Encoder Profiles

Encoder profiles tell the Cisco MXE 3500 how uncompressed preprocessor output will be compressed for distribution.

This section includes the following topics:

Introduction to Encoders

The Cisco MXE 3500 uses Encoder Profiles to set parameters that govern how uncompressed preprocessor output will be compressed for distribution. For example, a file that is intended for users of Microsoft Windows Media Player who connect to the Internet by using cable modems will have one set of requirements while users of RealPlayer who connect to the Internet by using a T1 connection will have a different set of requirements.

The settings included in each Encoder Profile are specific to the encoder being used. You add or adjust the settings in each Encoder Profile and then add them to the Job Profile.

See also: Encoders, page 8-5.

Creating an Encoder Profile

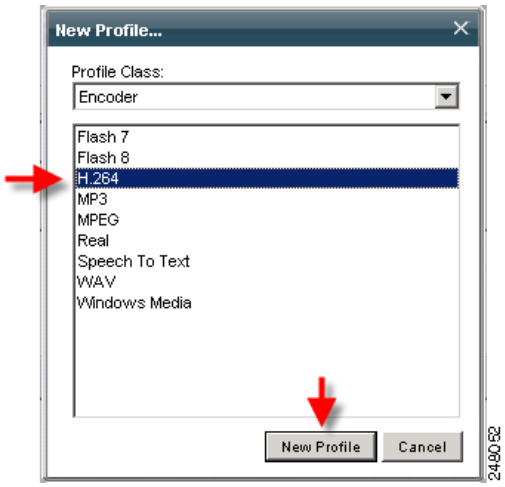
Use this procedure to create an Encoder Profile.

Procedure

Step 1 From the **Toolbox**, expand **Profile Management**, and click **New Profile**. The New Profile pop-up displays.

Step 2 From the **Profile Class** drop-down, select **Encoder**.

Figure 8-1 Creating a New Encoder Profile



Step 3 Highlight an encoder type, and click the New Profile button. The New Encoder Profile page displays.

Step 4 Enter the appropriate encoder settings, and click **Save**.

Editing an Encoder Profile

Use this procedure to edit an Encoder Profile.

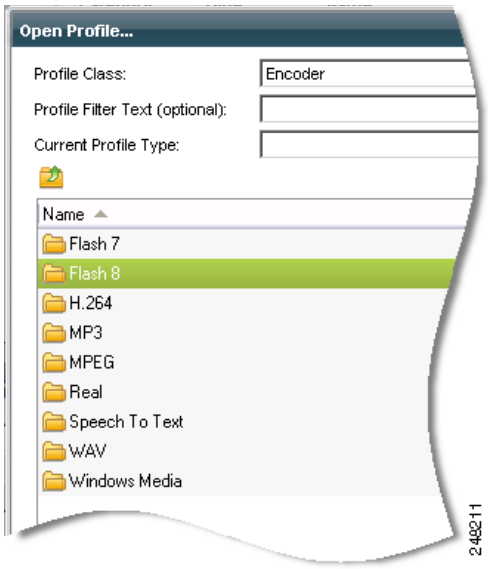
Procedure

Step 1 From the **Toolbox**, expand **Profile Management**, and click **Open Profile**. The Open Profile pop-up displays.

Step 2 From the **Profile Class** drop-down, select **Encoder**.

Step 3 Highlight a Profile Type, and double-click it.

Figure 8-2 Selecting a Profile Type



Step 4 Highlight a Profile Name, and double-click it. The Edit Profile page displays.

Step 5 Change the appropriate encoder settings, and click **Save**.

Deleting an Encoder Profile

Note Encoder profiles within Job Profiles should be checked and removed from the Job Profile before deleting encoder profiles. No warning or error message will be generated while deleting encoder profiles, but the system will display an error while submitting a job using a Job Profile with a missing encoder profile.

Use this procedure to delete an Encoder Profile.

Procedure

Step 1 From the **Toolbox**, expand **Profile Management**, and click **Open Profile**. The Open Profile pop-up displays.

Step 2 From the **Profile Class** drop-down, select **Encoder**.

Step 3 Highlight a Profile Type, and double-click it.

Step 4 Highlight a Profile Name, and double-click it. The Edit Profile page displays.

Step 5 Click **Delete**. When the deletion confirmation pop-up displays, click **OK**.

Adding an Encoder Profile to a Job Profile

Procedure

Step 1 From the **Toolbox**, expand **Profile Management**, and click **New Profile** or **Open Profile**.

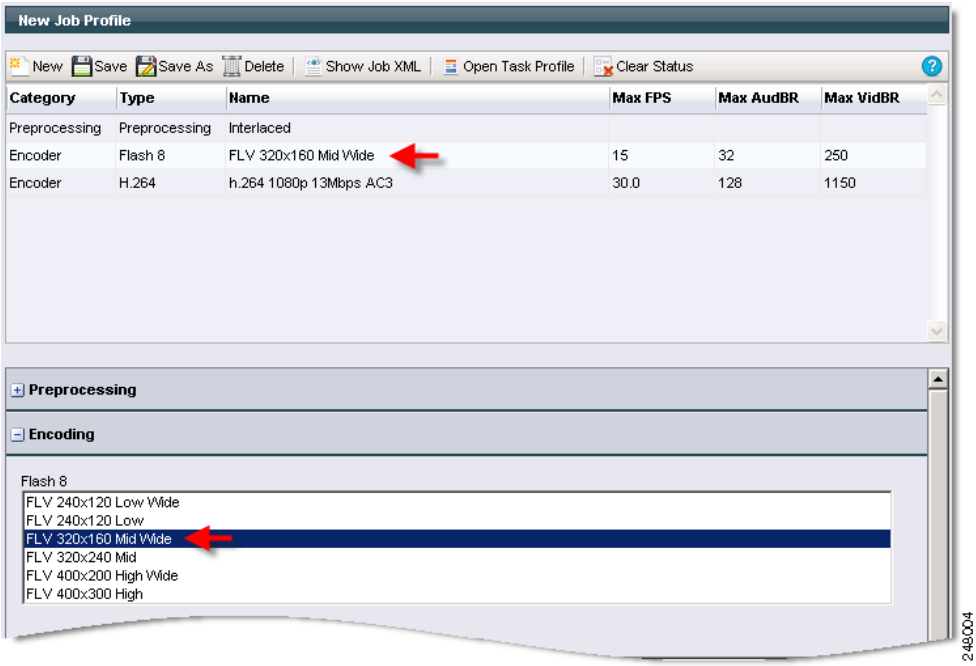
Step 2 From the **Profile Class** drop-down, select **Job** and click the **New Profile** or **Open Profile** button.

Step 3 Expand the **Encoding** section.

Step 4 Highlight one or more individual Encoder Profiles. As they are selected, the Encoder Profiles are added to the Job Profile in the upper pane.

Step 5 Click **Save**.

Figure 8-3 Adding an Encoder Profile to a Job Profile



Removing an Encoder from an Encoder Profile

See also: Editing an Existing Job Profile, page 5-8.

Procedure

Step 1 From the **Toolbox**, expand **Profile Management**, and click **Open Profile**.

Step 2 From the **Profile Class** drop-down, select **Job** and click the **Open Profile** button.

Step 3 Expand the **Encoding** section.

Step 4 In the **Encoding** section, hover over an Encoder Profile, and Ctrl+click. The highlighting is removed, and the Encoder Profile is removed from the list of profiles in the upper pane.

Step 5 Click **Save**.

Encoders

This section includes the following topics:

Flash 7 Encoder

This section includes the following topics:

Introduction to the Flash 7 Encoder

Adobe Flash 7 encodes media into audio only, video only, and/or audio and video media that conforms to the .swf, .flv, and QuickTime formats. The Flash 7 Encoder Profile allows you to define parameters used by the Flash 7 encoder to determine how clips are encoded.

See also: Adding an Encoder Profile to a Job Profile, page 8-4.

Understanding the Flash 7 Encoder Settings

A Flash 7 Encoder Profile allows you to adjust the following settings:

Common (Flash 7 Encoder)

Figure 8-4 shows the Common section.

Figure 8-4 Flash 7 Encoder: Common Section

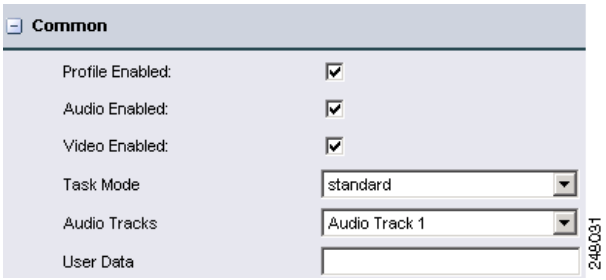


Table 8-1 describes the settings.

Table 8-1 Flash 7 Encoder: Common Settings and Descriptions

Setting	Description
Profile Enabled	Check the box to enable this profile for job processing.
Audio Enabled	Enables audio output for this task.
Video Enabled	Enables video output for this task.
Task Mode	Sets the execution mode for this task: standard, fast start, immediate **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding • If there are no webcasting jobs in progress **Immediate**: If you enable Immediate Encoding, the Cisco MXE 3500 will not use an intermediate file, but uses a memory-based interface between the preprocessor and the encoders. This is extremely useful for longer input clips and/or formats with high data volumes, such as MPEG or OMF, where the disk space requirements for intermediate files could become prohibitive. **Note** Since Immediate Encoding uses more memory resources and allows the encoder to control the rate at which the preprocessor provides data, it is not suitable for Live capture situations, only for file jobs.

Table 8-1 Flash 7 Encoder: Common Settings and Descriptions (continued)

Audio Tracks	The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks drop-down allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder.
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title 'Nightly News' in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata). As an example, in a Windows Media output, the result is a Nightly News.wmv file. 

Video (Flash 7 Encoder)

Figure 8-5 shows the Video section.

Figure 8-5 Flash 7Encoder: Video Section

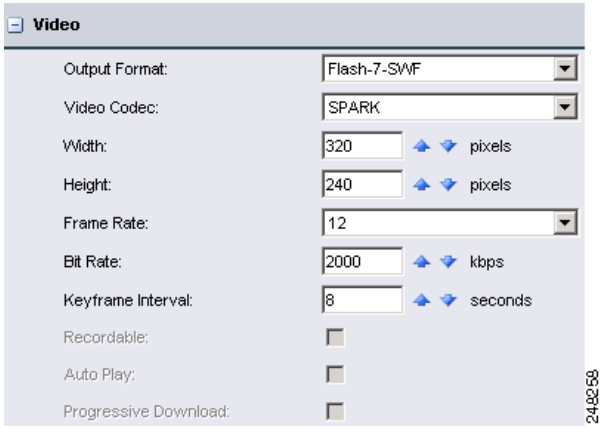


Table 8-2 describes the settings.

Table 8-2 Flash 7Encoder: Video Settings and Descriptions

Setting	Description
Output Format	• **Flash 7 SWF**: Macromedia ShockWave Flash 7 format, suitable for playing directly in any Flash compatible player. • **Flash 7 FLV**: Macromedia Flash 7 Video format, suitable for use in communications applications and importing into Flash MX projects.
Video Codec	• **Flash 7**: SPARK • **QT**: SV3Pro
Width	Width is set to 320. This is a required setting and cannot be changed.

Table 8-2 Flash 7Encoder: Video Settings and Descriptions (continued)

Height	60-1300 pixels
Frame Rate	Discrete values as defined in frames per second: 1,5,6,7.5,8,10,12,12.5,15,24,25,29.97, and 30
Bit Rate	Sets the transmission rate for video as a portion of the encoded output stream. Values are 1.0 to 50000.0 kilobits per second.
Keyframe Interval	Defines the maximum number of seconds allowed between key frames. If the specified number of seconds passes without a key frame detected, a new key frame will be created. Added key frames will be in addition to natural key frames and may not be added if natural key frames occur at sufficient frequency. Setting this value to 0 will result in a very high quality encode. Values are between 0 and 3600 seconds.
Recordable	• **Checked**: Allows streamed output files to be saved to disk. • **Unchecked**: Prevents a copy of the file from being saved. Unchecked is the default state.
Auto Play	• **Checked**: The clip will begin to play automatically once the file is accessed. • **Unchecked**: The end user will be required to click the Play button in the QuickTime Player for the clip to begin.
Progressive Download	Determines whether files will be encoded for streaming or for progressive download. Progressive download is a method of delivering audio and video. It uses the standard HTTP protocol to create a stream-like experience for the end user by downloading the file to the local drive and playing the file back as it downloads. Progressive download files do not require a streaming server. • **Checked**: The clip will be encoded for progressive download. • **Unchecked**: The clip will be encoded for RTSP streaming. **Note** If Progressive Download is checked, no hinting information will be added to the file. If it is unchecked, hinting information will be added that allows for streaming but slightly increases the size of the encoded file.

Note When QT is chosen as the Output Format, Auto Play, Recordable, and Progressive Download checkboxes are not available. Recordable and/or Auto Play may only be chosen when the Progressive Download box is checked. See also: Understanding QuickTime Encoder Settings, page 8-55.

Encode Mode (Flash 7 Encoder)

Figure 8-6 shows the Encode Mode section.

Figure 8-6 Flash 7 Encoder: Encode Mode Section

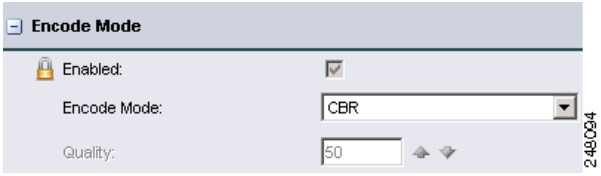


Table 8-3 describes the settings.

Table 8-3 Flash 7 Encoder: Encode Mode Settings and Descriptions

Setting	Description
Encode Mode Flash 7 FLV and SWF	• **CBR**: Constant Bit Rate encoding, where the same bit rate is maintained throughout the encode. • **1-pass VBR** • **2-pass VBR**: During the first pass, the video encoder analyzes the input from beginning to end before the actual encoding process begins. While analyzing the input, information about the input is saved to a file or memory that will determine the best possible way to encode the input within the set input bit rate limits. By using 2-pass VBR, the encoding process can use more bits for complex scenes to improve the encoded quality.
Encode Mode QuickTime	**CBR, 1-pass VBR, 2-pass VBR** (applies to QuickTime only): Defines the size of the search area for MPEG motion prediction. A higher value will result in better quality video but will increase encode time. Values are from 0 (low quality) to 99 (best quality).

Audio (Flash 7 Encoder)

Figure 8-7 shows the Audio section.

Figure 8-7 Flash 7 Encoder: Audio Section

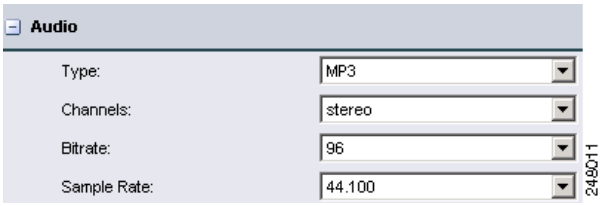


Table 8-4 describes the settings.

Table 8-4 Flash 7 Encoder: Audio Settings and Descriptions

Setting	Description
Type	• **Flash 7**: MP3 • **QuickTime**: MP3, QDesign, and QDesign Pro
Channels	Determines the number of audio channels in the output audio stream. • **Mono**: Audio in the output file will be streamed as a single channel. • **Stereo**: Audio in the output file will be streamed in stereo.

Table 8-4 Flash 7 Encoder: Audio Settings and Descriptions (continued)

Bit Rate	Sets the transmission rate for audio and a portion of the target value for the encoded output stream. Units are kilo bits per second (kbps). • **MP3**: Valid selections are: 96, 112, 128, 160,192, 256, and 320 kbps • **QDesign**: Valid selections are: 8, 10, 12, 16, 20, 24, 32, 40, and 48 kbps • **QDesign Pro**: Valid selections are: 8, 10, 12, 16, 20, 24, 32, 40, 48, 56 64, 80, 96, 112, and 128 kbps
Sample Rate	Represents the audio compression algorithm used for compression. Units are kilo Hertz (kHz). Valid selections are: 8.0, 11.025, 16.0, 22.05, 32.0, 44.1, and 48.0

Flash 8 Encoder

This section includes the following topics:

Introduction to the Flash 8 Encoder

Adobe Flash 8 encodes media into audio only, video only, and/or audio and video media that conforms to the .swf, .flv, and QuickTime formats. The Flash 8 Encoder Profile allows you to define Flash 8 encoding parameters.

See also: Adding an Encoder Profile to a Job Profile, page 8-4.

Understanding Flash 8 Encoder Settings

The Flash 8 encoder tab allows you to adjust settings on the following subtabs:

Common (Flash 8 Encoder)

Figure 8-8 shows the Common section.

Figure 8-8 Flash 8 Encoder: Common Section

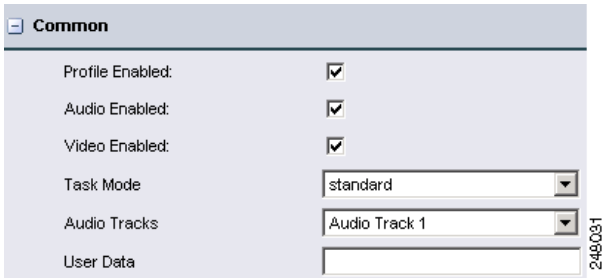


Table 8-5 describes the settings.

Table 8-5 Flash 8 Encoder: Common Settings and Descriptions

Setting	Description
Profile Enabled	Check the box to enable this profile for job processing.
Audio Enabled	Enables audio output for this task.
Video Enabled	Enables video output for this task.
Task Mode	Sets the execution mode for this task: standard, fast start, immediate **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding. • If there are no webcasting jobs in progress. **Immediate**: If you enable Immediate Encoding, the Cisco MXE 3500 will not use an intermediate file, but uses a memory-based interface between the preprocessor and the encoders. This is extremely useful for longer input clips and/or formats with high data volumes, such as MPEG or OMF, where the disk space requirements for intermediate files could become prohibitive. **Grid**: Choose this option to process (load balance) jobs across a number of ECS nodes. Use the System Administration page, Grid Computing section, to configure the number of nodes that will be included in the grid. Grid is an optional, separately licensed component. **Note** Since Immediate Encoding uses more memory resources and allows the encoder to control the rate at which the preprocessor provides data, it is not suitable for Live capture situations, only for file jobs.

Table 8-5 Flash 8 Encoder: Common Settings and Descriptions (continued)

Audio Tracks	The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks drop-down allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder.
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title 'Nightly News' in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata). As an example, in a Windows Media output, the result is a Nightly News.wmv file. 

