SVCD-compliant MPEG-2 file.
DVD NTSC	224 kbps, 48,000Hz, Layer 2	29.97 fps, 720x480	Creating an MPEG-2 file with an NTSC DVD-compliant video stream and an MPEG layer 2 audio stream.
DVD PAL	224 kbps, 48,000 Hz, Layer 2	25 fps, 720x576	Creating a PAL DVD-compliant MPEG-2 file.
DVD NTSC video stream *	224 kbps, 48,000Hz, Layer 2	29.97 fps, 720x480	Creating an NTSC DVD-compliant MPEG-2 video elementary stream file with extension .m2v. Consult your DVD-authoring software to determine supported audio formats. *
DVD PAL separate stream	224 kbps, 48,000 Hz, Layer 2	25 fps, 720x576	Creating separate PAL DVD-compliant video and audio elementary files with extensions .m2v and .mpa, respectively. *
DVD Architect NTSC video stream	None	29.97 fps, 720x480	Creating an NTSC DVD-compliant, video-only MPEG-2 video file for use in DVD Architect.
DVD Architect NTSC Widescreen video stream	None	29.97 fps, 720x480	Creating a widescreen NTSC DVD-compliant, video-only MPEG-2 file for use in DVD Architect.
DVD Architect 24p NTSC video stream	None	23.976 fps, 720x480	Creating a 24 fps, progressive-scan, DVD-compliant, video-only MPEG-2 file for use in DVD Architect.
DVD Architect 24p NTSC Widescreen video stream	None	23.976 fps, 720x480	Creating a widescreen 24 fps, progressive-scan, DVD-compliant, video-only MPEG-2 file for use in DVD Architect.
DVD Architect PAL video stream	None	25 fps, 720x576	Creating a PAL DVD-compliant, video-only MPEG-2 video file for use in DVD Architect.
DVD Architect PAL Widescreen video stream	None	25 fps, 720x576	Creating a widescreen PAL DVD-compliant, video-only MPEG-2 video file for use in DVD Architect.
HD 720-24p	224 kbps, 48,000 Hz, Layer 2	23.976 fps, 1080x720	Creating a 24 fps, progressive-scan, high-definition MPEG-2 video file.
HD 720-30p	224 kbps, 48,000 Hz, Layer 2	29.97 fps, 1080x720	Creating a 30 fps, progressive-scan, high-definition MPEG-2 video file.
HD 720-60p	224 kbps, 48,000 Hz, Layer 2	54.94 fps, 1080x720	Creating a 60 fps, progressive-scan, high-definition MPEG-2 video file.
HD 1080-24p	224 kbps, 48,000 Hz, Layer 2	23.976 fps, 1920x1080	Creating a 24 fps, progressive-scan, high-definition MPEG-2 video file.
HD 1080-30p	224 kbps, 48,000 Hz, Layer 2	29.97 fps, 1920x1080	Creating a 30 fps, progressive-scan, high-definition MPEG-2 video file.
HD 1080-60i	224 kbps, 48,000 Hz, Layer 2	54.94 fps, 1920x1080	Creating a 30 fps, interlaced, high-definition MPEG-2 video file.

** Note: If you choose to create elementary streams as above, Sony Pictures Digital editing applications will not be able to open these elementary streams.*

Creating and saving custom templates

If you have the professional version of the plug-in, you can use the **Custom** button to modify the template settings and save a custom template for future encodes.

Render loop region only

If checked, only the area in the loop selection of the timeline will be rendered.

