



## CHAPTER 5

# Adding Preprocessor Settings to a Job Profile (CLUI)

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**Revised: October 10, 2008, OL-16995-01**

The Preprocessor tab tells the Cisco MXE 3000 how to adjust video, color, and audio settings before incoming video is encoded.

This section includes the following topics:

- [Introduction to the Preprocessor Tab, page 5-1](#)
- [Understanding Preprocessor Settings, page 5-3](#)
- [Video Settings, page 5-4](#)
- [Color and Noise Reduction Settings, page 5-11](#)
- [Advanced Settings, page 5-14](#)
- [Watermark Settings, page 5-19](#)
- [V-Chip Gfx, page 5-21](#)
- [Audio Settings, page 5-24](#)
- [Flash Graphics Overlay, page 5-27](#)

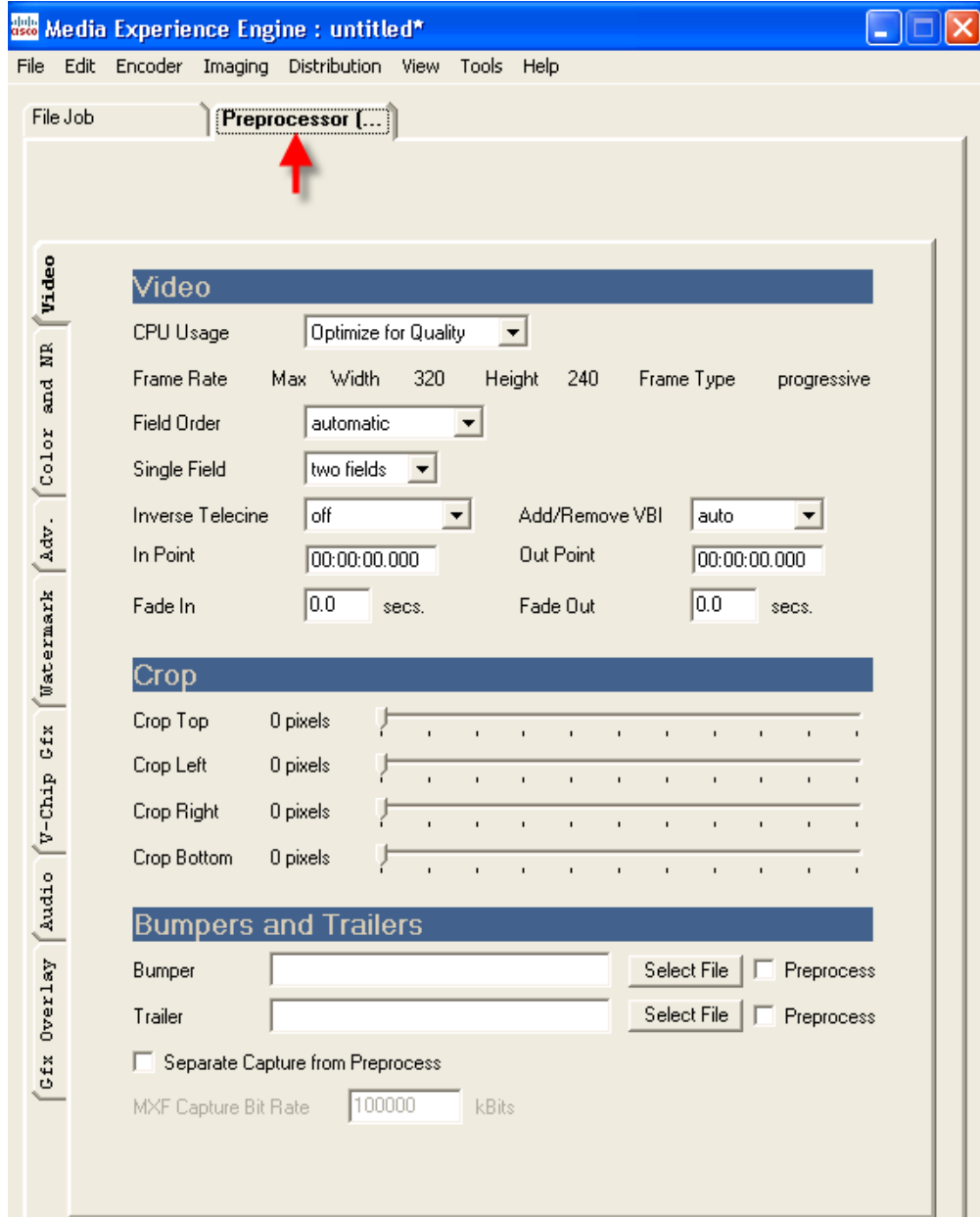
See also: [Working With Jobs in the Preview Window](#).

## Introduction to the Preprocessor Tab

Preprocessor settings allow you to adjust video, color, and audio settings to improve the quality of the incoming video before it is encoded. The Cisco MXE 3000 allows only one preprocessor tab per Job Profile.

When you open the Cisco MXE 3000 UI, the window contains one tab: File Job. To add preprocessor settings, from the main menu, select **File > New Job Profile**. A Preprocessor tab, shown in [Figure 5-1](#), displays.