Video (Flash 8 Encoder)

Figure 8-9 shows the Video section.

Figure 8-9 Flash 8 Encoder: Video Section

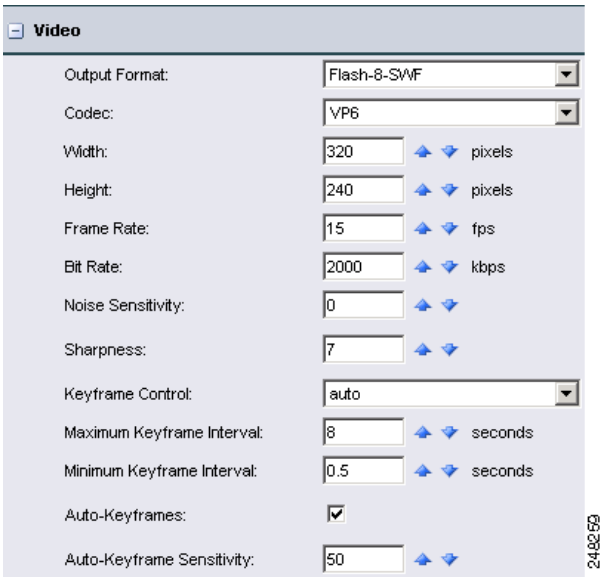


Table 8-6 describes the settings.

Table 8-6 Flash 8 Encoder: Video Settings and Descriptions

Setting	Description
Output Format	• **Flash 8 SWF**: Macromedia ShockWave Flash 8 format, suitable for playing directly in any Flash compatible player. • **Flash 8 FLV**: Macromedia Flash 8 Video format, suitable for use in communications applications and importing into Flash MX projects. • **QT**: QuickTime* format. If selected, the codec type is SV3Pro (Sorenson video).
Codec	VP6 or H263
Width	Values are 80-2000 pixels.
Height	Values are 60-1200 pixels.
Frame Rate	Values are 0.1-30.
Bit Rate	Sets the transmission rate for video as a portion of the encoded output stream. Values are 10-4096 kilobits per second.
Noise Sensitivity	Sets the level of preprocessing applied to the media being encoded. Values are: 0 (no temporal preprocessing) to 6 (highest temporal preprocessing). If no value is entered, the Cisco MXE 3500 uses the default value of 0.
Sharpness	Sets the output media's image sharpness. Lower settings will result in fewer visible artifacts but may blur the image. Higher sharpness settings will result in a sharper image but may result in more visible artifacts. Values are: 0 (lowest) - 10 (highest). If no value is entered, the Cisco MXE 3500 uses the default value of 7.
Keyframe Control	• **auto**: Keyframes are generated whenever one is needed. • **fixed**: Keyframes are generated at fixed intervals determined by the Max Keyframe Interval below.
Maximum Keyframe Interval	Defines the maximum number of seconds allowed between key frames. If the specified number of seconds passes without a key frame detected, a new key frame will be created. Added key frames will be in addition to natural key frames and may not be added if natural key frames occur at sufficient frequency. Setting this value to 0 will result in a very high quality encode. Values are 0 to 9 seconds.
Minimum Keyframe Interval	Sets the minimum time (0 - 9 seconds) allowed between keyframes. Setting this option to a very low value may cause an increase in the average output data rate. If no value is entered, the Cisco MXE 3500 applies a default value of 0.5 seconds.
Auto-Keyframes	When this box is checked, auto-keyframe settings apply to the media file during encoding.
Auto-Keyframe Sensitivity	Defines how different a frame must be from the previous frame before a new keyframe is inserted. Lower values produce fewer keyframes, while higher values produce keyframes.

Bit Rate Control (Flash 8)

Figure 8-10 shows the Bit Rate Control section.

Figure 8-10 Flash 8 Encoder: Bit Rate Control Section

Table 8-7 describes the settings.

Table 8-7 Flash 8 Encoder: Bit Rate Control Settings and Descriptions

Setting	Description
Enabled	Check the box to enable bit rate control.

Table 8-7 Flash 8 Encoder: Bit Rate Control Settings and Descriptions (continued)

Encode Mode	Determines the encode mode to be applied to the media during encoding. • **CBR**: creates output that is best suited for streaming to a server over a TCP network. • **2-Pass CBR**: first pass analyzes media, second pass provides constant bit rate encoding of the media. • **1-Pass VBR**: creates output for playback situations where bandwidth fluctuations are not a concern. • **2-Pass VBR**: first pass analyzes media, second pass provides variable bit rate encoding of the media. • **1-Pass Best quality**: creates output for playback situations where bandwidth is not a concern. Encode and decode times are the longest. • **2-Pass Best quality**: first pass analyzes media, second pass provides best quality encoding of the media. • **Realtime**: encodes media while meeting real time deadlines.
Allow Drop Frames	When checked, the Cisco MXE 3500 drops frames when necessary to maintain the defined data bit rate during encoding.
Speed	When Realtime is chosen from the Encode Mode drop-down, this setting sets the speed at which the encoder attempts to compress the frames it receives. When set to 0, the encoder tries to use all of the available cycles to compress the video. When set to 8, the encoder tries to use half the available cycles. When set to 16, no cycles are used. Values are 0 (100%) - 16 (0%). If no value is entered, the Cisco MXE 3500 uses the default value of 7.
Error Resilient Mode	When checked, the Cisco MXE 3500 attempts to protect against corruption due to mis-transmitted keyframes by invoking error-checking of all keyframes in the ingested media file. Error resilient mode may decrease overall video quality by up to 5%.
Peak Bit Rate	For CBR encoding, the maximum bit rate allowed in the stream as a percentage of the encoded bit rate.
Undershoot Target	Creates output that targets a slightly lower bit rate ensuring that bits are available in the data rate buffer to improve difficult sections.
Prebuffer	For CBR encoding, the buffer size to preload by the media player before beginning playback.
Optimal Buffer	For CBR encoding, the buffer size that the encoder should try to maintain in case a specific frame causes the buffer to overflow.
Max Buffer	For CBR encoding, the maximum size of the buffer.
Two Pass Controls Enabled	When this box is checked, the second pass variability control settings apply to the media file during the second pass of a 2-pass encode.
Two Pass Controls Variability	Determines the variability in the bit rate from nearly constant bit rate (0) to a highly variable bit rate (100) that is proportional to the difficulty of the encoded material. Values are 0 - 100 percent of the bit rate, default 70.
Two Pass Controls Min Section	Lowest bit rate that the encoder will allow for any section no matter how uncomplicated the section. This value is used to prevent difficult sections from stealing too many bits from uncomplicated sections. Values are 0 - 100 percent of the bit rate, default 40.

Table 8-7 Flash 8 Encoder: Bit Rate Control Settings and Descriptions (continued)

Two Pass Controls Max Section	Highest bit rate that can be streamed. Also, the highest bit rate that the encoder will allow no matter how difficult the section. Values are 100 - 1000 percent of the bit rate, default 400.
Fixed Quality Enabled	When this box is checked, the quality setting applies to the media file during encoding.
Quality	Lower numbers produce higher quality frames. However, the encoder may not be able to maintain the desired bit rate without dropping frames. Values are 0 (best) – 63 (worst), default 45.

Audio (Flash 8)

Figure 8-11 shows the Audio section.

Figure 8-11 Flash 8 Encoder: Audio Section

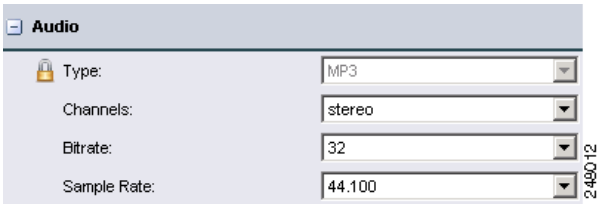


Table 8-8 describes the settings.

Table 8-8 Flash 8 Encoder: Audio Settings and Descriptions

Setting	Description
Type	Selects the audio codec to be applied during encoding.
Channels	Sets the number of audio channels to be applied during encoding.
Bit Rate	Sets the bit rate to be applied during encoding.
Sample Rate	Sets the sample rate to be applied during encoding.

Flash Grid

This section includes the following topics:

Introduction to Flash Grid

Grid encoding reduces the latency required to produce Flash content by processing the media in parallel on multiple systems. Grid processing uses multiple processors and processor cores to reduce encoding latency, resulting in performance improvement.

Grid encoding is unique in the following important ways:

1. **Matrix Decoding**: The Cisco MXE 3500 partitions and distributes both decoding and encoding across multiple systems, thereby completely leveraging resources to achieve performance improvements that scale linearly with the number of additional processor and cores. Additionally, image quality is noticeably improved.
2. **One and Two-pass Encoding**: The Cisco MXE 3500 uses Flash encoding to realize grid benefits with both one and two-pass encoding. Two-pass encoding improves output video quality, but takes additional time to process. Matrix decoding ensures linear performance scaling with one or two-pass encoding.
3. **Grid and Parallel Flash Encoding**: The Cisco MXE 3500 provides the flexibility to optimize for minimum latency (grid) or Maximum throughput (non-grid) Flash processing. The Cisco MXE 3500 uniquely utilizes multiple core processors to improve overall throughput if grid encoding is not enabled. In this case, multiple cores are allocated to process different media clips for an overall throughput benefit that also scales linearly with the number of processor cores to maximize overall throughput.

Activating Flash Grid

Use this procedure to activate the Grid feature.

Procedure

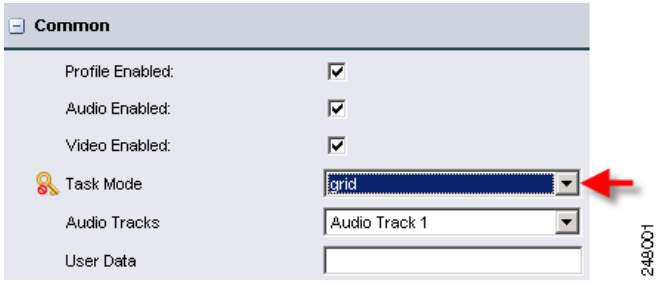
Step 1 Before using the Grid feature for the first time, navigate to the **System Administration**, and in the **Grid Computing** section, in the **Grid Nodes** box, enter the number of nodes, which represents the number of segments the file will be partitioned into.

Step 2 In a **Flash 8** profile, in the **Common** section, from the **Task Mode** drop-down, select **Grid**.

Note

- If Grid is **selected**, the Cisco MXE 3500 will break the job into parts and distribute them among your system's Flash-enabled nodes.
- If Grid is not **selected**, the job will run on individual nodes.

Figure 8-12 Activating Grid



H.264 Encoder

This section includes the following topics:

Introduction to the H.264 Encoder

The H.264 encoder produces well suited to a variety of applications and devices.

The H.264 encoder enables you to produce CableLabs-compliant output. To produce valid streams for the CableLabs format, the input video and audio settings should meet the requirements of the CableLabs format because non-standard settings for the CableLabs format are allowed as long as the settings are MPEG compliant.

In addition, you may change the display pixel aspect ratio. The pixel aspect ratio is the width of the pixel with respect to its height. A square pixel has a ratio of 1:1, but a nonsquare (rectangular) pixel does not have the same height and width. This concept is similar to the frame aspect ratio, which is the total width of an image with respect to its height. These aspect ratios are not necessarily tied together. For example, a widescreen image with a frame aspect ratio of 16:9 can be made of square or nonsquare pixels. If the output video size is the same as the source video, and the source video has nonsquare pixels, then the pixel aspect ratio of the source video is automatically preserved in the output video. Preserving the pixel aspect ratio of video increases the file size or stream bit rate. If the frame aspect ratio (Ix:Iy) and the height and width of the image source are known, then the following formula can be used to determine the x and y values of the pixel aspect ratio:

PixelAspectRatioX / PixelAspectRatioY = (Ix * height) / (Iy * width)

For example, if the image size is 720 x 360 pixels, and the frame aspect ratio is widescreen (16:9), then: PixelAspectRatioX / PixelAspectRatioY = (16 * 360) / (9 * 720) = 8/9 or PixelAspectRatioX = 8 and PixelAspectRatioY = 9.

If the image size is 176 x 144 pixels, and the frame aspect ratio is widescreen (16:9), then: PixelAspectRatioX / PixelAspectRatioY = (16 * 144) / (9 * 176) = 16/11 or PixelAspectRatioX = 16 and PixelAspectRatioY = 11.

See also: Adding an Encoder Profile to a Job Profile, page 8-4.

Understanding H.264 Encoder Settings

The H.264 encoder tab allows you to adjust the following settings:

- Stream (H.264 Encoder), page 8-29
- Special requirements for IP Streaming (H.264 Encoder), page 8-30

Common (H.264 Encoder)

Figure 8-13 shows the Common section.

Figure 8-13 H.264 Encoder: Common Section

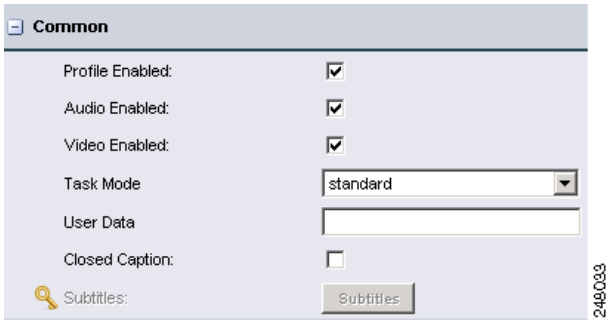


Table 8-9 describes the settings.

Table 8-9 H.264 Encoder: Common Settings and Descriptions

Setting	Description
Profile Enabled	Check the box to enable this profile for job processing.
Audio Enabled	Enables audio output for this task. This is a required setting and cannot be changed.
Video Enabled	Enables video output for this task. This is a required setting and cannot be changed.

Table 8-9 H.264 Encoder: Common Settings and Descriptions (continued)

Task Mode	Sets the execution mode for this task: standard, fast start, immediate **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding • If there are no webcasting jobs in progress **Immediate**: If you enable Immediate Encoding, the Cisco MXE 3500 will not use an intermediate file, but uses a memory-based interface between the preprocessor and the encoders. This is extremely useful for longer input clips and/or formats with high data volumes, such as MPEG or OMF, where the disk space requirements for intermediate files could become prohibitive. **Note** Since Immediate Encoding uses more memory resources and allows the encoder to control the rate at which the preprocessor provides data, it is not suitable for Live capture situations, only for file jobs. **Grid**: Choose this option to process (load balance) jobs across a number of ECS nodes. Use the System Administration page, Grid Computing section, to configure the number of nodes that will be included in the grid. Grid is an optional, separately licensed component. See also: Single Node Mode (System Administration), page 14-19.
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title ‘Nightly News’ in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata). As an example, in a Windows Media output, the result is a Nightly News.wmv file. 

Video (H.264 Encoder)

Figure 8-14 shows the Video section.

Figure 8-14 H.264 Encoder: Video Section

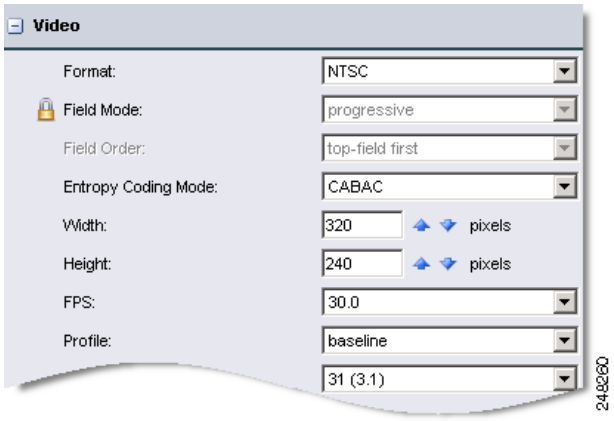


Table 8-10 describes the settings.

Table 8-10 H.264 Encoder: Video Settings and Descriptions

Setting	Description
Format	Defines the format of the input source: NTSC or PAL.
Field Mode	This setting may be locked depending on the Profile setting. • **Interlaced**: Images are made up of fields that scan alternate lines. Two fields are required to build a frame. • **Progressive**: Each frame is presented sequentially.
Field Order	Specifies which field will be used as the top field during de-interlacing: top or bottom. This field may be locked depending on the Field Mode setting.
Entropy Coding Mode	• CAVLC: Context-adaptive variable length coding. • CABAC: Context-adaptive binary arithmetic coding. Only binary decisions are encoded. Non-binary items are converted to binary codes and then encoded.
Width	Specifies the width in pixels of an encoded frame. Values are 16 to 1920 and must be a multiple of 2. If value is 0, width will be equal to source video. (Uses Smart Ingest feature.)
Height	Specifies the height in pixels of an encoded frame. Values are 16 to 1280 and must be a multiple of 4. If value is 0, height will be equal to source video. (Uses Smart Ingest feature.)
FPS	The video frame rate of the encoded output in frames per second. Values: 23.976 (NTSC), 24.0, 25.0 (PAL), 29.97, 30.0, 50.0, 59.94, or 60.0.

Table 8-10 H.264 Encoder: Video Settings and Descriptions (continued)

Profile	Establishes ranges for parameter settings in application-specific situations. For example, DVD authoring software may specify Main Profile only. Therefore, encoding settings can safely be assumed to match decoder capabilities. • **Baseline**: Progressive CAVLC, no B-slices, progressive encoding only • **Main**: CABAC and CAVLC, B-slices enabled, interlace and progressive encoding • **High**: CABAC and CAVLC, B-slices enabled, interlace and progressive encoding
Level	Limits the possible settings for video encoding.
Use B Slices	Specifies whether or not bi-predicted slices (B slices) are used to improve coding efficiency. This is not allowed for a baseline profile.
Use Hadamard Transform	Allows quality optimization for low bit-rate encoding.
Optimize Rate Distortion	Specifies whether to optimize rate distortion. Rate distortion defines the trade-off between quality and bit rate.
Reference Frames	Specifies the maximum number of reference frames that can be used for motion search compensation and prediction in order to encode a frame. Multiple reference frames can improve the prediction process and increase error resilience by using another reference frame in the event one is lost. A limit of 16 reference frames can be used within a frame. The default value is 2.
Write Sequence	Behavior for writing sequence parameter set. Values are: per IDR (default), or per I-frame.
Write Picture	Behavior for writing picture parameter set. Values are: per IDR (default), or per I-frame.
VBV Initial Fullness	Initial (before playing) VBV buffer fullness (%), default is 10%.
VBV Final Fullness	Final (when clip ends) VBV buffer fullness (%), default is 100%.
Aspect Ratio Enabled	Enable pixel aspect ration, which is the width of the pixel with respect to its height. A square pixel has a ratio of 1:1, but a nonsquare (rectangular) pixel does not have the same height and width.
Aspect Ratio Type	4:3, 16:9, custom
Aspect X Ratio	Enabled if Type: custom is selected.
Aspect Y Ratio	Enabled if Type: custom is selected.