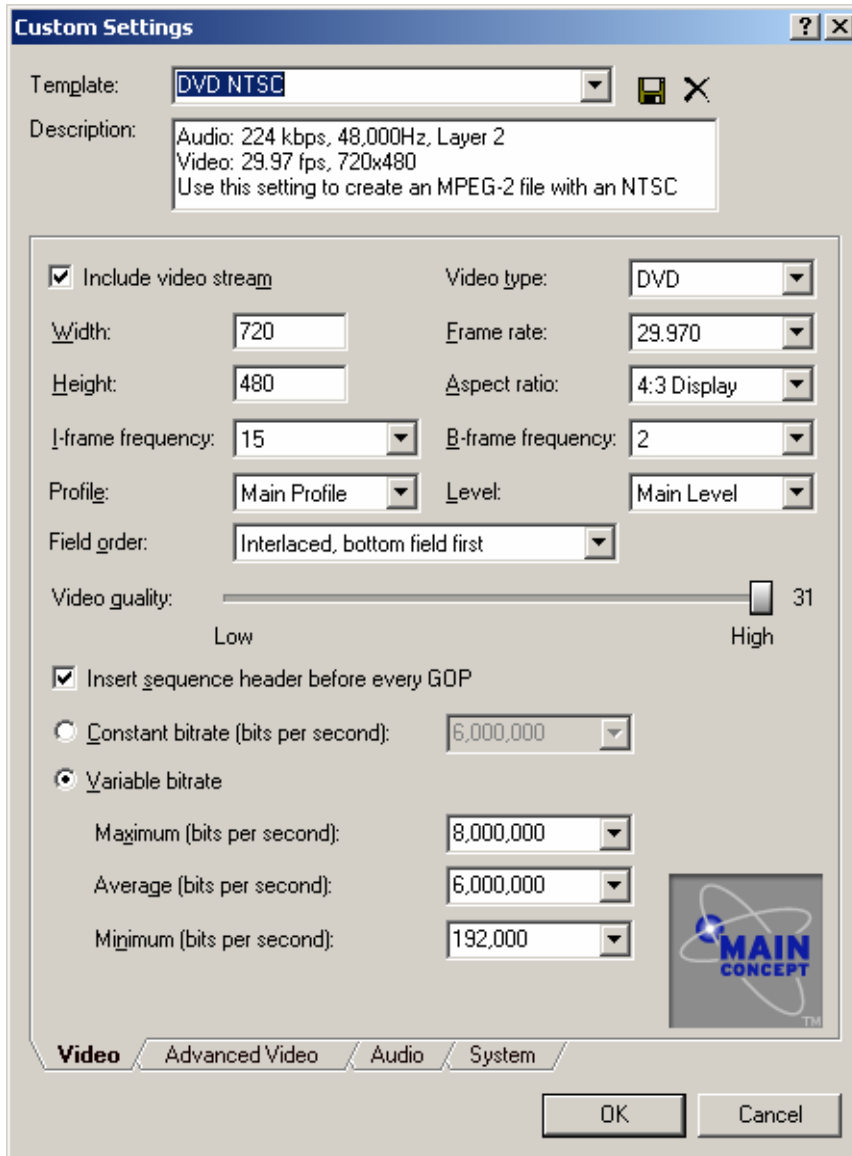
Stretch video to fill output frame size (do not letterbox)

If checked, the aspect ratio of the frames fed to the encoder will be stretched so that the encoded frame is filled on all edges. This option is useful when the frame aspect ratio of the project does not exactly match the frame aspect ratio of the destination file format.

Custom Controls Explained

If you have the professional version of the MPEG plug-in, you can use the **Custom** button on the Render As dialog to create and save your own templates for future encodes. The controls found on each tab of the Custom Settings dialog are explained below.

Custom Settings: Video tab



Include Video Stream

Select this check box if you want to include a video stream in your encoded MPEG file. The controls on the Video tab are available only when this check box is selected.

Video Type

Choose a setting from the drop-down list to specify the type of MPEG video to encode:

Setting	Description
MPEG-2	General MPEG-2 video
SVCD	SVCD-compatible MPEG-2 video
DVD	DVD-compatible MPEG-2 video

Width

Enter a value in the box to specify the width (in pixels) of the encoded video frames.

Recommended settings:

NTSC SVCD: 480

PAL SVCD: 480

NTSC DVD: 720

PAL DVD: 720

In general, we do not recommend changing these settings. The templates are designed to provide the best settings for each format.

Height

Enter a value in the box to specify the height (in pixels) of the encoded video frames.

Recommended settings:

NTSC SVCD: 480

PAL SVCD: 576

NTSC DVD: 480

PAL DVD: 576

In general, we do not recommend changing these settings. The templates are designed to provide the best settings for each format.

Frame rate

Choose a setting from the drop-down list to specify the number of frames that will be encoded for each second of video.

Recommended settings:

NTSC SVCD: 29.97

PAL SVCD: 25.000

NTSC DVD: 29.97

PAL DVD: 25.000

In general, we do not recommend changing these settings. The templates are designed to provide the best settings for each format.

Aspect ratio

Choose a setting from the drop-down list to determine the aspect ratio of your target display.

Recommended settings:

4:3 for standard televisions

16:9 for widescreen televisions

I-frame frequency

I-frames, also known as “intra-frames” are encoded independently of other frames. They are similar to key frames in other encoding scenarios. I-frames contain all the data to draw a complete video frame.

Enter a value to specify the number of frames between I-frames.

Recommended settings:

NTSC SVCD: 15

PAL SVCD: 15

NTSC DVD: 15

PAL DVD: 15

In general, we do not recommend changing these settings. The templates are designed to provide optimal settings.

B-frame frequency

B-frames, also known as “bidirectional predicted frames” are encoded like P-frames, except that they are calculated based on the data in both the previous and subsequent frames. P-frames, also known as “predicted frames,” take advantage of the fact that successive frames of a video have areas of the frame that have not changed from previous frames. A P-frame contains the data that has changed between frames. These frames cannot be played on their own since because all data needed to display the frame may not be present. There is no manual adjustment for P-frame frequency.

Enter a value to specify the number of B-frames that will be inserted between consecutive I- and P-frames. P-frames are predicted from past frames. B-frames can be coded from past or future frames.

Recommended settings:

NTSC SVCD: 2

PAL SVCD: 2

NTSC DVD: 2

PAL DVD: 2

In general, we do not recommend changing these settings. The templates are designed to provide optimal settings.

Profile

Choose a setting from the drop-down list to set the MPEG-2 syntax required for decoding the stream:

Setting	Suggested use
High Profile	Use for video-production equipment.
Main Profile	Use for most television, VCR, and cable TV applications.
Simple Profile	Low-cost memory, e.g., no B pictures.

Recommended settings:

NTSC SVCD: Main Profile

PAL SVCD: Main Profile

NTSC DVD: Main Profile

PAL DVD: Main Profile

This setting should only be changed in highly specialized production environments where there is a reason to do so.

Level

If you're encoding an MPEG-2 file, choose a setting from the drop-down list to set the acceptable ranges for parameters such as bitrate, sample rate, and the maximum allowed motion vector range for your destination:

Recommended settings:

NTSC SVCD: Main Level

PAL SVCD: Main Level

NTSC DVD: Main Level

PAL DVD: Main Level

This setting should only be changed in highly specialized production environments where there is a reason to do so.

Field order

Choose a setting from the drop-down list to determine the field order of the frames when drawn on the screen.

Setting	Suggested use
Progressive Only	Use when the video will be viewed on a computer.
Interlaced, top field first	Use when the video will be viewed on a television. Consult the hardware's documentation for the proper interlacing method.
Interlaced, bottom field first	Use when the video will be viewed on a television. Consult the hardware's documentation for the proper interlacing method.

Recommended settings:

NTSC SVCD: Interlaced, bottom field first

PAL SVCD: Interlaced, bottom field first

NTSC DVD: Interlaced, bottom field first

PAL DVD: Interlaced, bottom field first

If your source footage is being interpreted correctly in your Sony Pictures Digital application (in most cases the footage is correctly auto-interpreted and requires no adjustments), it will be encoded correctly by the MainConcept encoder, and will play back correctly from DVD. Consult the documentation that came with your Sony Pictures Digital product to learn more about field order.

Video quality

Drag the slider to determine the quality of the video when rendered.

Higher image quality settings require more system resources while rendering effects and transitions, increasing the rendering time.

Recommended settings:

NTSC SVCD: High (31)

PAL SVCD: High (31)

NTSC DVD: High (31)

PAL DVD: High (31)

Quality settings affect various types of material differently. With some experimentation, you may find that certain kinds of scenes can be rendered at lower quality settings (resulting in faster rendering times) with little or no apparent loss of quality. Other material may need the highest possible setting to achieve the desired quality level.

Insert sequence header before every GOP

In MPEG video, one or more I pictures followed by P and B pictures constitutes a GOP (Group Of Pictures). GOPs are limited in DVD-Video to 18 frames for NTSC and 15 frames for PAL. Each GOP needs to have its own sequence header if you are creating DVD video.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

The default setting generally provides the best results with popular DVD authoring software. We do not recommend changing this setting unless there is a specific reason to do so.

Constant bitrate (bits per second)

Select this radio button and choose a setting from the drop-down list if you want to encode your file using a single bitrate.

Recommended settings:

NTSC SVCD: 2,375,000

PAL SVCD: 2,375,000

NTSC DVD: 6,000,000

PAL DVD: 6,000,000

The default settings are designed to provide optimal results in the majority of situations. With some experimentation, you may find settings that will allow you to increase the amount of video you can fit on a disc. However, we only recommend changing these settings with caution, and we suggest using the template settings as the starting points for any variations.

Variable Bitrate

Select this radio button if you want the encoder to vary your file's bitrate to accommodate high- and low-motion changes in video. Variable bitrate files can produce higher picture quality and smaller file sizes than constant bitrate files.

Maximum (bits per second)

Specify the maximum allowable bitrate for encoding. When the **Variable bitrate** radio button is selected, the encoded file's bitrate will not exceed this value.

Recommended settings, maximum bits per second/video:

NTSC SVCD: 2,376,000

PAL SVCD: 2,376,000

NTSC DVD: 8,000,000

PAL DVD: 8,000,000

In general, we do not recommend changing these settings. Setting the maximum bitrate for DVD higher than 8,000,000 may result in a disc that will not play properly in some DVD players. For SVCD, some players can accommodate higher bitrates, while others cannot. For general distribution in which widespread compatibility is important, we do not recommend exceeding the default maximum setting for SVCD.