Table 8-10 H.264 Encoder: Video Settings and Descriptions (continued)

Bit Rate Control Mode	• **CBR**: (Constant Bit Rate) Maintains a constant bit rate for the stream. • **VBR**: (Variable Bit Rate) Allows variability in the bit rate for file size and bandwidth minimization. Max bit rate defines the range the encoder should stay within while encoding. The average bit rate is the desired average bit rate of the encoded bit stream. • **VBR-CQT**: (Variable Bit Rate – Constant Quantization) Allows quantization parameters for the different slice types (I, B, and P). Using this option, the stream bit rate can vary without any limitation. A lower value for any slice quantization parameter yields better video quality. – QUANT-pI - I Frame quantization. Valid values are 0 to 51; default is 28. – QUANT-pP - P Frame quantization. Valid values are 0 to 51; default is 30. – QUANT-pB - B Frame quantization. Valid values are 0 to 51; default is 32. • **2-PASS VBR**: Allows variability in the bit rate for file size and bandwidth minimization.
Bit Rate Buffer Size	Specifies the size of the Hypothetical Reference Decoder (HRD) Coded Picture Buffer (CPB). This value should be adjusted to the bit rate for CBR encoding and the max bit rate for VBR encoding to avoid DTS/PTS underflows during multiplexing. It controls the size of the buffer needed to encode the video. A low value can result in buffer overflows which can show up as stuttering video. Software decoders usually ignore the buffer size but most hardware players will have problems if the buffer size is not correct. It should match buffer sizes of targeted hardware decoders. Encoded frames are placed into the buffer (hypothetically) and removed from the buffer at regular intervals. The video stream is constructed by varying the size of the encoded frames such that the buffer does not underflow (i.e. becomes empty when it is time to decode a frame) or overflow (i.e. becomes full so that no space is available to store encoded frames).
Avg Bit Rate	Target average bit rate for CBR and VBR encoded files.
Max Bit Rate	Maximum allowable bit rate for VBR encoded files.
Inter Search Modes	Specifies macro block search modes. Creates a prediction model from previously encoded frames. The 16x16 value is standard unless you this box. Not valid with Profile: baseline setting.
Quant-pI	Specifies the macro block quantization value for I slices to use in the constant quantization variable bitrate.
Quant-pP	Specifies the macro block quantization value for P slices to use in the constant quantization variable.
Quant-pB	Specifies the macro block quantization value for B slices to use in the constant quantization variable.
Chroma Offset R	For high profile, this is the Cr chroma quantization offset. Values are: -51 - +51.
Chroma Offset B	For baseline and main profiles, this is the chroma quantization offset (both Cb and Cr). For high profile, this is the Cb chroma quantization offset. Values are: -51 - +51.

V-Chip/CGMS-A Override (H.264 Encoder)

CGMS-A is a copy protection mechanism covered as part of the CEA-608-B Line 21 Data Services Standard.

Figure 8-15 shows the V-Chip/CGMS-A Override section.

Figure 8-15 H.264 Encoder: V-Chip/CGMS-A Override Section

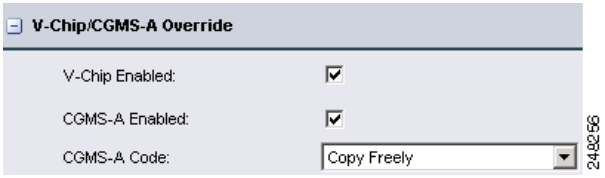


Table 8-11 describes the settings.

Table 8-11 H.264 Encoder: V-Chip/CGMS-A Override Settings and Descriptions

Setting	Description
V-Chip Enabled	Specify at submission: the Cisco MXE 3500 preprocessor will select a rating image file specified on the File/Live Job Submission pages and overlay this on the video using the graphic watermark capability.
CGMS-A Enabled	This setting allows you to set CGMS-A on a per-job basis via user-defined metadata, similar to V-Chip.
CGMS-A Code	Set the CGMS-A code by selecting the appropriate item from drop-down: • Copy Freely • Copy Once • Copy No More • Copy Never

Audio Common (H.264 Encoder)

Figure 8-16 shows the Audio Common section.

Figure 8-16 H.264 Encoder: Audio Common Section

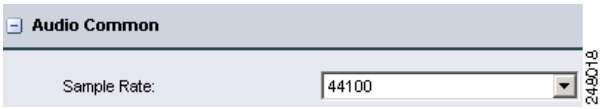


Table 8-12 describes the settings.

Table 8-12 H.264 Encoder: Audio Common Settings and Descriptions

Setting	Description
Sample Rate	Output audio sample rate in hertz. PCM requires 48000. Only AAC and AAC-HE are valid for settings of 24000, 22050, and 16000. Rates below 16000 are AAC only.

Audio 1 - 8 (H.264 Encoder)

The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks section allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder.

You may select as many tracks as are supported by the encoder. For example, if the encoder supports up to four outputs, you can select up to four of the preprocessor outputs, and they will be mapped to the encoder output in order.

Figure 8-17 shows the Audio 1 -8 section.

Figure 8-17 H.264 Encoder: Audio 1 - 8 Section

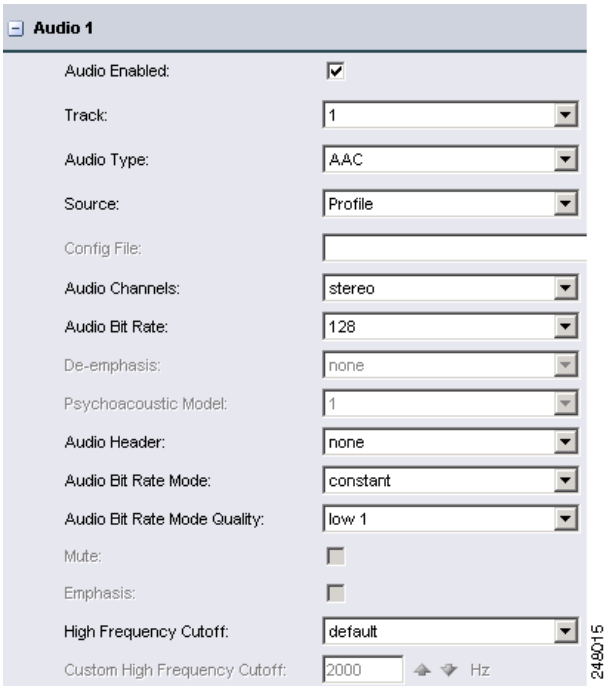


Table 8-13 describes the settings.

Table 8-13 H.264 Encoder: Audio 1 - 8 Settings and Descriptions

Setting	Description
Audio Enabled	Enables output audio using the settings in this section.
Track	The input source audio track to use for this output audio track.
Config File	This option is only enabled if the Dolby Program Optimizer audio source is selected. It allows you to select a configuration file from the optimizer.

Table 8-13 H.264 Encoder: Audio 1 - 8 Settings and Descriptions (continued)

Audio Type	Specifies AAC, PCM, WAV, AC3, Layer1, Layer2, AAC-HE V1, and AAC-HE V2 audio encoding. AAC, AAC-HE, AC3, Layer1, and Layer2 enable stream multiplexing. AAC enables header and bit rate mode settings. **Note** AAC-HE V1 uses spectral band replication (SBR) to enhance the compression efficiency in the frequency domain frequency domain, and AAC-HE V2 couples SBR with Parametric Stereo (PS) to enhance the compression efficiency of stereo signals. It is a standardized and improved version of the AACplus codec.
Audio Channels	Select mono, stereo, joint stereo, dual stereo, or 2/0 channels for output.
Audio Sample Rate	Sets audio sampling rate to tradeoff audio quality and transmission bandwidth and file size limitations.
Audio Bit Rate	Sets audio bit-rate to tradeoff audio quality and transmission bandwidth and file size limitations.
De-emphasis	Enabled for Layer1 and Layer2 audio only. Sets a flag for the player to indicate that de-emphasis mode employed. Choices are None, 50/15 us, and ccit.j17. Set to None for DVD and SVCD. Set to None or 50/15 us for VCD.
Psychoacoustic Model	Enabled for Layer1 and Layer2 audio only. Sets the psychoacoustic model to use.
Audio Header	Enabled for AAC audio only. May be None (raw encoded output) or ADTS (Advanced Digital Theater Systems).
Audio Bit Rate Mode	Enabled for AAC audio only. Specifies whether to use constant bit rate or variable bit rate encoding mode.
Audio Bit Rate Mode Quality	Enabled for AAC audio only. For variable bit rate mode, specifies the target quality level from low to high.
Mute	Enabled for PCM audio only. Sets a flag for the player to mute output if all samples in an audio frame are set to zero.
Emphasis	Enabled for PCM audio only. Sets a flag for the player to apply emphasis to all samples from the start of the audio stream.
High Frequency Cutoff	Enabled for AAC audio only. Selects the cut-off frequency in hertz. • **Default** sets a cut-off value for the sampling frequency. • **Not used** indicates that all frequencies are kept. • **Custom** removes frequencies above the specified frequency (Hz) value.
Custom High Frequency Cutoff	Enabled for AAC audio only. If Custom is chosen for the high frequency cutoff, then all frequencies above the specified frequency value are removed. Values are 1000 to 48000 Hz.

Multiplexing (H.264 Encoder)

Figure 8-18 shows the Multiplexing section.

Figure 8-18 H.264 Encoder: Multiplexing Section

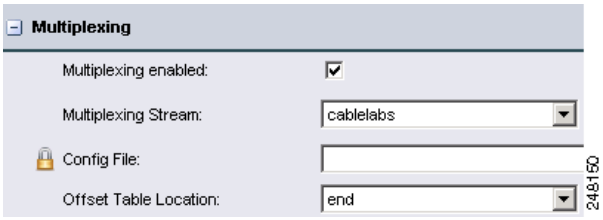


Table 8-14 describes the settings.

Table 8-14 H.264 Encoder: Multiplexing Settings and Descriptions

Setting	Description
Multiplexing Enabled	Enables this feature.
Multiplexing Stream	Specifies what type of multiplexing will be performed. • **mpeg1**: System stream multiplexing is enabled. • **MPEG-2**: Program stream multiplexing is enabled. Valid audio input is AAC, AC3, layer 1 or Layer 2 audio. • **videocd**: Constrained multiplexing that satisfies the requirements for Video CD production. • **vcd-padded**: Constrained multiplexing that satisfies the requirements for padded Video CD production. • **dvd**: Constrained multiplexing that satisfies the requirements for DVD production. • **transport**: Multiplexing into a transport. Valid audio input is AAC, Layer 1 or Layer 2 audio. • **external**: Multiplexing into a transport stream using the Manzanita multiplexer. This is suitable for cable transmission and other applications that require transport streams. Valid audio input is AAC, AC3, Layer 1 or Layer 2 audio. A configuration file to control the Manzanita multiplexer is required. • **none**: No multiplexing is performed. This is suitable for DVD authoring systems that require separate video and audio files. • **cablelabs**: Multiplexing that conforms to CableLabs specifications. • **mp4**: Multiplexing to produce output that is mp4 compliant. • **ipod**: Multiplexing to produce output that can be played on an iPod. • **3gpp**: Multiplexing to produce output that is 3gpp compliant.
Config File	Specifies the Manzanita configuration file used for external transport stream multiplexing. This option is available only if the external stream multiplexing type is selected.

Motion Estimation (H.264 Encoder)

Figure 8-19 shows the Motion Estimation section.

Figure 8-19 H.264 Encoder: Motion Estimation Section

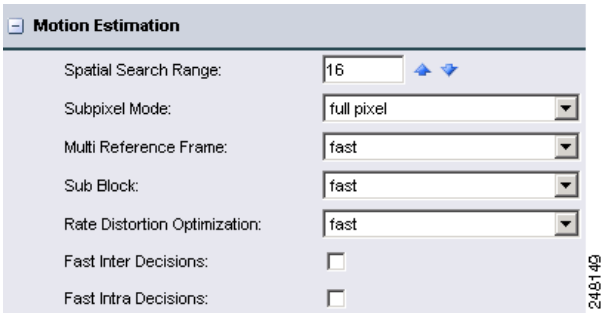


Table 8-15 describes the settings.

Table 8-15 H.264 Encoder: Motion Estimation Settings and Descriptions

Setting	Description
Spatial Search Range	Specifies the motion vector range (circle of the motion vectors from a pixel). Values depend on the level used. Values are: • Level 10 (1.0) - 0 - 63 • Level 11 (1.1) – 20 (2.0) - 0 - 127 • Level 21 (2.1) – 30 (3.0) - 0 - 255 • Level 31 (3.1) – 51 (5.1) - 0 - 511
Subpixel Mode	Subpixel motion search depth. Values are: • **full pixel**: only full pixel position will be examined • **half pixel**: half-pixel positions will be added to the search • **quarter pixel**: both half and quarter pixel positions will be added to the search
Multi Reference Frame	Multi-reference frame motion estimation search mode. Values are: • **complex**: slower, better quality • **fast**: faster, lower quality
Sub Block	Sub-block motion estimation search mode. Values are: • **complex**: slower, better quality • **fast**: faster, lower quality
Rate Distortion Optimazation	Rate distortion optimization method. Values are: • **complex**: slower, better quality • **fast**: faster, lower quality

Table 8-15 H.264 Encoder: Motion Estimation Settings and Descriptions (continued)

Fast Inter Decisions	Allows the encoder to use fast intercoding decision metrics to speed up the encoding process. If yes, can decrease quality but will reduce encoding time. Values are: yes or no (default).
Fast Intra Decisions	Allows the encoder to use fast intracoding decision metrics to speed up the encoding process. If yes, can decrease quality but will reduce encoding time. Values are: yes or no (default).

Stream (H.264 Encoder)

Figure 8-20 shows the Stream section.

Figure 8-20 H.264 Encoder: Stream Section

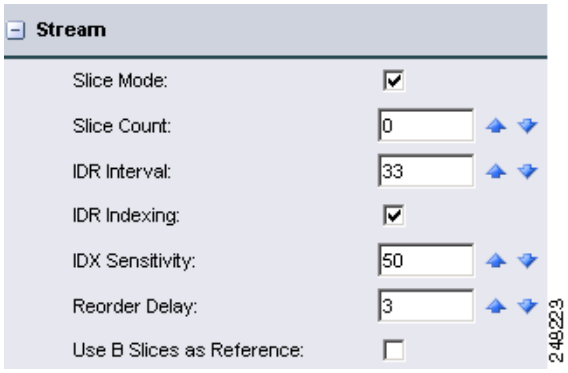


Table 8-16 describes the settings.

Table 8-16 H.264 Encoder: Stream Settings and Descriptions

Setting	Description
Slice Mode	Uses multiple slices. On systems with multiple physical or logical CPUs, encoding can be accelerated by using more than one slice.
Slice Count	The number of slices to use if Slice Mode is enabled. Values are: 0 (auto detect the number of CPUs) or a positive number not greater than the picture size in macroblocks.
IDR Interval	Instantaneous Decoder Refresh (IDR) interval specifies the number of frames in a group of pictures (GOP) or the number of frames between IDR frames. The first frame in a GOP is always an IDR frame (I-frame). It is used as a reference frame and is the first frame without quality loss because it contains the maximum information. It is similar to an I-frame in MPEG. The IDR interval must be a multiple of the reordering delay value. If this field is 1, then only IDR frames are generated. Values are 1 to 300; the default value is 33.
IDR Indexing	The H.264 encoder will use scene change detection algorithms to improve video quality around scene changes in the video.
Index Sensitivity	This field is activated by the IDR Indexing option. Sensitivity adjusts the dynamic threshold for detecting when a scene change has occurred.

Table 8-16 H.264 Encoder: Stream Settings and Descriptions (continued)

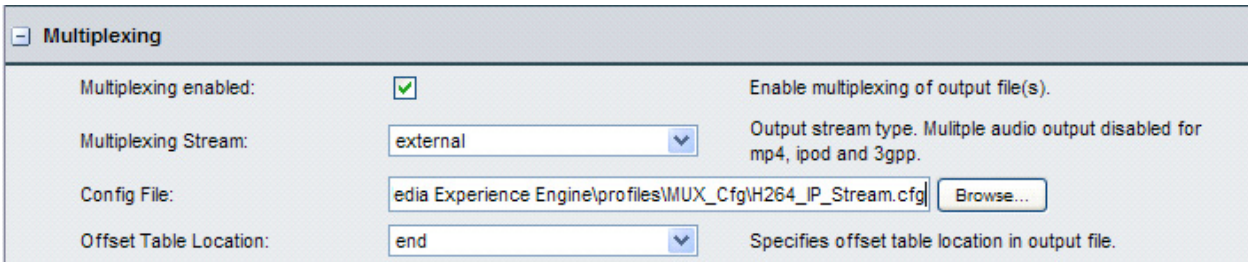
Reorder Delay	Specifies the number of B-frames between consecutive I- and P-frames. If this value is 1, then no B-frames will be generated. Values are 1 to 4; default value is 3.
Use B Slices as Reference	Allows B-frames to be used as reference frames.

Special requirements for IP Streaming (H.264 Encoder)

When creating H264 profiles for IP streaming (MPEG-2 TS multicast over UDP only), Multiplexing should be configured as follows:

- "Multiplexing enabled" should be checked
- "Multiplexing Stream" should be set to "external"
- A config file for the external multiplexer should be specified under "Config File". The MXE3500 ships with a predefined configuration file C:\Program Files\Cisco\Media Experience Engine\profiles\MUX_Cfg\H264_IP_Stream.cfg that can be used with most IP streams.
- Setting Width and Height to 0 will result in the output dimensions matching the source ones, which allows using the same profile for different source dimensions.

Figure 8-21 Multiplexing settings



Dolby DP 600 Program Optimizer

There are two ways to use the Cisco MXE 3500 with the Dolby DP 600 Program Optimizer (available from Dolby Labs):

- Encoder Level, page 8-30
- Preprocessor Level, page 8-31

Encoder Level

This method is only supported for H.264 encodes. The source Dolby-E, PCM, or a combination of Dolby-E and PCM data is passed from the source file directly to the encoder. The encoder then uses the Dolby Program Optimizer to create a 5.1 or a 2/0 AC3 track. The AC3 track is transferred back to the Cisco MXE 3500 encoding system and is then multiplexed into a transport stream.