Average (bits per second)

Specify the average bitrate that you want the encoder to use when encoding your video.

Recommended settings, average bits per second/video:

NTSC SVCD: 2,000,000

PAL SVCD: 2,000,000

NTSC DVD: 6,000,000

PAL DVD: 6,000,000

With some experimentation, you may find average bitrate settings that are optimal for the material you are working with. However, the default settings are designed to provide the best results in the majority of cases. If you do use custom settings, we recommend using the default settings as a starting point for experimentation.

Minimum (bits per second)

Specify the minimum allowable bitrate for encoding. When the **Variable bitrate** radio button is selected, the encoded file's bitrate will not fall below this value.

Recommended settings, minimum bits per second/video:

NTSC SVCD: 192,000

PAL SVCD: 192,000

NTSC DVD: 192,000

PAL DVD: 192,000

With some experimentation, you may find minimum bitrate settings that are optimal for the material you are working with. However, the default settings are designed to provide the best results in the majority of cases. If you do use custom settings, we recommend using the default settings as a starting point for experimentation.

Custom Settings: Advanced Video tab

Custom Settings [?] [X]

Template: DVD NTSC [X] [X]

Description: Audio: 224 kbps, 48,000Hz, Layer 2
Video: 29.97 fps, 720x480
Use this setting to create an MPEG-2 file with an NTSC

Write sequence end code Write sequence display extension

Allow field base to motion compensation

Non-Linear Quantization _____

I Frames P Frames B Frames

Optimize to Table 1 _____

I Frames P Frames B Frames

Alternate Scan Pattern _____

I Frames P Frames B Frames


DC coefficient: 9 bit [v]

Video format: NTSC [v]

Color prim.: ITU-R Rec. 624-4 System M [v]

Transfer: ITU-R Rec. 624-4 System M [v]

VBV buffer size (bytes): 224 [v]



Video **Advanced Video** Audio System

OK Cancel

Write sequence end code

Specifies whether the encoder writes a sequence end code at the end of the stream. A sequence end code at the end of an MPEG stream tells the decoder that the sequence has ended.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

If you are using an MPEG joining tool to combine multiple MPEG streams, you can uncheck this option. Please be aware that this is a complex process and will require some specialized tools and research by the user.

Write sequence display extension

Select this check box to write a sequence display extension for every every GOP (group of pictures). The sequence display extension will define the vertical and horizontal resolution for the decoding device.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so. It is possible to force the decoding device to display the video at an author-specified vertical and horizontal resolution that is different from the actual resolution, but this process will require some specialized tools and research by the user.

Allow field base to motion compensation

Select this check box if you want to use field- and frame-based motion prediction when predicting frames. When the check box is cleared, only frame-based motion prediction is used.

Recommended settings:

NTSC SVCD: unchecked

PAL SVCD: unchecked

NTSC DVD: unchecked

PAL DVD: unchecked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Non-Linear Quantization: I Frames

Select this check box if you want to use non-linear quantization scale types for I-frames. This setting is applicable to MPEG-2 only and allows more precise quantization at low levels.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Non-Linear Quantization: P Frames

Select this check box if you want to use non-linear quantization scale types for P-frames. This setting is applicable to MPEG-2 only and allows more precise quantization at low levels.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do. For DVD or SVCD, this should be checked.

Non-Linear Quantization: B Frames

Select this check box if you want to use non-linear quantization scale types for B frames. This setting is applicable to MPEG-2 only, and allows more precise quantization at low levels.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Optimize to Table 1: I Frames

Select this check box to use the variable-length encoding table for I-frames. This setting is applicable to MPEG-2 only and uses compression of 0.3 to 0.6 bits per pixel. Clear the check box to use the previous encoding table (the previous table may work better for some videos—especially if the compression per pixel is outside 0.3 to 0.6 bits per pixel).

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Optimize to Table 1: P Frames

Select this check box to use the variable-length encoding table for P frames. This setting is applicable to MPEG-2 only and uses compression of 0.3 to 0.6 bits per pixel. Clear the check box to use the previous encoding table (the previous table may work better for some videos—especially if the compression per pixel is outside 0.3 to 0.6 bits per pixel).

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Optimize to Table 1: B Frames

Select this check box to use the variable-length encoding table for B-frames. This setting is applicable to MPEG-2 only and uses compression of 0.3 to 0.6 bits per pixel. Clear the check box to use the previous encoding table (the previous table may work better for some videos—especially if the compression per pixel is outside 0.3 to 0.6 bits per pixel).