To use the Dolby Program Optimizer for H.264 encodes:

1. In the **Preprocessor** Profile, **Audio** section, select **Audio Pass Through** to disable all audio processing in the prefilter. The Dolby-E audio track(s) will be propagated unmodified to the encoders without going through the audio processing pipeline.
2. In the **H.264 Encoder** Profile, **Audio Tracks** section, set **Audio Type** to **AC3** and **Source** to **Dolby Program Optimizer**.
3. Select the corresponding Dolby Program Optimizer **Configuration File**. A typical configuration file looks like this:

```
<dp600>
    <url>http://dp600node/WorkorderService/WorkorderWsImpl</url>
    <unc-path>\\output-node-name\output-share-name</unc-path>
    <user>username</user>
    <password>password</password>
    <profile>WAV/E_STITCH_AC3-1</profile>
</dp600>
```

   - **dp600node** is the name of the Dolby Program Optimizer node.
   - **\\output-node-name\output-share-name** is the unc path of the output folder for H.264 encodes.
   - **username** will be used by the Dolby Program Optimizer to connect to \\output-node-name\output-share-name share for reading and writing.
   - **password** will be used by the Dolby Program Optimizer to connect to \\output-node-name\output-share-name share for reading and writing.
   - **WAV/E_STITCH_AC3-1** is the profile on the Dolby Program Optimizer used for data processing.
4. In the **Multiplexing** section, select **external** and select a multiplexing configuration file. A simple config file looks like this (please refer to Manzanita Transport Stream Multiplexer documentation for further reference):

```
Transport*
File = out.mpg
Program1*
ProgramNumber = 1
PMTPID = 0x01E0
PCRPID = 0x01E1
PCRper = 35

Video1$
File = video.h264
PID = 0x01E1

Audio1$
File = audio.h264
PID = 0x01E2
```

Preprocessor Level

The source Dolby-E track(s) are decoded into uncompressed PCM tracks at the preprocessing stage. The resulting uncompressed tracks will be propagated to the encoder, or down-mixed first using Audio Mapping. In either case, in order to trigger the Dolby Program Optimizer from the Preprocessor, use the Audio Mapping dialog (see also: Input/Output Audio Channel Mapping (Preprocessor), page 6-28). The dialog has a column for routing audio inputs to the Dolby Program Optimizer. Setting the audio mapping in the Preprocessor requires knowledge of the contents of the source file. Typically, the Dolby E track

will contain 5.1 or 5.1 + 2 audio, though it may use other configurations, such as 2+2+2+2. The Dolby E Cfg column must be preset to accommodate decoded tracks, and will be set as if these virtual tracks exist in the prefilter file.

The above scenario assumes a source file with two-channel PCM in the first stereo pair (for example, English stereo) and 5.1+2 Dolby-E in the second stereo pair (for example, English 5.1 and Spanish stereo). Since this represents 10 channels in total from the source (2 + 6 + 2), you must configure 10 discreet inputs in the Audio Mapping dialog. Setting the Dolby-E config column to a non-empty value tells the Dolby Program Optimizer how to parse the incoming Dolby E stream. In this example, add three output audio tracks: a two-channel track (English stereo), a six- channel track (for English 5.1), and another two-channel track (Spanish stereo). The encoders can now reference all three output tracks: 5.1-aware encoders, like VOD, can reference Track 2 and encode into 5.1 AC3. An encoder that only encodes stereo audio pairs can reference Track 1 (English) and Track 2 (Spanish) and so on.

Preprocessor-based Dolby-E decoding requires the following configuration file in the %bluerelease%\bin folder on all the encoding nodes: dp600config.xml. A typical configuration files looks like this:

```
<dp600>
    <url>http://dp600node/WorkorderService/WorkorderWsImpl</url>
    <unc-path>\\tmp-node-name\tmp-share-name</unc-path>
    <user>username</user>
    <password>password</password>
    <profile>WAV/E_PCM-2</profile>
</dp600>
```

- dp600node is the name of the Dolby Program Optimizer node.
- \\tmp-node-name\tmp-share-name is the unc path of the temp folder for intermediate Preprocessor files.
- username will be used by the Dolby Program Optimizer to connect to \\tmp-node-name\tmp-share-name share for reading and writing.
- password will be used by the Dolby Program Optimizer to connect to \\tmp-node-name\tmp-share-name share for reading and writing.
- WAV/E_PCM-2 is the profile on the Dolby Program Optimizer used for Dolby-E decoding.

MP3 Encoder

This section includes the following topics:

Introduction to the MP3 Encoder

The MP3 encoder produces audio-only MP3 files.

Note Because MP3 players do not accommodate the standard video metadata used by the Cisco MXE 3500, any metadata entered during job submission will be stored in the database but will not be included in output files.

See also: Adding an Encoder Profile to a Job Profile, page 8-4

Understanding MP3 Encoder Settings

This section includes the following topics:

Common (MP3 Encoder)

Figure 8-22 shows the Common section.

Figure 8-22 MP3 Encoder: Common Section

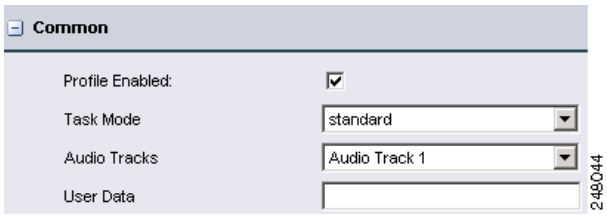


Table 8-17 describes the settings.

Table 8-17 MP3 Encoder: Audio Settings and Descriptions

Setting	Description
Enabled	Check the box to enable this profile for job processing.
Task Mode	Sets the execution mode for this task: standard, fast start, immediate. **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding • If there are no webcasting jobs in progress.

Table 8-17 MP3 Encoder: Audio Settings and Descriptions (continued)

Audio Tracks	The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks drop-down allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder.
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title 'Nightly News' in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata). As an example, in a Windows Media output, the result is a Nightly News.wmv file. 

Audio (MP3 Encoder)

Figure 8-23 shows the Audio section.

Figure 8-23 MP3 Encoder: Audio Section

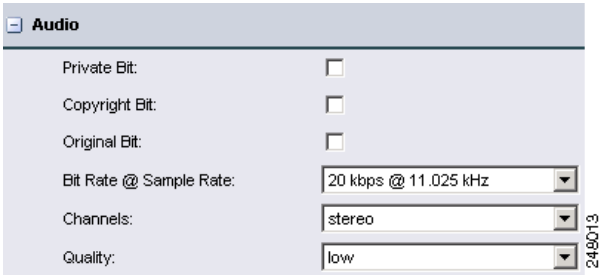


Table 8-18 describes the settings.

Table 8-18 MP3 Encoder: Audio Settings and Descriptions

Setting	Description
Private Bit	Turns the MP3 Private bit on or off. The Private bit can be used when the clip is played to trigger application-specific events.
Copyright Bit	Indicates whether the encoded clip is copyright protected.
Original Bit	Indicates whether the encoded file is the original or a copy.
Bit Rate @ Sample Rate	A drop-down list displays valid combinations of bit rate and sample rate. Bit rates range from 20 kbps to 320 kbps, and sample rates are 11.025, 22.050, and 44.100 kHz.

Table 8-18 MP3 Encoder: Audio Settings and Descriptions (continued)

Channels	Determines the number of audio channels in the output audio stream. • **Mono**: Audio in the output file will be streamed as a single channel. • **Stereo**: Audio in the output file will be streamed in stereo.
Quality	Controls the trade-off between seed and compression quality of the encoded output. The Quality selected affects both the speed of encoding and output file size as follows: • **Low**: Encoding is done as quickly as possible with less emphasis on the quality of the encode. • **Medium**: Equal emphasis is given to speed and quality during encoding. • **High**: Emphasis is given to the quality of the encode with less emphasis on speed.

MPEG Encoder

This section includes the following topics:

Introduction to the MPEG Encoder

The MPEG worker encodes input material into MPEG-1/ MPEG-2 video and MPEG Layer1/2, WAV, AC-3, PCM, and AES3 PCM audio in program or transport streams.

See also: Adding an Encoder Profile to a Job Profile, page 8-4.

Understanding MPEG Encoder Settings

An MPEG Encoder Profile allows you to adjust the following settings:

Common (MPEG Encoder)

Figure 8-24 shows the Common section.

Figure 8-24 MPEG Encoder: Common Section

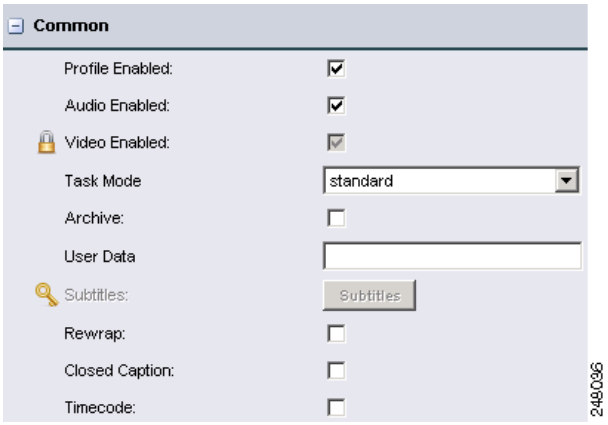


Table 8-19 describes the settings.

Table 8-19 MPEG Encoder: Common Settings and Descriptions

Setting	Description
Profile Enabled	Check the box to enable this profile for job processing.
Audio Enabled	Enables audio output for this task.
Video Enabled	Enables video output for this task.
Task Mode	Sets the execution mode for this task: standard, fast start, immediate. **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding • If there are no webcasting jobs in progress **Immediate**: If you enable Immediate Encoding, the Cisco MXE 3500 will not use an intermediate file, but uses a memory-based interface between the preprocessor and the encoders. This is extremely useful for longer input clips and/or formats with high data volumes, such as MPEG or OMF, where the disk space requirements for intermediate files could become prohibitive. **Note** Since Immediate Encoding uses more memory resources and allows the encoder to control the rate at which the preprocessor provides data, it is not suitable for Live capture situations, only for file jobs.

Table 8-19 MPEG Encoder: Common Settings and Descriptions (continued)

Archive	Check this box to automatically load a 50Mbps I-Frame MPEG-2 output that bypasses the preprocessor settings for the given Job Profile. For example, if you want to include audio normalization, graphics overlays, and cropping controls for Web output, but also want a high resolution archive of your source materials, the Archive option will create both Web and Archive formats from a single ingest of the source material.
Audio Tracks	The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks drop-down allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder. You may select as many tracks as are supported by the encoder. For example, if the encoder supports up to four outputs, you can select up to four of the preprocessor outputs, and they will be mapped to the encoder output in order. The individual encoders allow you to determine if the output of the encoder is stereo (two different channels) or mono, where stereo inputs to the encoder will be averaged, and one output channel will be created from the pair.
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title 'Nightly News' in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata). As an example, in a Windows Media output, the result is a Nightly News.wmv file. 

Table 8-19 MPEG Encoder: Common Settings and Descriptions (continued)

Subtitles	Subtitles are text versions of the dialog in films and television programs, usually displayed at the bottom of the screen. Click the Subtitles button to display the Subtitles pop-up shown below*. **Enable Subtitles**: Enables subtitles insertion. Note: You must also attach a Subtitles File on the File Job Submission page, in the File Information section. **Format**: Specifies the type of subtitles to insert • **DVB Bitmap**: The subtitles are rendered into the output video by a playback device (a settop box). • **DVB Teletext**: The subtitles are inserted into the VBI and then decoded by a TV set. **PID**: Specifies the output Packet ID that the subtitles are placed on. **Language Code**: (ISO 639, 3 letters) The ISO 639-2 language code to be inserted into the PMT descriptor. This should be a valid ISO 639-2 code to help the set-top box figure out the language. The complete code list can be found here: http://www.loc.gov/standards/iso639-2/php/code_list.php **Timecode Sync Method**: • **Adhere to Timecode**: The subtitles are inserted based on the source and STL timecodes. For instance, if the source timecode is 00:00:20:00, and the first STL entry is at 00:00:30:00, the first subtitles will appear at the 10th second. • **First Frame**: The source and STL timecodes are ignored. The first subtitles will appear on the first frame. **Timecode Offset**: Specifies an offset in frames (00:00:10:00) or seconds (12.375) to delay the first subtitles entry. This can be very useful when used with bumpers. For instance, if the source timecode is 10:00:00:00, the first STL entry is at 10:00:20:00, Timecode Sync Method is Adhere to Timecode, and the offset is 30 seconds, the first subtitles will appear at the 50th second. If Timeocde Sync Method is First Frame, the first subtitles will appear at the 30th second. **Page ID**: Specifies the DVB-Bitmap composition page ID. This setting must be any positive integer from 1 to 65535 **Font Name**: The font used to draw DVB-Bitmap subtitles. These are actual Windows font names (Times New Roman, Arial, etc). Default means use the default font. **Cell Height**: Specifies the DVB-Bitmap subtitles height in pixels (1-1080). **Cell Width**: Specifies the DVB-Bitmap subtitles width in pixels (1-1920). **Bottom Edge**: The bottom edge of the safe area should be about 576 - (576 x 10%). **Top Edge**: The top edge of the safe area should be about (576 x 10%). **Left Edge**: The left edge of the safe area should be about (720 x 10%). **Right Edge**: The right edge of the safe area should be about 720 - (720 x 10%

Table 8-19 MPEG Encoder: Common Settings and Descriptions (continued)

Rewrap	Choose this option to rewrap RAW data in the encoder's header. By choosing this option, the Cisco MXE 3500 does not decompress and recompress the video, resulting in faster job processing. **Note** Rewrap only works if the video input and output formats are completely compatible. Rewrap works best for DV formats. (The RAW encoded form of audio and video data is often called essence).
Closed Caption	Choose this option to enable the Closed Caption feature for this encoder. To enable closed captioning for the entire job, in the Preprocessor Profile, in the Closed Captioning section, check the Burn In box.
Timecode	Choose this option to insert timecodes from the source file into the output file.

Video (MPEG Encoder)

Figure 8-25 shows the Video section.

Figure 8-25 MPEG Encoder: Video Section

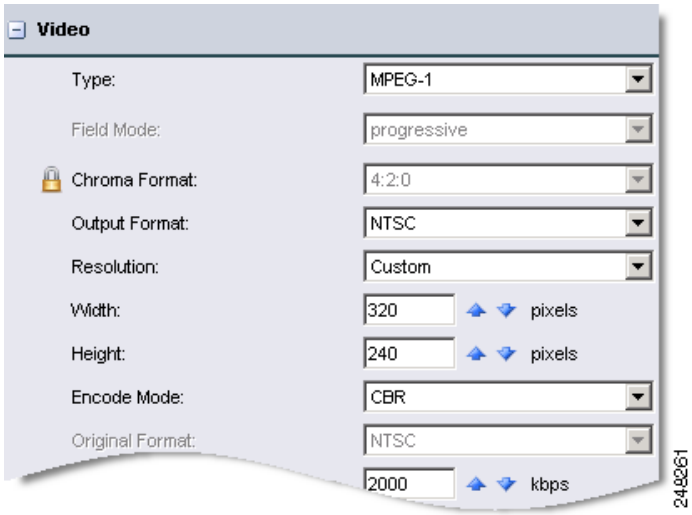


Table 8-20 describes the settings.

Table 8-20 MPEG Encoder: Video Settings and Descriptions

Setting	Description
Type	Identifies the type of MPEG video being created by the encoder. Settings in the MPEG tab will vary depending on the Type selected. • **MPEG-1**: Designed for data rates between 192 kbps and 104.857 Mbps. Used primarily for PC multimedia applications. • **Video-CD**: A standard digital format for storing video on a compact disc. • **MPEG-2**: MPEG-2 is designed for data rates of between 192 kbps and 300 mbps. Used primarily for digital broadcast satellite and digital television. Supports interlaced video, and larger frame sizes and bit rates than MPEG-1. • **Super Video-CD**: Super Video CD is a format used for storing video on standard compact discs. SVCD was intended as a successor to Video CD and an alternative to DVD Video and falls somewhere between both in terms of technical capability and picture quality. • **DVD**: DVD video is a consumer video format used to store digital video on DVD (DVD-ROM) discs.
Field Mode	Specifies the field mode of the input source. Values are: progressive and interlaced. For MPEG-1, Video-CD, and Super Video-CD types, the input must be progressive.
Chroma Format	Specifies the resolution of the chrominance data. Valid values are 4:2:0 and 4:2:2. 4:2:2 is valid only for MPEG-2 4:2:2 profile.
Output Format	Specifies whether to encode in NTSC or PAL format.
Resolution	Specifies the size of the encoded frames. The available pre-configured choices are different for MPEG-1 and MPEG-2. The size is fixed for Video-CD, Super Video-CD, and DVD. For MPEG-1 and MPEG-2, the custom resolution allows an individual height and/or width to be entered.
Width	Specifies the width in pixels of the output file created by the encode. Values are between 80 and 1920 pixels.
Height	Specifies the height in pixels of the output file created by the encoder. Values are between 60 and 1088 pixels.
Encode Mode	• **CBR**: Constant Bit Rate encoding, where the same bit rate is maintained throughout the encode. • **VBR**: Variable Bit Rate encoding, where the bit rate is varied during the encode, depending on the complexity and output requirements. • **VBR-Quality**: Variable Bit Rate encoding, where the quality is maintained within bit rate boundaries during the encode, depending on input complexity and output format requirements.

Table 8-20 MPEG Encoder: Video Settings and Descriptions (continued)

Original Format	The original video format that indicates the representation of the picture before encoding. It is a flag to the decoder (in the sequence display extension header) and does not affect the video encoding. Values are: • Component • PAL • NTSC (default) • SECAM • MAC • Unspecified
Bit Rate	Sets the transmission rate for video as a portion of the encoded output stream. Values are 192.0 to 100000.0 kbps for 4:2:0 chroma format and 192.0 to 300000.0 kbps for 4:2:2 chroma format. **Note** When Variable Bit Rate is selected, this value is not used.
Frame Rate	Determines the frame rate of the encoded output. • **23.976**: 29.97 NTSC with 3:2 pull-down (inverse telecine) applied. • **24.00**: Film-based source footage or 30 FPS NTSC with 3:2 pull-down (inverse telecine) applied. • **25.00**: PAL video source footage. • **29.97**: NTSC video source footage. • **30.00**: NTSC drop-frame video source footage. • **50.00**: Double frame rate/progressive PAL video source footage. • **59.97**: Double frame rate NTSC video source footage. • **60.00**: Double frame rate NTSC drop-frame video source footage.
Pixel Aspect	Selects the pixel aspect ratio. Aspect Ratio here refers to the ratio of the width to the height of the area represented by a pixel. Pixel Aspect Ratio settings defined for MPEG-1 are given as floating point numbers: 1.0 (square), 0.06735 (default 3:4), 0.7031 (9:16 625 line), 0.7615, 0.8055, 0.8473 (9:16 525-line), 0.8935, 0.9157 (BT.601 625-line), 0.9815, 1.0255, 1.0950 (BT.601 525-line), 1.1575, and 1.2015. Pixel Aspect Ratio settings defined for MPEG-2 are written as ratios: • **1:1**: Square • **3:4**: Default • **9:16**: Anamorphic (wide-screen) • **1:2.21**: Wide-screen film

Table 8-20 MPEG Encoder: Video Settings and Descriptions (continued)

Profile & Level	Specifies a subset of the MPEG-2 syntax required for decoding the stream as well as coded parameter constraints, such as bit rate, sample rate, frame rate, etc. Supported combinations are: simple profile - main level, main profile – low level, main profile – main level, main profile – high level, high profile – high level, 4:2:2 profile – main level, or 4:2:2 profile – high level
VBV Buffer Size	Specifies the size of the virtual buffer verifier (VBV) in 2048 byte units. If 0 is input then the VBV buffer size will be calculated by the encoder. This value is different for MPEG-1 and MPEG-2. For MPEG-2, the maximum value is determined by the profile/level combination. Unless a particular size is required this parameter should be set to 0 to allow the encoder to choose the size.
Average Bit Rate	Specifies the average bit rate to maintain. The average bit rate value must always be less than the maximum bit rate value. Values are in the range 192.0 to 300000.0 kbps depending on the profile/level combination. **Note** The Average Bit Rate value must always be less than the Maximum Bit Rate value.
Quantization Scale	Specifies the desired image quality for VBR encoding. The bit rate will be made as large as necessary to achieve the desired quality. Values range from 1 to 31, but reasonable approximate values are as follows: • **2-3**: Very good picture quality, very high bit rate. • **4-5**: Good picture quality, high bit rate. • **6-7**: Medium picture quality, medium bit rate. • **8-9**: Low picture quality, low bit rate.
Minimum Average Bit Rate	Specifies the lower limit for the average bit rate maintained to achieve a desired quantization value. Values are in the range 192.0 to 300000.0 kbps depending on the profile/level combination. The minimum average bit rate value must always be less than the maximum average bit rate value. **Note** The Minimum Average Bit Rate value must always be less than the Maximum Average Bit Rate value.
Maximum Average Bit Rate	Specifies the upper limit for the average bit rate maintained to achieve a desired quantization value. Values are in the range 192.0 to 300000.0 kbps depending on the profile/level combination.
Optimization Mode	Indicates whether to maintain quality at the expense of speed or speed at the expense of quality. Values are speed or quality.
Optimization Level	If Optimization Mode is set to quality, the number represents desired quality, 0 - 31 (highest quality). If Optimization Mode is set to speed, the number represents available CPU performance, 0 – 31 (highest performance).

GOP Properties (MPEG Encoder)

The GOP (Group of Pictures) is central to MPEG encoding. A GOP is defined as an encoded keyframe (I-frame) and all of its delta frames (P- and B-frames). Figure 8-26 shows the GOP Properties section. Table 8-21 describes the settings.

Figure 8-26 MPEG Encoder: GOP Properties Section

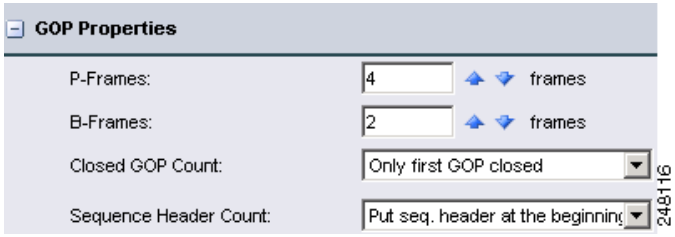


Table 8-21 GOP Properties Settings and Descriptions

Setting	Description
P-Frames	P-frames are forward predictive delta frames. Increasing the number of P-frames increases the time between keyframes, and will result in smaller output files. P-frame values should be between 0 and 4. The default value is 3.
B-Frames	B-frames are bi-directional predictive delta frames, and are the smallest type of frame. Increasing the number of B-frames decreases file size and can help to reduce noise in the image. B-frame values should be between 0 and 4. The default value is 3.

Table 8-21 GOP Properties Settings and Descriptions (continued)

Setting	Description
Closed GOP Count	Indicates the number of closed GOPs per second. Increasing the frequency will yield better quality for high-motion footage and an improved search capability in the output clip, but the output file will be larger. Decreasing the frequency will result in a smaller output file. Valid choices are: • Only first GOP closed. • All GOPs closed. • One out of every 2 GOPs closed. • One out of every 3 GOPs closed. • One out of every 4 GOPs closed. • One out of every 5 GOPs closed. • One out of every 6 GOPs closed. • One out of every 7 GOPs closed. • One out of every 8 GOPs closed. • One out of every 9 GOPs closed. **Note** A closed GOP is a group of pictures that begins with an I frame (or keyframe). An Open GOP begins with a B-frame. Open GOPs require information from the previous GOP to be properly decoded, and therefore cannot be used as edit points in the output clip.
Sequence Header Count	Defines the frequency of sequence header placement relative to GOPs. Sequence Headers include information required to decode the clip, such as buffer size, frame size, aspect ratio, frame rate, and bit rate. Sequence headers should occur more frequently for footage that will be edited or will be broadcast in order to allow access at any point in the video. Video encoded for DVD can have a sequence header only at the beginning. Valid choices are: • Put sequence header before every GOP. • Put sequence header before one out of every 2 GOPs. • Put sequence header before one out of every 3 GOPs. • Put sequence header before one out of every 4 GOPs. • Put sequence header before one out of every 5 GOPs. • Put sequence header before one out of every 6 GOPs. • Put sequence header before one out of every 7 GOPs. • Put sequence header before one out of every 8 GOPs. • Put sequence header before one out of every 9 GOPs.

Multiplexing (MPEG Encoder)

Figure 8-27 shows the Multiplexing section. Table 8-22 describes the settings.

Figure 8-27 MPEG Encoder: Multiplexing Section

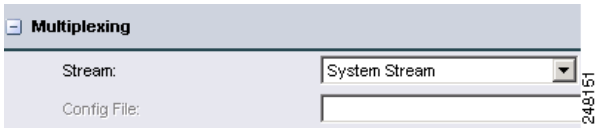


Table 8-22 Multiplexing Settings and Descriptions

Setting	Description
Stream	Specifies what type of multiplexing to be performed. Available options depend on Video Type selected. • **None**: No multiplexing is performed. This is suitable for DVD authoring systems that require separate video and audio files. • **System Stream**: This option is only available for MPEG-1 encoding. • **Program Stream**: This is suitable for standard MPEG usage and only works with Layer 1 or Layer 2 audio. • **Transport Stream**: This is suitable for cable transmission and other applications that require transport streams and only works with Layer1, Layer 2, or AC3 audio. • **Video-CD**: Constrained multiplexing that satisfies the requirements for Video-CD production. This option is only available for Video-CD or MPEG-1 encoding. • **Super Video-CD**: Constrained multiplexing that satisfies the requirements for Super Video-CD production. This option is only available for MPEG-2 or Super Video-CD encoding. • **DVD**: Constrained multiplexing that satisfies the requirements for Super Video-CD production. This option is only available for MPEG-2 or DVD encoding.
Config File	Specifies the Manzanita configuration file to use for transport stream multiplexing. This option is only available if the transport stream multiplexing type is selected.

Audio Common (MPEG Encoder)

Figure 8-28 shows the Audio Common section. Table 8-23 describes the settings.

Figure 8-28 MPEG Encoder: Audio Common Section

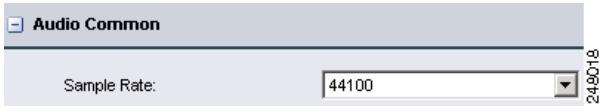


Table 8-23 Audio Common Settings and Descriptions

Setting	Description
Sample Rate	Output audio sample rate in hertz. PCM and AES3 302M require a setting of 48000. Rates below 32000 require Layer 1 or 2.

Audio Tracks 1-8 (MPEG Encoder)

Figure 8-29 shows the Audio 1-8 section. Table 8-24 describes the settings.

Figure 8-29 MPEG Encoder: Audio 1-8 Section

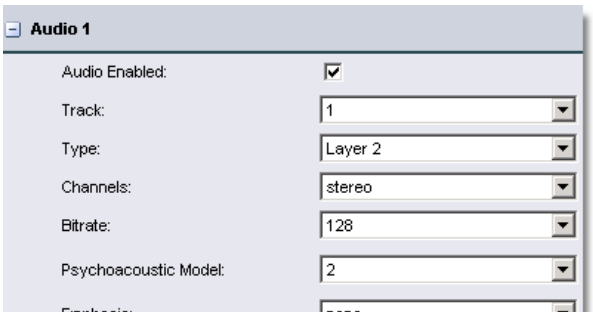


Table 8-24 MPEG Encoder: Audio Settings and Descriptions

Setting	Description
Type	Determines the type of audio processing to perform. • **Layer 1**: MPEG Audio Layer 1 (ISO/IEC 11172-3). • **Layer 2**: MPEG Audio Layer 2 (ISO/IEC 13818-3). The standard audio format for MPEG files; various bit rates can be used. The audio stream will be multiplexed with the video stream. • **PCM**: An uncompressed format that is typically used by many MPEG-2 authoring products for DVDs. The format of the output is not a separate WAV file but is meant to be multiplexed with video into a DVD output. • **AES 302M**: An extension to the AES3 interface standard. This setting allows for the transmission of AC-3 compressed audio (multi-channel surround sound) over existing television technology. • **WAV**: Uncompressed audio in the pulse-coded modulation (PCM) format. PCM audio is the standard audio file format for CDs, containing two channels of audio sampled at 44,100 samples per second, 16 bits per sample. • **AC3**: High quality AC3 audio suitable for DVD authoring or multiplexing with MPEG video for transport stream generation.
Channels	Determines the number of audio channels in the output audio stream. • **Mono**: Audio in the output file will be streamed as a single channel. • **Stereo**: Audio in the output file will be streamed in stereo.

Table 8-24 MPEG Encoder: Audio Settings and Descriptions (continued)

Setting	Description
Bitrate	Indicates the bit rate for the audio stream. Valid choices are: 32-640 kbps. (Depending on the type selected, some values may not be available.) Increasing the bit rate will yield better sound quality and will result in larger files. If the total bit rate is limited and you increase the bit rate, less of the total bit rate is available for video.
Sample Rate	Indicates the sample rate that the audio compression algorithms should use for compressing the data. Values are 32000, 44100, and 48000 kHz (depending on the type selected, some values may not be available).
Psychoacoustic Model	Specifies the MPEG psychoacoustic model in the MPEG-1 audio specification that is used for encoding. It optimizes audio at lower bit rates by tuning it to human hearing. It is not recommended for high bit rate applications. • **1**: Use calculations from Model 1. These calculations are simpler than those performed when Model 2 is selected. Processing time for these calculations is faster, but results in more compromises in the optimization. • **2**: Use calculations from Model 2. These calculations are more complex that those performed when Model 1 is selected. Processing time for these calculations is slower. This is the default setting.
Emphasis	Defines any emphasis that has been applied to the audio before encoding. The encoder does not modify the input samples before encoding them. This field is just a flag to the decoder to indicate that some emphasis was applied to the original source audio. • **0**: No emphasis. This is the default setting. • **1**: 50/15 msec emphasis. • **2**: Reserved • **3**: CCITT J.17
Private Bit	A spare, user-defined bit in the audio headers. DVD format specifies it should be set to 0.
CRC-Protection	Check this box to enable CRC-Protection, which specifies that a CRC is embedded in each audio frame. Both SVCD and DVD formats specify that CRC-Protection should be enabled.
Mute	Check this box to enable the mute state the decoder should use when the audio samples are zero. This is only a flag for the decoder, it does not affect encoding at all.

Table 8-24 MPEG Encoder: Audio Settings and Descriptions (continued)

Setting	Description
AC3 Settings and Descriptions	
Dynamic Compression	Compression profile presets that can be specified depending on the nature of the program material being encoded. • **none**: Completely shut off the compression on playback • **film-standard**: For most movies • **film-light**: Less compression, more dynamic range • **music-standard**: For most music-only input • **music-light**: For music material, less compression • **speech**: For most dialog-only input
Bit Stream Mode	Indicates the type of audio service that the bit stream conveys. • **complete-main**: The normal mode of operation and contains a complete audio program including dialog, music, and effects. • **music-and-effect**: The music-and-effect mode contains the music and effects for an audio program but not the dialog. • **visually-impaired**: The visually-impaired mode contains a narrative description of the visual program content. • **hearing-impaired**: The hearing-impaired mode contains only dialog and is intended for use by those whose hearing impairments make it difficult to understand the dialog in the presence of music and sound effects. The dialog can be processed for increased intelligibility by the hearing impaired. • **dialog**: The dialog mode is employed to most efficiently offer multichannel audio in several languages simultaneously when the program material is such that the restrictions of a single dialog channel can be tolerated. • **commentary**: The commentary mode conveys primary program dialog. • **emergency**: The emergency mode is intended to allow the insertion of emergency announcements. The normal audio services do not necessarily have to be replaced to present the emergency message. • **voice-over-karaoke**: The voice-over-karaoke mode is intended for reproduction along with the complete-main mode.
Dialog Normalization	The Dialog Normalization parameter allows the Dolby decoder to keep speech levels at a nearly consistent level between different sources. It is important to set this level correctly when you encode. For instance, if the speech in the material averages -17 dBa, then the Dialog Normalization number would be -17. Values are -1 to -31.

Table 8-24 MPEG Encoder: Audio Settings and Descriptions (continued)

Setting	Description
Lowpass Filter	The Channel Bandwidth Lowpass Filter is used to roll off the high frequency content in the input signal at a frequency just below that specified by the Dolby Digital audio bandwidth boundary. Using this filter ensures that the audio signal is completely contained within the Dolby Digital audio bandwidth. By providing a smooth transition at the upper bandwidth edge, this filter helps to minimize artifacts that may arise if the input signal contains significant high-frequency energy. In general, this filter should be enabled unless the encoding engineer is confident that the input signal does not contain appreciable high-frequency energy above the Dolby Digital audio bandwidth.
DC Filter	The DC Highpass Filter is used to block DC from being Dolby Digital encoded. This is important, as a DC offset requires some amount of data rate to encode even though it is not audible, thereby wasting bits. Another benefit of using this filter is that the meter values do not get stuck at the DC offset level during very quiet passages (DC offset can easily be greater than -60 dBFS). The DC Highpass Filter should always be enabled unless the encoding engineer is absolutely sure that there is no DC in the input audio.
De-Emphasis	The Digital De-emphasis filter is used to de-emphasize any 50/15 µs pre-emphasized linear PCM signals that may be presented to the inputs of the Dolby Digital encoder. Pre-emphasis is a technique that was once commonly used to reduce the harshness of A/D and D/A converters.
Pre-Emphasis Filter	A pre-emphasis filter is used in the overload protection algorithm to prevent RF overmodulation in set-top box decoders.
Dolby Surround	Dolby Surround Mode indicates whether or not a two-channel Dolby Digital bitstream is conveying a Dolby Surround encoded program. This information is not used by the Dolby Digital decoding algorithm, but can be used by other portions of the audio reproduction equipment, such as a Dolby Surround Pro Logic decoder.
Production Mixing Level	This information indicates the absolute Sound Pressure Level (SPL) of the audio program as heard by the original mixing engineer. This information makes it possible to replay the program at exactly the same loudness, or at a known difference in loudness. This level is used by the decoder during playback.
Production Room Type	This information indicates the type and calibration of the mixing room used for the final audio mixing session. The Room Type value is not normally used within the Dolby Digital decoder but can be used by other elements in the audio system. • not-indicated • large-room • small-room

Table 8-24 MPEG Encoder: Audio Settings and Descriptions (continued)

Setting	Description
Extended Bit Stream Dolby Surround Ex-Mode	Indicates if the input material is EX-encoded. Dolby Digital EX is similar in practice to Dolby's earlier Pro-Logic format, which utilized Matrix technology to add a center and single rear surround channel to stereo soundtracks. EX adds an extension to the standard 5.1 channel Dolby Digital codec in the form of matrixed rear channels, creating 6.1 or 7.1 channel output. However, the format is not considered a true 6.1 or 7.1 channel codec because it lacks the capability to support a discrete 6th channel unlike the competing DTS-ES codec.
Extended Bit Stream HDCD	Indicates if the input material is High Definition Compatible Digital (HDCD) encoded. By correcting distortions found in current digital recording technology, HDCD A/D conversion, dynamic digital filtering, dither, and amplitude encoding/decoding provide extended dynamic range, a focused 3-D sound stage, and extremely natural musical timbre. HDCD CD, DVD, or Internet distributed digital recordings offer improved sound quality with any playback system, and when reproduced on HDCD equipped systems, have the potential to provide 20-bit or greater sound quality from all digital audio release formats.

QuickTime Encoder

This section includes the following topics:

Introduction to the QuickTime Encoder

The QuickTime encoder can be used to produce files for streaming or for progressive download. Multiple QuickTime profiles can be added to a single Job Profile.

QuickTime Profiles are different than other Encoder Profiles in that they must be created or edited using the Cisco MXE 3500 Tools User Interface.

See also: Adding an Encoder Profile to a Job Profile, page 8-4.

Installing the Apple QuickTime Encoder

The QuickTime encoder is a separately installed component because of Apple licensing requirements. It is required for transcoding to and from specific formats. You can obtain version 7.6.9 of QuickTime at http://support.apple.com/kb/DL837.