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Alternate Scan Pattern: I Frames

Select this check box to use the alternate scan pattern (better for interlaced video) on I frames.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Alternate Scan Pattern: P Frames

Select this check box to use the alternate scan pattern (better for interlaced video) on P-frames.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Alternate Scan Pattern: B Frames

Select this check box to use the alternate scan pattern (better for interlaced video) on B frames.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

DC Coefficient

Choose a setting from the drop-down list to specify the precision of the DC coefficient in MPEG-2 intracoded macroblocks.

Recommended settings:

NTSC SVCD: 9 bit

PAL SVCD: 9 bit

NTSC DVD: 9 bit

PAL DVD: 9 bit

In most cases, 9 bit is the correct setting. If you are encoding to lower bitrates or have footage that does not contain much movement, you may want to do a test render with the 8-bit setting. For high motion footage with many luminance changes and encoded at high bitrates, you may want to do a test render with the 10-bit setting. *After experimenting with bitrate settings, DC Coefficient should be the next control you experiment with.*

Video format

Choose a setting from the drop-down list to indicate the format of the video you are encoding. This setting is a flag to the video decoder and does not affect the video encoding.

Recommended settings:

NTSC SVCD: NTSC

PAL SVCD: PAL

NTSC DVD: NTSC

PAL DVD: PAL

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Color primaries

Choose a setting from the drop-down list to indicate the color format of your source media. This setting is a flag to the video decoder and does not affect the video encoding.

Recommended settings:

NTSC SVCD: ITU-R rec. 624-4 System M

PAL SVCD: ITU-R rec. 624-4 System B, G

NTSC DVD: ITU-R rec. 624-4 System M

PAL DVD: ITU-R rec. 624-4 System B, G

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Transfer

Choose a setting from the drop-down list to set the opto-electronic transfer characteristic of the video being encoded. This setting is for informational purposes only and does not affect the encoding or decoding process.

Recommended settings:

NTSC SVCD: ITU-R rec. 624-4 System M

PAL SVCD: ITU-R rec. 624-4 System B, G

NTSC DVD: ITU-R rec. 624-4 System M

PAL DVD: ITU-R rec. 624-4 System B, G

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

VBV buffer size

Choose a setting from the drop-down list to set the size of the video buffer verifier. This buffer ensures that the proper amount data (i.e., not too much or not too little) is being fed to the encoder.

Recommended settings:

NTSC SVCD: 224

PAL SVCD: 224

NTSC DVD: 224

PAL DVD: 224

This setting should be changed only in highly specialized situations where there is a specific reason to do so.

Custom Settings: Audio tab

The screenshot shows a dialog box titled "Custom Settings" with a blue header bar containing a question mark and a close button. The dialog is divided into several sections:

- Template:** A dropdown menu set to "Default" with a save icon and a close icon to its right.
- Description:** A text box containing "Audio: 224 kbps, 44,100 Hz, Layer 2" and "Video: 29.97 fps".
- Audio Stream Options:**
 - Include audio stream
 - Audio mode:** Dropdown menu set to "Stereo Mode".
 - Psychoacoustic model:** Dropdown menu set to "Psychoacoustic Model 2".
 - Audio layer:** Dropdown menu set to "Audio Layer 2".
 - Bitrate (Kbps):** Dropdown menu set to "224".
 - Emphasis:** Dropdown menu set to "No emphasis (default)".
 - Sample rate (Hz):** Dropdown menu set to "44,100".
- Advanced Options:**
 - Embedded CRC error protection
 - Set copyright bit
 - Set original bit
- Logo:** A logo for "MAIN CONCEPT" with a stylized atom symbol.
- Navigation:** A row of tabs: "Video", "Advanced Video", "Audio" (selected), and "System".
- Buttons:** "OK" and "Cancel" buttons at the bottom right.

Include audio stream

Select this check box if you want to include the audio stream in the encoded MPEG file. The controls on the Audio tab are available only when this check box is selected.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

Note: If you choose to create elementary streams as below, Sony Pictures Digital editing applications will not be able to open these elementary streams.

NTSC DVD video stream template: unchecked

You will need to render the audio as a separate file. Consult your DVD-authoring software to determine supported audio formats and naming conventions.

DVD PAL separate streams template: checked

Some DVD authoring software requires elementary streams (separate video and audio files). We recommend checking the authoring program's documentation to determine the best output method.

Audio mode

Choose a setting from the drop-down list to specify how audio should be encoded:

Setting	Description
Stereo Mode	Contains two distinct audio channels.
Joint Stereo Mode	A stereo file that is encoded to take advantage of the redundant information in the two channels.
Dual Channel Mode	Contains two distinct audio channels, and each channel has separate content (e.g., one channel might be in English and the other channel might be in French).
Mono Mode	Contains a single audio channel.

Recommended settings:

NTSC SVCD: Stereo Mode

PAL SVCD: Stereo Mode

NTSC DVD: Stereo Mode

PAL DVD: Stereo Mode

In general, the default setting produces the best results in the majority of situations. We only recommend changing this setting in highly specialized situations (for example, if you are encoding a multilingual DVD).