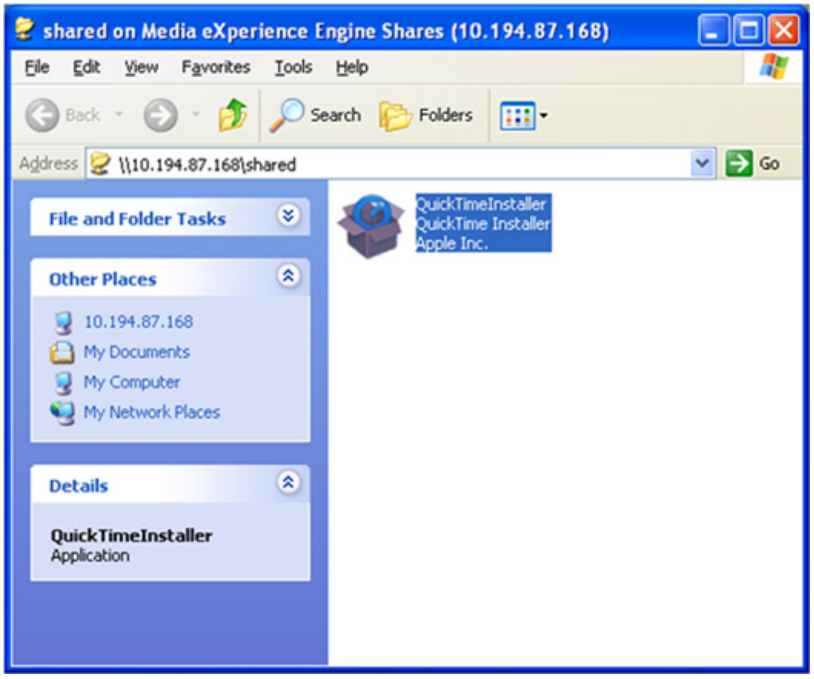
Procedure

Step 1 Download the QuickTime installer.

Step 2 Connect to any of the Cisco MXE 3500 shared folders by using the mxe_IP_address or hostname.

Step 3 Use the folder **shared** (recommended), as shown in Figure 8-30.

Figure 8-30 Downloading and Saving the QuickTime Installer

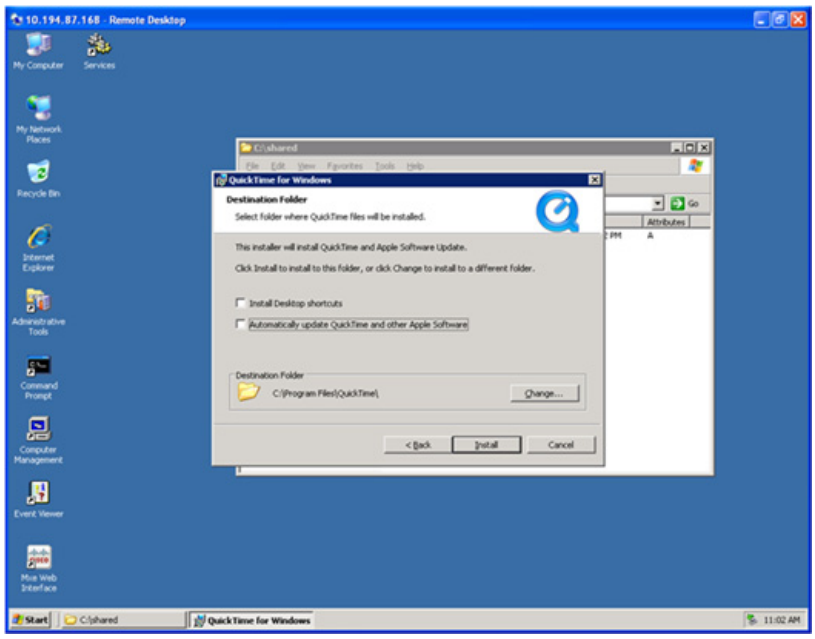


Step 4 RDC to the Windows VM.

Step 5 Navigate to **C:\shared**.

Step 6 Double-click the installer to begin the installation process (Figure 8-31).

Figure 8-31 Launching the QuickTime Installer



Step 7 Disable automatic updates.

Step 8 Delete the installer when installation is complete.

Step 9 Restart the Windows VM.

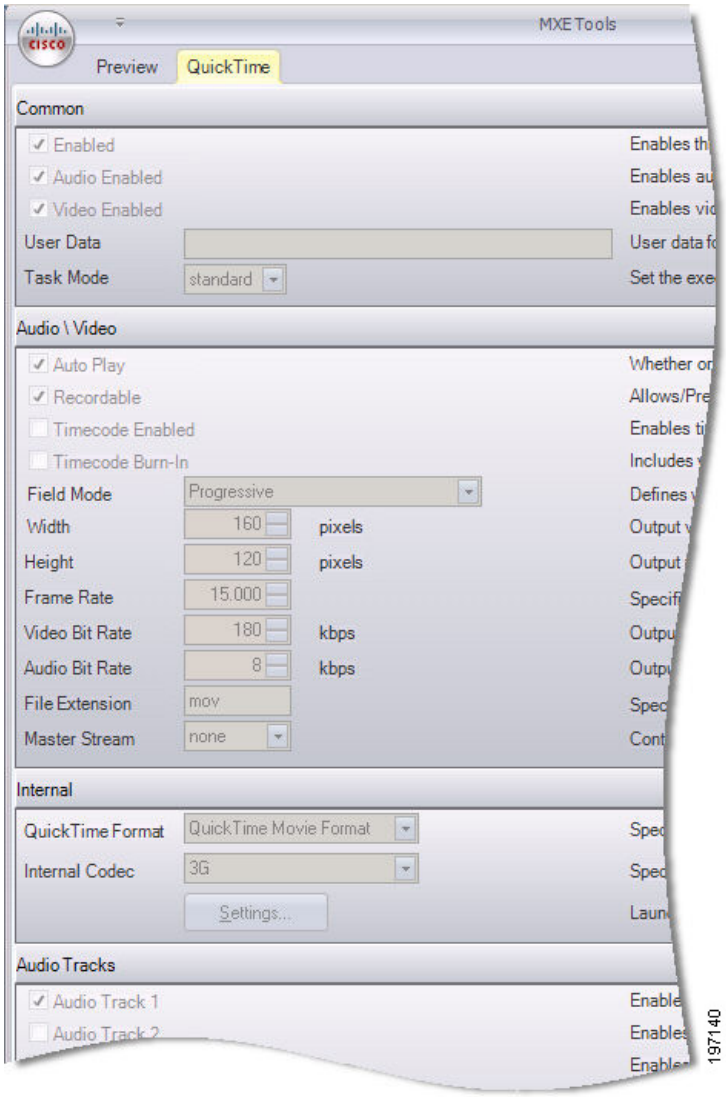
Creating a QuickTime Encoder Profile

The QuickTime Encoder Profile Creator/Editor is a Cisco MXE 3500 Tools application.

Procedure

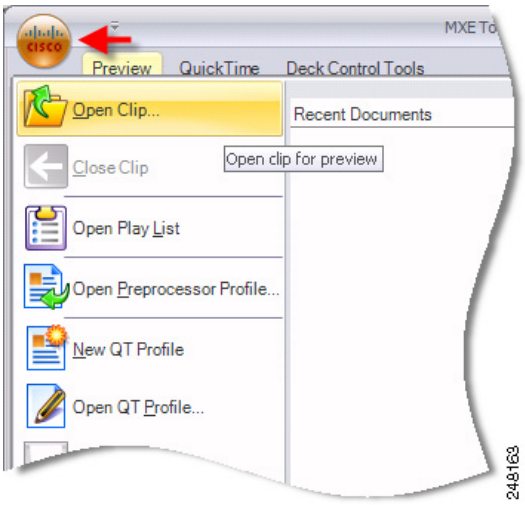
Step 1 To access the QuickTime tool, click **Start > All Programs > Cisco > Media Experience Engine > Media Experience Engine Tools**. Make sure the **QuickTime** tab is highlighted (Figure 8-32).

Figure 8-32 QuickTime Creator/Editor



Step 2 Click the Cisco icon in the upper left corner, and click **New QT Profile** (Figure 8-33).

Figure 8-33 Creating a New QuickTime Profile



Step 3 Adjust settings as needed. See also: Understanding QuickTime Encoder Settings, page 8-55.

Step 4 Click the Cisco icon, and click **Save QT Profile As**.

Step 5 In the Save the Cisco MXE 3500 Profile pop-up, enter a **Profile Name**, and click **Ok**.

Note If you are working in the Job Profile section of the Cisco MXE 3500 UI, click the refresh button to view the newly created QuickTime profile in the Encoder section.

Editing a QuickTime Encoder Profile

The QuickTime Encoder Profile Creator/Editor is a Cisco MXE 3500 Tools application.

Note Depending on your Windows theme setting, your Cisco MXE 3500 Tools frame may display in a different color.

Procedure

Step 1 To access the QuickTime tool, click **Start > All Programs > Cisco > Media Experience Engine > Media Experience Engine Tools.** Make sure the **QuickTime** tab is highlighted. The following displays:

Step 2 Click the Cisco icon in the upper left corner, and click **Open QT Profile**.

Step 3 Adjust settings as needed.

Step 4 Click the Cisco icon, and click **Save QT Profile**.

Note If you are working in the Job Profile section of the Cisco MXE 3500 UI, click the refresh button to load the edited QuickTime profile in the Encoder section.

Understanding QuickTime Encoder Settings

The QuickTime Encoder Profile allows you to adjust the following settings:

- Common (QuickTime Encoder), page 8-55
- Audio/Video (QuickTime Encoder), page 8-56
- Internal (QuickTime Encoder), page 8-58
- Audio Tracks (QuickTime Encoder), page 8-58

Common (QuickTime Encoder)

Figure 8-34 shows Common settings. Table 8-25 describes the settings.

Figure 8-34 QuickTime Encoder: Common Settings

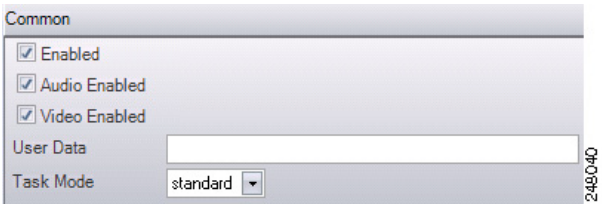


Table 8-25 QuickTime Encoder: Common Settings and Descriptions

Setting	Description
Enabled	Enables this profile for job processing.
Audio Enabled	Enables audio output for this task.
Video Enabled	Enables video output for this task.
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title 'Nightly News' in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata): As an example, in a Windows Media output, the result is a Nightly News.wmv file.
Task Mode	Sets the execution mode for this task: standard, fast start, immediate **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding • If there are no webcasting jobs in progress

Audio/Video (QuickTime Encoder)

Figure 8-35 shows Audio/Video settings. Table 8-26 describes the settings.

Figure 8-35 QuickTime Encoder: Audio/Video Settings

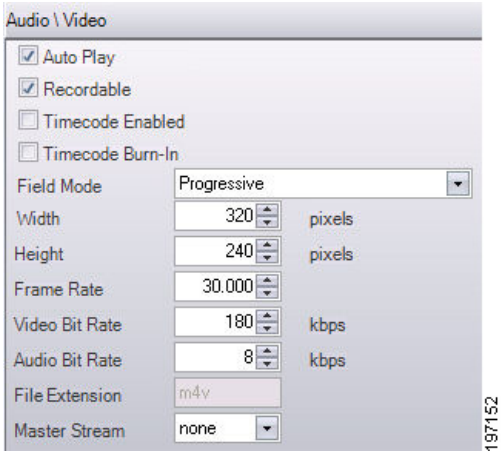


Table 8-26 QuickTime Encoder: Audio/Video Settings and Descriptions

Settings	Descriptions
Auto Play	**Checked**: The clip will begin to play automatically once the file is accessed. **Unchecked**: The end user will be required to click the Play button in the QuickTime Player for the clip to begin.
Recordable	**Checked**: Allows streamed output files to be saved to disk. **Unchecked**: Prevents a copy of the file from being saved. Unchecked is the default state.

Table 8-26 QuickTime Encoder: Audio/Video Settings and Descriptions (continued)

Settings	Descriptions
Timecode Enabled/Timecode Burn-In	There are two kinds of QuickTime timecode tracks: regular timecode information that is not displayed and an optional timecode that is displayed at the bottom of the active video region in the QuickTime 7 Pro player (Burned–In). The selections for inserting regular and Burned-In timecode information during a QuickTime encode are controlled by the **Timecode Enabled** and **Timecode Burn-In** checkboxes. Use the two settings in the following way: **Timecode Burn-In checkbox** / **Timecode Enabled checkbox** / **Encoded State** / **Timecode is displayed** / **Timecode is displayable** Checked / Checked / Enabled / Yes / Yes Checked / Unchecked / Disabled / No / Yes Unchecked / Checked / Disabled / No / No Unchecked / Unchecked / N/A / N/A / N/A 
Progressive Download	Determines whether files will be encoded for streaming or for progressive download. Progressive download is a method of delivering audio and video. It uses the standard HTTP protocol to create a stream-like experience for the end user by downloading the file to the local drive and playing the file back as it downloads. Progressive download files do not require a streaming server. **Checked**: The clip will be encoded for progressive download. **Unchecked**: The clip will be encoded for RTSP streaming. **Note**: If Progressive Download is checked, no hinting information will be added to the file. If it is unchecked, hinting information will be added that allows for streaming but slightly increases the size of the encoded file.
Field Mode	Defines whether the video images will be interlaced or progressive. **Progressive**: Each frame is presented sequentially. **Interlaced: Upper/Top Field First**: Images are made up of fields that scan alternate lines. Two fields are required to build a frame. Upper or top fields will be first in the sequence. **Interlaced: Lower/Bottom Field First**: Images are made up of fields that scan alternate lines. Two fields are required to build a frame. Bottom or lower fields will be first in the sequence.
Width	Specifies the width in pixels of the output file. Values are 80 to 2000 pixels. The value is set automatically if the width has been set using the Settings button.

Table 8-26 QuickTime Encoder: Audio/Video Settings and Descriptions (continued)

Settings	Descriptions
Height	Specifies the height in pixels of the output file. Values are 60 to 1200 pixels. The value is set automatically if the height has been set using the Settings button.
Frame Rate	Specifies the frame rate of the encoded output file. The value is set automatically if the frame rate has been set using the Settings button.
Video Bit Rate	Specifies the video bitrate of the output file. Values are 0 to 250,000.
Audio Bit Rate	Specifies the audio bitrate of the output file. Values are 0 to 2000.
File Extension	Specifies the file extension to be used for the encoded output file. Most format selections will prepopulate this box with a default extension value.
Master Stream	Depending on the clip length and the encoding parameters, up to two white frames may appear at the end of a clip. This happens if the encoded audio stream is longer than video. The Master Stream setting overcomes this limitation. Choices are: **None** (default), **Video**, and **Audio**. When Video is selected, the audio duration will be padded or truncated to match the video and vise-versa.

Internal (QuickTime Encoder)

Figure 8-36 shows Internal settings. Table 8-27 describes the settings.

Figure 8-36 QuickTime Encoder: Internal Settings

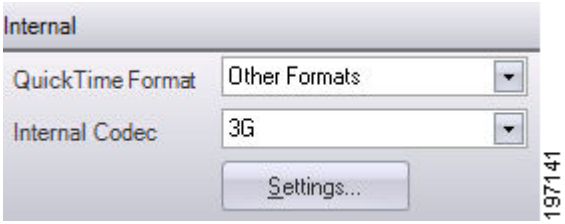


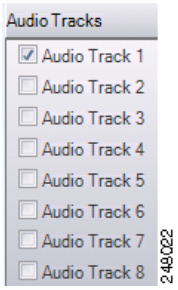
Table 8-27 QuickTime Encoder: Internal Settings and Descriptions

Settings	Description
QuickTime Format	**QuickTime Movie Format**: This selection allows access to any QuickTime plug-in installed on your Cisco MXE 3500 server, generating files with a .mov extension. **Other Formats**: This selection allows access to any QuickTime export plug-in installed on your Cisco MXE 3500 server, generating files with an extension other than .mov.
Internal Codec	Specifies QuickTime's internal codec type.
Settings	Displays the QuickTime dialog(s) for specifying video and audio parameters for the selected format.

Audio Tracks (QuickTime Encoder)

Figure 8-37 shows Audio Tracks.

Figure 8-37 QuickTime Encoder: Audio Tracks



The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks drop-down allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder.

You may select as many tracks as are supported by the encoder. For example, if the encoder supports up to four outputs, you can select up to four of the preprocessor outputs, and they will be mapped to the encoder output in order.

The individual encoders allow you to determine if the output of the encoder is stereo (two different channels) or mono, where stereo inputs to the encoder will be averaged, and one output channel will be created from the pair.

Real Encoder

This section includes the following topics:

Introduction to the Real Encoder

The Real encoder produces output that can be heard and viewed on the Real Player and all other applications that are able to play material encoded for the Real format.

See also: Adding an Encoder Profile to a Job Profile, page 8-4.

Understanding Real Encoder Settings

The Real Encoder Profile allows you to adjust the following settings:

Common (Real Encoder)

Figure 8-38 shows Common settings. Table 8-28 describes the settings.

Figure 8-38 Real Encoder: Common Settings

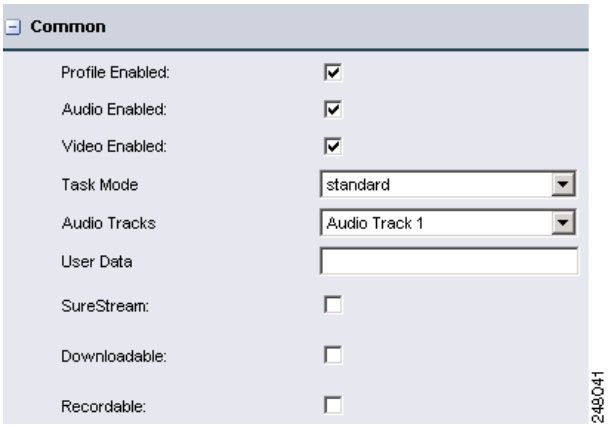
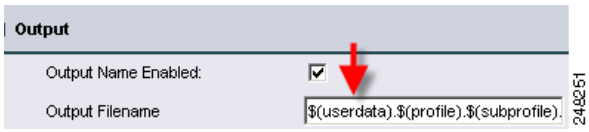


Table 8-28 Real Encoder: Common Settings and Descriptions

Settings	Description
Profile Enabled	Check the box to enable this profile for job processing.
Audio Enabled	Enables audio output for this task.
Video Enabled	Enables video output for this task.
Task Mode	Sets the execution mode for this task: standard, fast start, immediate **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding • If there are no webcasting jobs in progress **Immediate**: If you enable Immediate Encoding, the Cisco MXE 3500 will not use an intermediate file, but uses a memory-based interface between the preprocessor and the encoders. This is extremely useful for longer input clips and/or formats with high data volumes, such as MPEG or OMF, where the disk space requirements for intermediate files could become prohibitive. **Note** Since Immediate Encoding uses more memory resources and allows the encoder to control the rate at which the preprocessor provides data, it is not suitable for Live capture situations, only for file jobs.

Table 8-28 Real Encoder: Common Settings and Descriptions (continued)

Settings	Description
Audio Tracks	The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks drop-down allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder. You may select as many tracks as are supported by the encoder. For example, if the encoder supports up to four outputs, you can select up to four of the preprocessor outputs, and they will be mapped to the encoder output in order. The individual encoders allow you to determine if the output of the encoder is stereo (two different channels) or mono, where stereo inputs to the encoder will be averaged, and one output channel will be created from the pair.
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title 'Nightly News' in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata). As an example, in a Windows Media output, the result is a Nightly News.wmv file. 
SureStream	Determines whether the encoded output will be encapsulated using SureStream. This allows multiple bit rates to be encoded into the same file, rather than having a different file created for each bit rate selected.
Downloadable	Determines whether end users will have the ability to download a copy of the file for local playback. By default, this box is not checked, meaning copy protection is enabled.
Recordable	Determines whether end users will be able to record a copy of the encoded file. By default, this box is not checked, meaning copy protection is enabled.
Indexed by search engines	This option is no longer supported by the Cisco MXE 3500.

Network Properties (Real Encoder)

Figure 8-39 shows Network Properties. Table 8-29 describes the settings.

Figure 8-39 Real Encoder: Network Properties

Table 8-29 Real Encoder: Network Properties Settings and Descriptions

Setting	Description
Loss Protection	Protect against packet loss by adding error correction packets to the broadcast stream. If packets are lost, then the Helix™ server may be able to reconstruct the lost packets using the error correction packets. Error correction packets are supported only for broadcast streams that use the UDP transport protocol. This setting is ignored for broadcast streams that use the TCP transport protocol. Loss protection increases the bandwidth only to the stream Helix server. It does not affect the bandwidth of the broadcast streams delivered to the player by the Helix server. Loss protection is most useful when sending a broadcast stream over a lossy network such as the Internet. On the same local area network, loss protection may not be needed.
Real-Time Events	Determines whether to include the real-time events stream in the encoded output. Default is unchecked.

Encoder Properties (Real Encoder)

Figure 8-40 shows Encoder Properties. Table 8-30 describes the settings.

Figure 8-40 Real Encoder: Encoder Properties

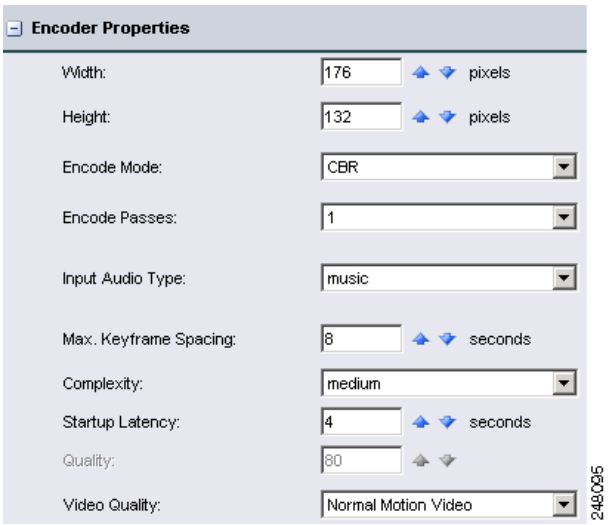


Table 8-30 Real Encoder: Encoder Properties Settings and Descriptions

Setting	Description
Width	Width of finished output defined in pixels. Default is 320.
Height	Height of finished output defined in pixels. Default is 240.

Table 8-30 Real Encoder: Encoder Properties Settings and Descriptions

Setting	Description
Encode Mode	• **CBR**: Constant bit rate (CBR) encoding is the more traditional method of encoding streaming video. It maintains a consistent bit rate for the stream. CBR encoding should be used when streaming at bandwidths below 350 Kbps and when encoding multiple streams into the same clip or broadcast (SureStream). • **VBR Bitrate**: Unlike CBR encoding, variable bit rate (VBR) encoding does not maintain a constant streaming rate. Instead, it has a target average bit rate and a maximum bit rate. VBR encoding generally provides video quality superior to CBR encoding. It gives more bandwidth to scenes that are hard to compress, making the most visible difference in videos that have fast-moving, high-action scenes. VBR is not compatible with SureStream technology. Therefore, only a single stream can be encoded. VBR encoding is suited for bandwidths of 350 Kbps or higher. • **VBR Quality**: Specifies that the encoder should maintain a specified quality level within the constraints of the maximum target bit rate. The target bit rate setting is ignored (the target bit rate and quality settings are mutually exclusive). This setting is also not compatible with SureStream technology. • **VBR Unconstrained Bitrate**: Specifies that the encoder should maintain a specified quality level with no constraints of the maximum target bit rate. This setting is also not compatible with SureStream technology.
Encode Passes	With **two-pass** encoding, which is used only when encoding from a source file, the encoder processes the entire source once to gather information about how best to encode the source file. Then a second pass is made through the source file to encode the streams. Two-pass encoding can substantially increase encode quality, but requires more encoding time. The first pass takes about as long as it would to encode the source file for one target audience. Although two-pass encoding helps for constant bit rate encoding, it provides greater benefit for variable bit rate (VBR) encoding. For **one-pass** encoding, the source is sequentially analyzed in small sections during encoding, creating a string of VBR sections within the clip.
Input Audio Type	Music (default) or Voice
Max. Keyframe Spacing	Defines the maximum time allowed between keyframes. If the interval passes without a keyframe detected, a new keyframe will be created. Values are expressed in number of seconds between keyframes. Added keyframes will be in addition to natural keyframes, and may not be added if natural keyframes occur at sufficient frequency. Values range from 0 to 200 seconds, with 8 as the default value. Keyframes are frames that contain all of the information about the image, without relying on previous or subsequent frames to build the image. Increasing the number of keyframes in the encoded output can increase the quality of the clip. Because keyframes contain more data, increasing the frequency of keyframes can also increase file size. Setting this value to 0 will allow natural keyframes, but will not add any additional.

Table 8-30 Real Encoder: Encoder Properties Settings and Descriptions

Setting	Description
Complexity	This setting determines the balance between encoding time and quality. **Low**: Results in the fastest encoding time, but reduces the quality. **Medium**: Results in a balance between encoding time and quality. This is the default. **High**: Produces the best possible result, but requires the greatest processing and therefore the longest encoding times.
Startup Latency	Specifies a buffer size in seconds that the encoded output uses before beginning streaming when using live webcasting with RealVideo. Startup latency determines how long after the player begins to receive the stream that it is required to display video. The value ensures that the video requires no more buffering once the stream begins. The startup latency does not include the time it takes to launch the player, find the host Helix Server, send the request, and receive the server's response. The startup latency can be increased for videos that stream at low bit rates and start out with high action sequences. The longer latency creates a larger data buffer for the starting sequence, and generally improves the video's appearance. Long latency time may cause restless viewers to stop the presentation before playback begins. The startup latency does not affect how quickly a downloaded clip begins to play. Increasing the latency value, however, can improve the visual quality in downloaded clips that begin with fast-action sequences.
Quality	Determines the desired quality level for the VBR Quality mode. Values range from 0 to 100 with a default of 80.
Video Quality	Video quality mode influences the visual quality of the encoded video. It helps to balance visual clarity against frame rate, and generally has more effect on videos encoded for low bandwidths. It helps to heighten the visual clarity or increase the encoded frame rate. Choose one on the following values: • **Smoothest Motion Video**: Use for video with high-speed motion to provide smoothest image. • **Normal Motion Video**: Use when video contains normal motion. • **Sharpest Image Video**: Use for slow- or low-motion video to provide sharpest image. • **Slide Show Video**: Use for slide presentation type video.

Streams (Real Encoder)

Figure 8-41 shows Stream settings. Table 8-31 describes the settings.

Figure 8-41 Real Encoder: Stream Settings

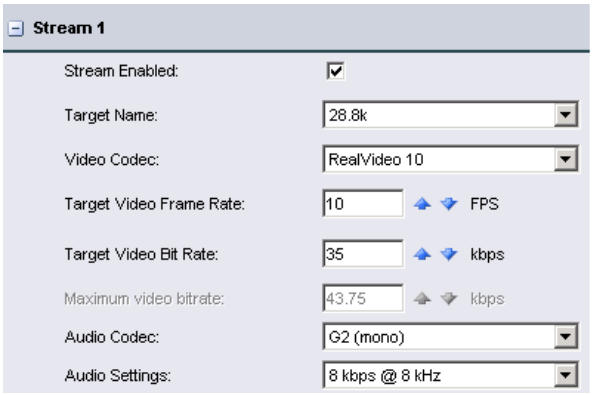


Table 8-31 Real Encoder: Stream Settings and Descriptions

Setting	Description
Target Name	Specifies to the client player the bandwidth requirement of the encoded media.
Video Codec	Specifies which codec will be used. • **RealVideo 10**: RealVideo 10 is the latest video codec and supersedes all previous codecs such as RealVideo 9 and RealVideo G2. This codec requires an automatic software download for the client player if it is not already installed. So, in some instances, older codecs are still used. • **RealVideo 9**: RealVideo 9 is an older version of RealVideo. • **RealVideo 8**: RealVideo 8 is an older version of RealVideo.
Target Video Frame Rate	Defines the targeted maximum number of frames per second (FPS) for the encoded output. Values are from 4 to 30 FPS.
Target Video Bit Rate	Sets the transmission rate for video as a portion of the Target value for the encoded output stream. Values are 4.0 to 5000.0 kilobits per second (kbps)
Maximum video bitrate	Sets the maximum transmission rate for video as a portion of the Target value for the encoded output stream, when the encode mode is VBR Bitrate. Values are 4.0 to 5000.0 kilobits per second (kbps)

Table 8-31 Real Encoder: Stream Settings and Descriptions (continued)

Setting	Description
Audio Codec	Specifies which codec will be used. • **Real Audio10**: Real Audio 10 is the latest audio codec and supersedes all previous codecs. This codec may require an automatic software download for the client player. So, in some instances older codecs are still used. • **Real Audio 8**: This is an older version of Real Audio. • **G2 (Mono)**: This is an older version of Real Audio 8 and should only be used when client player requirements do not support Real Audio 8. • **G2 (Stereo)**: This is an older version of Real Audio 8 and should only be used when client player requirements do not support Real Audio 8.
Audio Settings	Defines the bit rate and sample frequency for the encoded output.

Speech-to-Text Encoder

The Speech-to-Text option enables output of a transcript derived from verbal passages in the audio track.

Activation To use this feature, you must purchase and install the Speech-to-Text feature license on the standalone Cisco MXE 3500 or the Resource Manager device.

The purpose of the Cisco MXE 3500 Speech-to-Text module is rapidly to create text transcriptions from speech in the source audio track. These transcriptions may also include timestamps so that the transcriptions can be synchronized to the video.

Possible Speech to Text uses:

- Automate transcription creation that may then be corrected and edited as part of a captioning or subtitling workflow for Cisco TelePresence meetings, corporate and product training, or corporate briefings.
- Create a data index for searching video media keywords or specific subject matter.

Note Currently, only Live Job Submissions are supported with Speech to Text.

This section includes the following topics:

- Introduction to the Speech to Text Encoder, page 8-66
- Understanding Speech-to-Text Settings, page 8-67

Introduction to the Speech to Text Encoder

The Cisco MXE 3500 uses technology licensed for Nuance, the *Naturally Speaking* transcription engine transform audio sources into WAVE files, simple text transcripts, and XML files suitable for the Graphics Overlay function. See also: Graphics Overlay (Preprocessor), page 6-28.

During initialization, the Nuance speaker and vocabulary files identified in the Cisco MXE 3500 Job Profile are used to configure the Nuance Naturally Speaking transcription engine.

After initialization is complete, the Speech to Text worker receives uncompressed audio samples from the Cisco MXE 3500 Preprocessor. These audio samples are encoded into a standard WAVE file. When encoding of all audio samples is complete, the name of the WAVE file is passed to the Nuance engine for transcription.

The Nuance Naturally Speaking transcription engine reads the contents of the WAVE file and generates timestamped text based upon speech within the file. This text and the associated timestamps are passed to Speech to Text (STT). The text is then written to simple transcription files or merged with a template to generate a file that can be used later as input to the Cisco MXE 3500 Graphics Overlay function.

To create STT output, first create an STT Encoder Profile (if it does not already exist), and add the STT profile to a Job Profile. See also: Creating an Encoder Profile, page 8-2, and Adding an Encoder Profile to a Job Profile, page 8-4.

Understanding Speech-to-Text Settings

The Speech to Text encoder profile allows you to adjust the following settings:

- Common (Speech-to-Text Encoder), page 8-67
- Settings (Speech-to-Text Encoder), page 8-68
- Speakers (Speech-to-Text Encoder), page 8-69

Common (Speech-to-Text Encoder)

Figure 8-42 show Common settings. Table 8-32 describes the settings.

Figure 8-42 Speech-to-Text Encoder: Common Settings

Table 8-32 Speech-to-Text Encoder: Common Settings and Descriptions

Setting	Description
Profile Enabled	Check the box to enable this profile for job processing.
Audio Tracks	Select an audio track from the source file. This is the audio track that will be transcribed. The encoder can only transcribe one audio track per profile.

Settings (Speech-to-Text Encoder)

Figure 8-43 shows Settings. Table 8-33 describes the settings.

Figure 8-43 Speech-to-Text Encoder: Settings

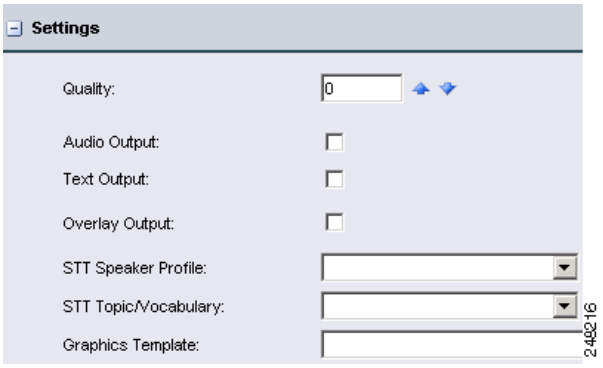


Table 8-33 Speech-to-Text Encoder: Settings and Descriptions

Setting	Description
Quality	The value of this parameter provides a balance between the speed of the transcription process and the accuracy of the transcript. The higher the Quality, the better the output of the transcription. However, a higher value will also reduce the speed of the transcription. Example: 0 - Fastest Example: 100 – Best Quality Values are 0 to 100.
Audio Output	Check this box to produce a WAVE output file. Note: A WAVE file is always created by the Nuance Naturally Speaking transcription engine. If the box is unchecked, the WAVE file will be deleted after the transcription is complete.
Text Output	Check this box to produce a text transcript output file.
Overlay Output	Check this box to produce a Graphic Overlay output file.
Nuance Speaker Profile	During initialization, Speech to Text instructs the Nuance Naturally Speaking engine to load a speaker profile. The speaker profile is a Nuance component that configures speech recognition and other details for a specific speaker or speakers. **Note** The speaker profile name is an integral part of the Nuance system. This is not a file or database created or maintained by the Cisco MXE 3500. As such, the Cisco MXE 3500 does not have direct access to the list of speaker profiles configured in the Nuance system.

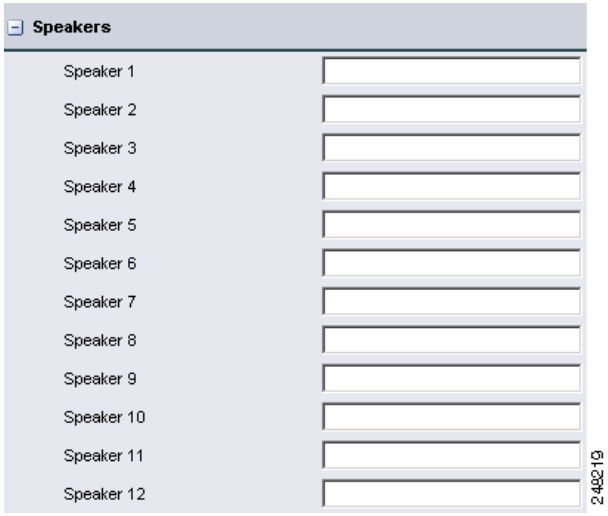
Table 8-33 Speech-to-Text Encoder: Settings and Descriptions (continued)

Setting	Description
Nuance Topic/Vocabulary	During initialization, Speech to Text instructs the Nuance Naturally Speaking engine to load a topic/vocabulary profile. The vocabulary profile is a Nuance component that provides a list of known vocabulary words and their pronunciation. **Note** The vocabulary profile name is an integral part of the Nuance system. This is not a file or database created or maintained by the Cisco MXE 3500. As such, the Cisco MXE 3500 does not have direct access to the list of vocabulary profiles configured into the Nuance system.
Graphics Template	Click the Browse button to display the Locate a graphics template page. The template controls overlay elements such as colors, fonts, and the position of text. Speech to Text (STT) uses the template as a basis for the final Graphics Overlay file. STT starts with the template file and inserts dynamic elements, such as the speaker names and transcribed text. The resulting output is a new file containing the elements in the template combined with the transcription. **Activation** To use this feature, you must purchase and install the Graphics Overlay feature license on the standalone Cisco MXE 3500 or the Resource Manager device.

Speakers (Speech-to-Text Encoder)

List the names of up to 12 speakers found in the audio content. Graphics Overly uses these names to identify the speakers during the introduction chapters of the overlay. Figure 8-44 shows Speakers.

Figure 8-44 Speech-to-Text Encoder: Speakers



WAV Encoder

This section includes the following topics:

Introduction to the WAV Encoder

The WAV encoder creates audio-only Waveform files that can be played back by most audio and media players. See also: Adding an Encoder Profile to a Job Profile, page 8-4.

Note Because WAV files do not store metadata, any metadata entered when a job is submitted will not be included in the output file.

Understanding WAV Encoder Settings

The WAV Encoder Profile allows you to adjust the following settings:

Common (WAV Encoder)

Figure 8-45 shows Common settings. Table 8-34 describes the settings.