Psychoacoustic model

Choose a setting from the drop-down list to specify the psychoacoustic model that will be used for audio compression.

Recommended settings:

NTSC SVCD: Psychoacoustic Model 2

PAL SVCD: Psychoacoustic Model 2

NTSC DVD: Psychoacoustic Model 2

PAL DVD: Psychoacoustic Model 2

The default setting is designed to produce the best results in the majority of situations. This setting should only be changed if there is a specific reason to do so.

Audio layer

Choose a setting from the drop-down list to specify the MPEG audio layer that will be used for audio encoding.

Recommended settings:

NTSC SVCD: Audio Layer 2

PAL SVCD: Audio Layer 2

NTSC DVD: Audio Layer 2

PAL DVD: Audio Layer 2

This setting is designed to provide the best results in most real-world situations. Note that some DVD authoring applications require (or prefer) PCM audio. In such a case, it is recommended that you render an MPEG video stream, and save the audio track separately as a WAV file.

Bitrate (Kbps, audio)

Choose a setting from the drop-down list to specify the bitrate for the audio data in your encoded file.

Recommended settings:

NTSC SVCD: 224

PAL SVCD: 224

NTSC DVD: 224

PAL DVD: 224

The default setting is designed to provide the best results in most situations. There is generally no need to change this setting, but if you want higher-quality audio for critical listening situations, you may want to increase the audio bitrate.

Emphasis

Choose a setting from the drop-down list to specify the type of de-emphasis to use during encoding. During encoding, a filter is applied to improve the signal-to-noise ratio at high frequencies.

Recommended settings:

NTSC SVCD: No emphasis

PAL SVCD: No emphasis

NTSC DVD: No emphasis

PAL DVD: No emphasis

The default setting is designed to provide the best results in most situations. There is generally no need to change this setting.

Sample rate (Hz)

Choose a setting from the drop-down list to specify the number of samples per second used to store the audio data in your encoded file.

Recommended settings:

NTSC SVCD: 44,100

PAL SVCD: 44,100

NTSC DVD: 48,000

PAL DVD: 48,000

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting, and doing so could result in noncompliant files.

Embed CRC error protection

Select this check box to enable CRC error protection in your encoded file. Cyclic redundancy code (CRC) is required by the SVCD and DVD specification and is used to determine if data is corrupt.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting. Clearing this check box could result in noncompliant files.

Set copyright bit

Select this check box to indicate that your encoded file contains copyrighted information. This bit is for informational purposes only and does not affect encoding or decoding.

Recommended settings:

NTSC SVCD: unchecked

PAL SVCD: unchecked

NTSC DVD: unchecked

PAL DVD: unchecked

There is generally no need to change this setting unless specified by your authoring tool.

Set original bit

Select this check box to indicate that your encoded file contains original information. This bit is for informational purposes only and does not affect encoding or decoding.

Recommended settings:

NTSC SVCD: unchecked

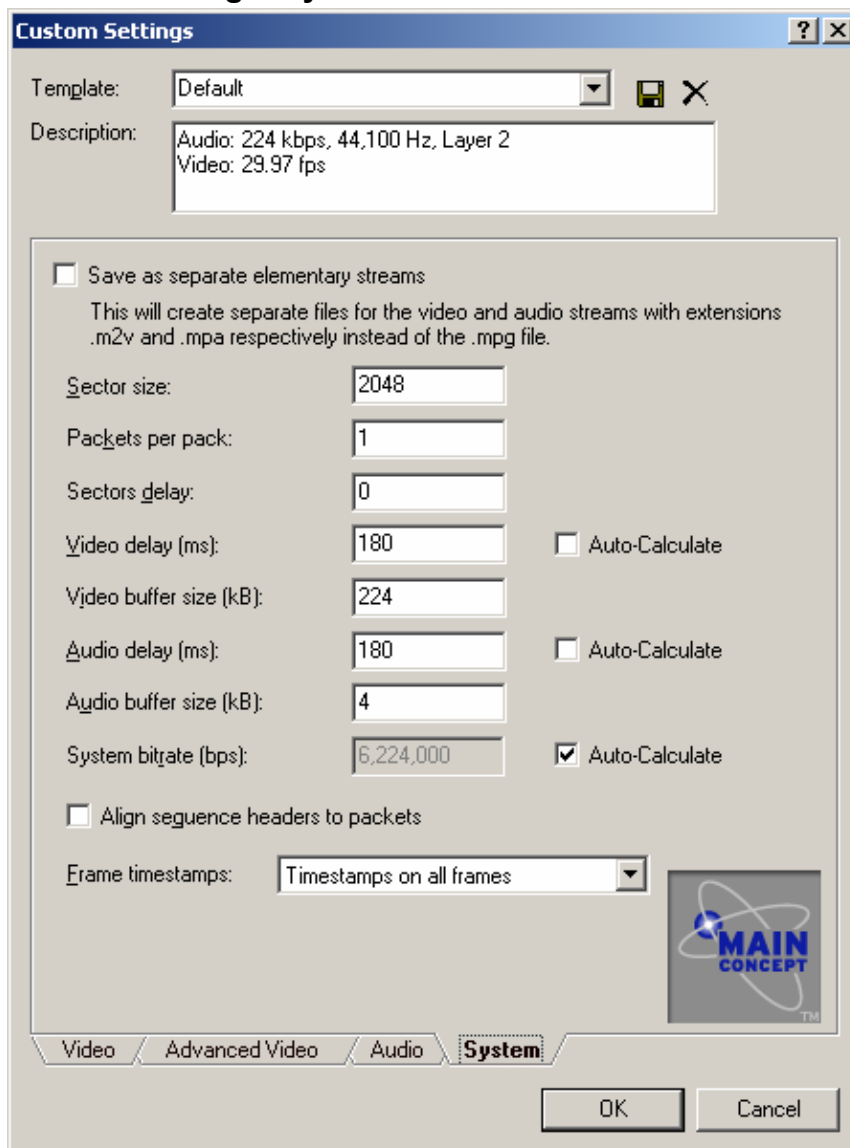
PAL SVCD: unchecked

NTSC DVD: unchecked

PAL DVD: unchecked

There is generally no need to change this setting unless specified by your authoring tool.

Custom Settings: System tab



The screenshot shows the 'Custom Settings' dialog box with the 'System' tab selected. The 'Template' is set to 'Default'. The 'Description' field contains 'Audio: 224 kbps, 44,100 Hz, Layer 2' and 'Video: 29.97 fps'. The 'Save as separate elementary streams' checkbox is unchecked. Below this, there are several input fields: 'Sector size' (2048), 'Packets per pack' (1), 'Sectors delay' (0), 'Video delay (ms)' (180), 'Video buffer size (kB)' (224), 'Audio delay (ms)' (180), 'Audio buffer size (kB)' (4), and 'System bitrate (bps)' (6,224,000). There are 'Auto-Calculate' checkboxes next to the video delay, audio delay, and system bitrate fields. The 'Align sequence headers to packets' checkbox is also unchecked. The 'Frame timestamps' dropdown is set to 'Timestamps on all frames'. The 'MAIN CONCEPT' logo is visible in the bottom right corner of the dialog. At the bottom, there are 'Video', 'Advanced Video', 'Audio', and 'System' tabs, with 'System' being the active tab. 'OK' and 'Cancel' buttons are at the bottom right.

Template: Default

Description: Audio: 224 kbps, 44,100 Hz, Layer 2
Video: 29.97 fps

Save as separate elementary streams
This will create separate files for the video and audio streams with extensions .m2v and .mpa respectively instead of the .mpg file.

Sector size: 2048

Packets per pack: 1

Sectors delay: 0

Video delay (ms): 180 Auto-Calculate

Video buffer size (kB): 224

Audio delay (ms): 180 Auto-Calculate

Audio buffer size (kB): 4

System bitrate (bps): 6,224,000 Auto-Calculate

Align sequence headers to packets

Frame timestamps: Timestamps on all frames

MAIN CONCEPT

Video Advanced Video Audio **System**

OK Cancel

Save as separate elementary streams

Select this check box if you want to create separate files for the audio and video portions of your project. Instead of rendering a single .mpg file, this option will create an .m2v (MPEG-2) file for the video stream and an .mpa file for the audio stream.

Sector size

Enter a value to specify the size of the MPEG pack or sector in bytes. For a streaming MPEG file, you can set this value between 306 and 4096.

Recommended settings:

NTSC SVCD: 2324

PAL SVCD: 2324

NTSC DVD: 2048

PAL DVD: 2048

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting unless specified by your authoring tool.

Packets per pack

Enter a value to specify how many packets are put into each pack.

Recommended settings:

NTSC SVCD: 1

PAL SVCD: 1

NTSC DVD: 1

PAL DVD: 1

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting unless specified by your authoring tool.

Sectors delay

Enter a value to specify the number of sectors to display before the first sector is written.

Recommended settings:

NTSC SVCD: 0

PAL SVCD: 0

NTSC DVD: 0

PAL DVD: 0

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting unless specified by your authoring tool.

Video delay (ms)

Enter a value to specify a delay (in milliseconds) to apply to the video stream timestamps. You can use a delay to correct audio/video synchronization problems.