Figure 8-45 WAV Encoder: Common Settings

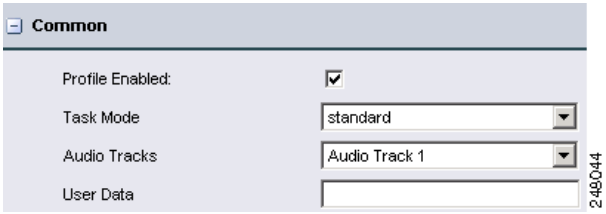
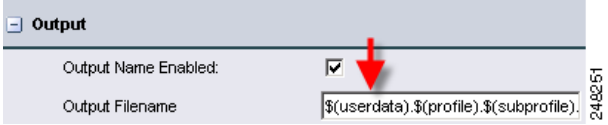


Table 8-34 WAV Encoder: Common Settings and Descriptions

Setting	Description
Profile Enabled	Check the box to enable this profile for job processing.
Task Mode	Sets the execution mode for this task: standard, fast start, immediate **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding • If there are no webcasting jobs in progress I**mmediate**: If you enable Immediate Encoding, the Cisco MXE 3500 will not use an intermediate file, but uses a memory-based interface between the preprocessor and the encoders. This is extremely useful for longer input clips and/or formats with high data volumes, such as MPEG or OMF, where the disk space requirements for intermediate files could become prohibitive. **Note** Since Immediate Encoding uses more memory resources and allows the encoder to control the rate at which the preprocessor provides data, it is not suitable for Live capture situations, only for file jobs.
Audio Tracks	The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks drop-down allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder. You may select as many tracks as are supported by the encoder. For example, if the encoder supports up to four outputs, you can select up to four of the preprocessor outputs, and they will be mapped to the encoder output in order. The individual encoders allow you to determine if the output of the encoder is stereo (two different channels) or mono, where stereo inputs to the encoder will be averaged, and one output channel will be created from the pair.
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title ‘Nightly News’ in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata). As an example, in a Windows Media output, the result is a Nightly News.wmv file. 

Audio (WAV Encoder)

Figure 8-46 shows Audio settings. Table 8-35 describes the settings.

Figure 8-46 WAV Encoder: Audio Settings

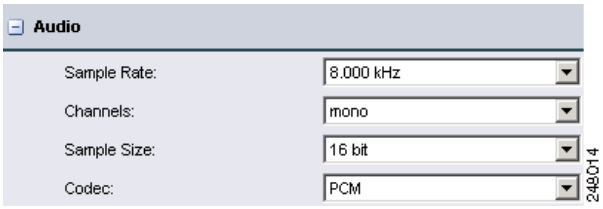


Table 8-35 WAV Encoder: Audio Settings and Descriptions

Setting	Description
Sample Rate	Indicates the sample rate of the audio compression algorithm used for compression. In kHz, values are 8.000, 11.025, 22.050, 44.100, and 48.000.
Channels	Determines the number of audio channels in the output audio stream. • **Mono**: Audio in the output file will be streamed as a single channel. • **Stereo**: Audio in the output file will be streamed in stereo.
Sample Size	Determines the number of bits used for each sample. Valid choices are 8 kbps or 16 kbps. Increasing the Sample Size will result in higher quality output and larger file size.
Codec	Determines which codec will be used for WAV encoding. • **PCM**: Encodes using Pulse Code Emulation (PCM), an uncompressed digital format. This is the default value. • **ULAW**: Uses μ-law algorithms to reduce the size of audio files. This method, referred to as companding (for compacting/expanding), allows maximum increments in the most frequently used audio range, with larger increments beyond the range.

Windows Media Encoder

This section includes the following topics:

Introduction to the Windows Media Encoder

The Windows Media Encoder Profile defines parameters used by Microsoft to determine how clips should be encoded for output to the Windows Media player.

See also: Adding an Encoder Profile to a Job Profile, page 8-4.

Understanding Windows Media Encoder Settings

The Windows Media Encoder Profile allows you to adjust the following settings:

- Common (Windows Media Encoder), page 8-73
- Video Stream (Windows Media Encoder), page 8-76
- Audio Stream (Windows Media Encoder), page 8-78
- Streams 1-5 (Windows Media Encoder), page 8-80

Common (Windows Media Encoder)

Figure 8-47 shows Common settings. Table 8-36 describes the settings.

Figure 8-47 Windows Media Encoder: Common Settings

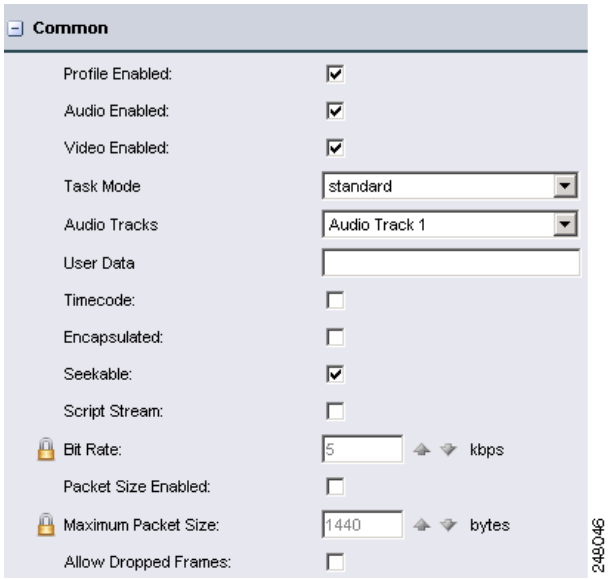


Table 8-36 Windows Media Encoder: Common Settings and Descriptions

Settings	Description
Enabled	Check the box to enable this profile for job processing.
Audio Enabled	Enables audio output for this job.
Video Enabled	Enables video output for this job.

Table 8-36 Windows Media Encoder: Common Settings and Descriptions (continued)

Settings	Description
Task Mode	Sets the execution mode for this task: standard, fast start, immediate. **Standard**: The Cisco MXE 3500 generates an intermediate uncompressed AVI file as the output of the preprocessing step. **Fast Start**: Fast Start reduces the total time required to process a job by starting the encoding process as soon as enough of the image has been preprocessed, rather than waiting for the preprocessing to be completed. You may choose to use this feature when submitting large jobs. Because Fast Start encoding utilizes available computer processing cycles, the Cisco MXE 3500 will use Fast Start encoding only under the following circumstances: • If at most one other clip is currently encoding • If there are no webcasting jobs in progress **Immediate**: If you enable Immediate Encoding, the Cisco MXE 3500 will not use an intermediate file, but uses a memory-based interface between the preprocessor and the encoders. This is extremely useful for longer input clips and/or formats with high data volumes, such as MPEG or OMF, where the disk space requirements for intermediate files could become prohibitive. **Note** Since Immediate Encoding uses more memory resources and allows the encoder to control the rate at which the preprocessor provides data, it is not suitable for Live capture situations, only for file jobs.
Audio Tracks	The Cisco MXE 3500 allows you to define which output channels to include in the final encoded media file. The Audio Tracks drop-down allows you to select the desired output tracks from the preprocessor as input to the encoder. These selected channels then map directly to the encoder. You may select as many tracks as are supported by the encoder. For example, if the encoder supports up to four outputs, you can select up to four of the preprocessor outputs, and they will be mapped to the encoder output in order. The individual encoders allow you to determine if the output of the encoder is stereo (two different channels) or mono, where stereo inputs to the encoder will be averaged, and one output channel will be created from the pair.

Table 8-36 Windows Media Encoder: Common Settings and Descriptions (continued)

Settings	Description
User Data	The data entered in this field will appear anywhere $(user-data) occurs in the XML. An example: If you want to include the title 'Nightly News' in the output file name, you would, in the Encoder Profile, set User Data to: Nightly News. Then, in the Output Profile, set the Output Filename to include $(userdata). As an example, in a Windows Media output, the result is a Nightly News.wmv file. 
Timecode	Choose this option to insert timecodes from the source file into the output file.
Encapsulated	Check this box to specify that output files will be encapsulated as a single file. **Note** When Encapsulated is not checked, only a single output target may be defined in the job profile. To encode multiple, un-encapsulated files, add multiple Windows Media encoder tabs to the job profile.
Seekable	Check this box to allow end users to use the player's controls to view the clip from any point. If unchecked, the clip must be viewed from the beginning.
Script Stream	Check this box to enable event script stream in the encoded output.
Bit Rate	Specifies the size of the event script in kilobytes per second (kbps).
Packet Size Enabled	Check this box to specify a maximum TCP/IP packet size for transmission of the encoded media, or to accept the default size. **Note** If a large packet size is specified, the success of the transmission depends on all hardware and network components in the transmission chain being able to handle the larger packet size.
Maximum Packet Size	Specifies the maximum packet size in bytes.
Allowed Dropped Frames	In the event that frames are not being passed to the Windows Media encoder core due to an inadequate number of cycles, check this box to allow the job to continue even though the output is incomplete.

Video Stream (Windows Media Encoder)

Figure 8-48 shows Video Stream settings. Table 8-37 describes the settings.

Figure 8-48 Windows Media Encoder: Video Stream Settings

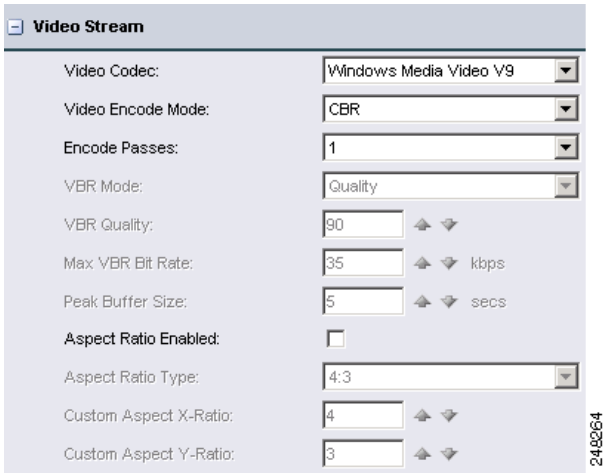


Table 8-37 Windows Media Encoder: Video Streaming Settings and Descriptions

Setting	Description
Video Codec	Specifies the codec to be used for encoding video. Codec options are as follows: **Windows Media Video V9**: This codec may require an automatic software download for the client player, so in some instances older codecs are still used. **Windows Media Video V8**: Windows Media Video 8 is an older version of this codec and is used when the available player is incompatible with the latest version. **Windows Media Video V7**: Windows Media Video 7 is an older version of this codec and is used when the available player is incompatible with the latest version. **ISO MPEG-4 Video V1**: This is the ISO compliant MPEG-4 codec. **MPEG4V3**: MPEG4V3 was the first Windows Media codec and encodes only to .asf files. **Windows Media Screen V7**: This is an older version of the codec used for screen capture recordings and other types of non-standard video. **Windows Media Screen V9**: This codec is used for screen capture recordings and other types of non-standard video. **Advanced Profile**: The VC1 codec supports this profile.
Video Encode Mode	Determines whether the output will be streamed at a variable bit rate (VBR) or a constant bit rate (CBR). • **VBR**: Variable bit rate encoding allows the codec to vary the bit rate of each frame as required by the complexity of the image. High-action scenes, where each frame changes frequently, will use higher bit rates. Lower bit rates will be used for static scenes. • **CBR**: Constant bit rate encoding keeps the same bit rate per frame regardless of the complexity of the video image.
Encode Passes	This option is only available with CBR. It determines how many encoding passes are made. • **1**: Single pass encoding results in faster encoding. • **2**: Two pass encoding results in better quality compression. **Note** Only single pass encoding can be used for live webcasting. Two pass encoding requires the Windows Media Video 9 codec.
VBR Mode	Determines the VBR encoding mode, requiring additional parameters to be set. **Quality**: Specifies that the encoder should vary the bit rate to maintain a specified quality level. **Constrained**: Specifies that the encoder should vary the bit rate, but not to exceed a specified maximum bit rate and peak buffer size. **Unconstrained**: Specifies that the encoder should vary the bit rate with no limits.

Table 8-37 Windows Media Encoder: Video Streaming Settings and Descriptions (continued)

Setting	Description
VBR Quality	Determines the desired quality level for Quality VBR mode. Values range from 0 (low quality) to 100 (high quality).
Max VBR Bit Rate	Determines the maximum bit rate value allowed for variable bit rate video encoding. Enter a value between 10 kilo bits per second to 5 million bits per second. Max VBR bit rate is only available for VBR encoding in Constrained mode.
Peak Buffer Size	Determines the maximum allowed buffer size in seconds for variable bit rate video encoding. Enter a value between 1 and 100 seconds. Peak Buffer Size is only available for VBR encoding in Constrained mode.
Aspect Ratio Enabled	Enable pixel aspect ration, which is the width of the pixel with respect to its height. A square pixel has a ratio of 1:1, but a nonsquare (rectangular) pixel does not have the same height and width.
Aspect Ratio Type	4:3, 16:9, custom
Custom Aspect X-Ratio	Enabled if Type: custom is selected.
Custom Aspect Y-Ratio	Enabled if Type: custom is selected.

Audio Stream (Windows Media Encoder)

Figure 8-49 shows Audio Stream settings. Table 8-38 describes the settings.

Figure 8-49 Windows Media Encoder: Audio Stream Settings

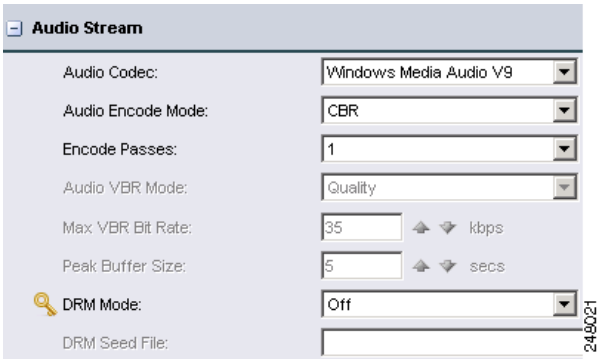


Table 8-38 Windows Media Encoder: Audio Stream Settings and Descriptions

Setting	Description
Audio Codec	Sets which audio codec will be used. • **Windows Media Audio V9**: This is the most recent codec and is used for both voice and music. This codec may require an automatic software download for the client player, so in some instances older codecs are still used. • **Windows Media Audio V9 Voice**: This codec is optimized specifically for voice. • **Windows Media Audio V9 Lossless**: This codec is optimized for lossless compression. • **ACELP.net**: This is an older codec for very low bandwidth voice-only audio.
Audio Encode Mode	Determines whether the output will be streamed at a variable bit rate (VBR) or a constant bit rate (CBR). • **VBR**: Variable bit rate encoding allows the codec to vary the bit rate of each frame as required by the complexity of the image. High-action scenes, where each frame changes frequently, will use higher bit rates. Lower bit rates will be used for static scenes. • **CBR**: Constant bit rate encoding keeps the same bit rate per frame regardless of the complexity of the video image.
Audio VBR Mode	Sets the VBR encoding mode, requiring additional parameters to be set. • **Quality**: Specifies that the encoder should vary the bit rate to maintain a specified quality level. • **Constrained**: Specifies that the encoder should vary the bit rate, but not to exceed a specified maximum bit rate and peak buffer size. • **Unconstrained**: Specifies that the encoder should vary the bit rate with no limits.
Max VBR Bit Rate	Sets the maximum bit rate value allowed for variable bit rate video encoding. Enter a value between 10 kilo bits per second to 5 million bits per second. Max VBR bit rate is only available for VBR encoding in Constrained mode.
Peak Buffer Size	Sets the maximum allowed buffer size in seconds for variable bit rate video encoding. Enter a value between 1 and 100 seconds. Peak Buffer Size is only available for VBR encoding in Constrained mode.
DRM Mode	The Digital Rights Management (DRM) mode used to encode the output. Values are: none, version 1, or version 7
Select Seed File	The name of the file where the DRM information that was used to encode, and will be used to decode, the output will be stored.

Streams 1-5 (Windows Media Encoder)

Figure 8-50 shows Stream settings. Table 8-39 describes the settings.

Figure 8-50 Windows Media Encoder: Stream Settings

Table 8-39 Windows Media Encoder: Stream Settings and Descriptions

Setting	Description
Enabled	Check the box to activate the stream. **Note** You must check the Encapsulated box in the Common section to enable configuration of multiple streams.
Video Target Name	Specifies to the client player the bandwidth requirement of the encoded media. Select a name based on the end user's Internet connection. For instance, choose xDSL.512\Cable Modem to create output optimized for end users who connect to the Internet using the fastest form of DSL modems, those capable of sustained download exceeding 512 kbps. This is a required field.
Encoder Complexity	Sets the trade-off between the quality of the encoded content and the time that is required to encode the video. Values for this parameter are auto, 0, 1, 2, 3, or 4. 0 is the least complex and 4 is the most complex.
Width	Specifies the width in pixels of the output file. Values are 80 to 2000 pixels. This is a required field.
Height	Specifies the height in pixels of the output file created. Values are 60 to 2000 pixels. This is a required field.
Target Frame Rate	Defines the targeted maximum number of frames per second (FPS) for the encode. Values are .1 to 60 FPS. The default value depends on the Target Name selected. **Note** The number of frames per second in the output file cannot exceed the number of frames per second in the source video.

Table 8-39 Windows Media Encoder: Stream Settings and Descriptions (continued)

Setting	Description
Target Video Bit Rate	Sets the transmission rate for video as a portion of the Target value for the encoded output stream. Values are 10 kbps to 20 million bits per second. The default depends on the target selected. **This is a required field.** **Note** The Target Bit Rate entered in the Video section and the Audio section combined should not exceed the appropriate total bit rate for the selected target. It is possible to exceed the target specified, but poor stream output quality will result.
Video Quality	Adjusts bias by controlling the relationship between the number of frames and the sharpness of the image. Slide the bar to the left (decrease) for more frames and less spatial image quality, or slide the bar to the right (increase) for fewer frames and higher image quality. Values are 0 to 100.
Max Keyframe Spacing	Defines the maximum number of seconds allowed between keyframes. If the interval passes without a keyframe detected, a new keyframe will be created. Values range from 0 to 200 seconds. **Note** Setting this value to 0 will allow natural keyframes, but will not add any additional.
Compression Buffer Size	Specifies the amount of time the encoder uses to achieve an average bit rate. A larger buffer may increase quality but will result in increased latency.
Audio Channels	Determines the number of audio channels in the output audio stream. • **mono**: Audio in the output file will be streamed as a single channel. Stereo sources will be mixed to a single output channel. • **stereo**: Audio in the output file will be streamed in stereo.
Target Settings	Determines the selection of bit rate and sample rate that will be used for audio encoding. The available set of selections depends on the audio codec selected.