Recommended settings:

NTSC SVCD: 180

PAL SVCD: 180

NTSC DVD: 180

PAL DVD: 180

Important: Software emulation of DVD playback is not a reliable method of verifying audio/video sync.

Do not change this setting to compensate for an apparent audio/video synchronization error in an MPEG-2 file destined for DVD until you have confirmed the sync error is actually occurring in a file on a DVD disc when played back on a true DVD player and viewed on a television monitor. Even then, be aware that some DVD players have unique synchronization problems that should not be compensated for in the encoding, as the disc will play out-of-sync on other (correct) players.

Video buffer size (kB)

Enter a value to specify the video buffer size (in kB) coded in the pack header.

Recommended settings:

NTSC SVCD: 230

PAL SVCD: 230

NTSC DVD: 232

PAL DVD: 232

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting unless specified by your authoring tool.

Audio delay (ms)

Enter a value to specify a delay (in milliseconds) to apply to the audio stream timestamps. You can use a delay to correct audio/video synchronization problems.

Recommended settings:

NTSC SVCD: 180

PAL SVCD: 180

NTSC DVD: 180

PAL DVD: 180

Important: software emulation of DVD playback is not a reliable method of verifying audio/video sync.

Do not change this setting to compensate for an apparent audio/video synchronization error in an MPEG-2 file destined for DVD until you have confirmed the sync error is actually occurring in a file on a DVD disc when played back on a true DVD player and viewed on a television monitor.

The default setting is designed to provide the best results in the vast majority of situations. There is generally no need to change this setting unless you are experiencing audio/video sync problems. Even then, be aware that some DVD players have unique synchronization problems that should not be compensated for in the encoding, as the disc will play out-of-sync on other (correct) players.

Audio buffer size (kB)

Enter a value to specify the audio buffer size (in kB) coded in the pack header.

Recommended settings:

NTSC SVCD: 4

PAL SVCD: 4

NTSC DVD: 4

PAL DVD: 4

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting unless specified by your authoring tool.

System bitrate (bps)

Enter a value to specify the multiplexer rate in bits per second (bps).

Recommended settings:

NTSC SVCD: 2,788,800

PAL SVCD: 2,788,800

NTSC DVD: auto-calculate

PAL DVD: auto-calculate

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting unless specified by your authoring tool.

Align sequence headers to packets

Select this check box if you want sequence headers to be aligned to the start of the video packet.

Recommended settings:

NTSC SVCD: checked

PAL SVCD: checked

NTSC DVD: checked

PAL DVD: checked

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting unless specified by your authoring tool.

Frame timestamps

Choose a setting from the drop-down list to specify which frames will have presentation timestamps (PTS)/decode timestamps (DTS).

The bidirectional encoding/decoding process often requires that a picture be decoded before it is output by the decoder. The DTS indicates the time when a picture must be decoded, and a PTS indicates when it must be sent to the decoder output.

Recommended settings:

NTSC SVCD: Timestamps on all frames

PAL SVCD: Timestamps on all frames

NTSC DVD: Timestamps on I-frames only

PAL DVD: Timestamps on I-frames only

The default setting is designed to provide the best results in the majority of situations. There is generally no need to change this setting.

Additional Sony Pictures Digital resources

Knowledge Base

<http://mediasoftware.sonypictures.com/support/supporthome.asp>

Access answers and articles from our technical support experts. Make this the first stop on your search for a solution.

Customer Service

<http://mediasoftware.sonypictures.com/support/custserv.asp>

At your service: products, shopping, delivery, and more.

Updates

<http://mediasoftware.sonypictures.com/download/step1.asp?CatID=2>

Download bug fixes and new features for your existing product.

Forums

<http://mediasoftware.sonypictures.com/forums/default.asp?siteid=1>

Join discussions with other Sony Pictures Digital product users.

Tutorials

<http://mediasoftware.sonypictures.com/tutorials/default.asp>

Master our software with these interactive presentations for users of all experience levels.

Product Suggestion

<http://mediasoftware.sonypictures.com/support/productsuggestion.asp>

Share your feature requests or concerns with us.

E-mail Support

<http://mediasoftware.sonypictures.com/support/supportmail.asp>

Can't find your answer online? Send us your technical support question. We will respond as soon as possible.

Phone Support Options

<http://mediasoftware.sonypictures.com/support/phonesupport.asp>

Learn about our pay-for-support options.

Additional MPEG online resources

MPEG.org: www.mpeg.org/MPEG

For good information on MPEG-2: bmrc.berkeley.edu/frame/research/mpeg/mpeg2faq.html

For widescreen anamorphic information: www.thedigitalbits.com/articles/anamorphic/index.html

A great site for MPEG-1, VCD, SVCD, player compliance, additional tools and other information:
www.vcdhelp.com