Figure 5-1 Preprocessor Tab

**Note**

It is possible to save a Job Profile without including a Preprocessor tab, though this is generally only done by advanced users building specialized workflows. A Job Profile that does not include a Preprocessor tab can only be used for submission of \*.REF files.

# Understanding Preprocessor Settings

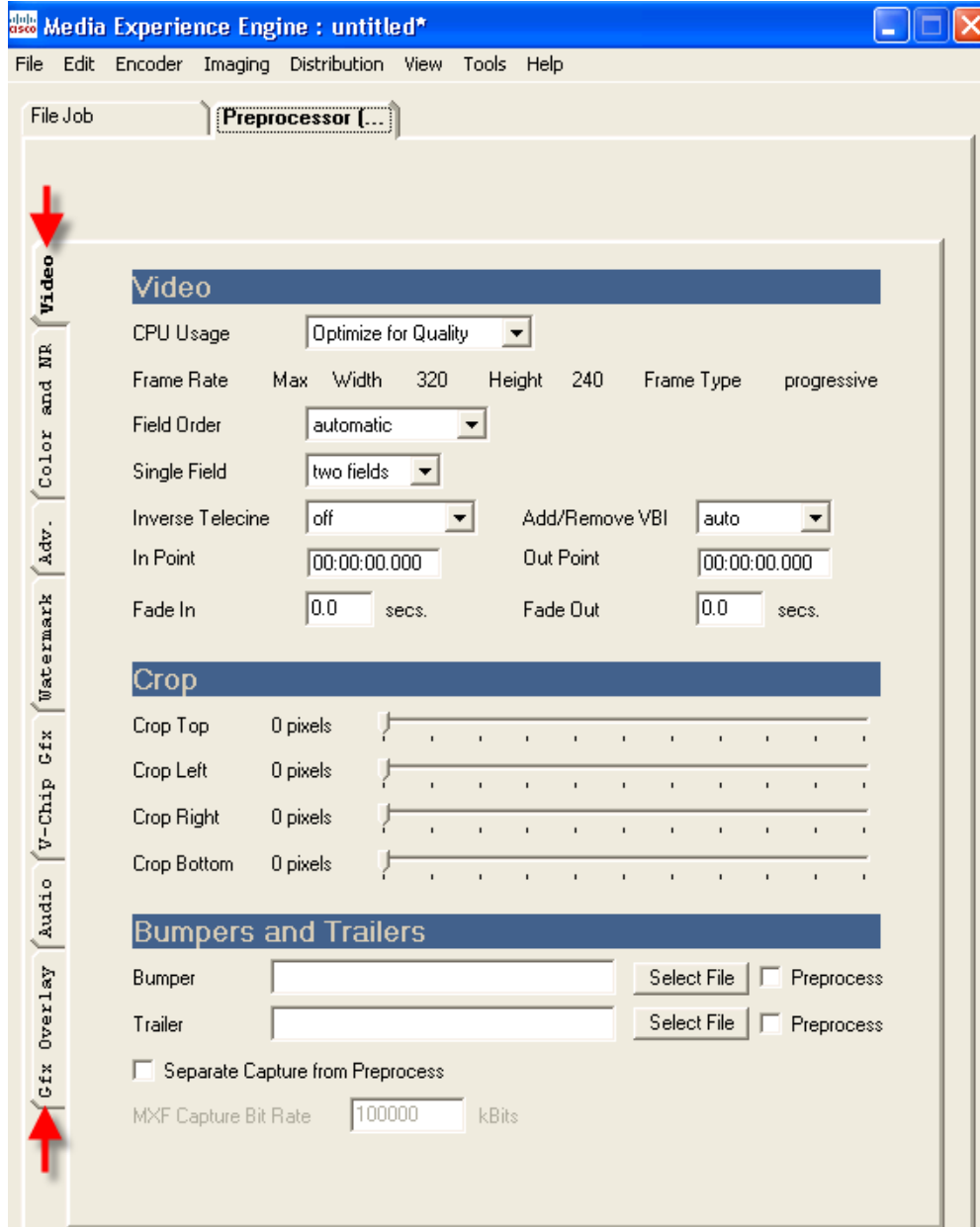
Generally, the type of source footage determines the preprocessor settings. You can modify the settings to make the source footage look as good as possible before encoding. Different settings are used depending on the nature and quality of the incoming video.

The preprocessor allows you to adjust the following settings on the preprocessor subtabs, shown in [Figure 5-2](#):

- [Video Settings](#)
- [Color and Noise Reduction Settings](#)
- [Advanced Settings](#)
- [Watermark Settings](#)
- [V-Chip Gfx](#)
- [Audio Settings](#)
- [Flash Graphics Overlay](#)

See also: [Working With Jobs in the Preview Window](#).

Figure 5-2 Preprocessor Subtabs



## Video Settings

The Preprocessor Video subtab, shown in [Figure 5-3](#), allows you to adjust the following settings:

- [Video](#)
- [Crop](#)
- [Bumpers and Trailers](#)

See also: [Capturing from HD Video Sources](#).

**Figure 5-3** Preprocessor Tab: Video Subtab

## Video

Table 5-1 describes the video settings on the Video subtab.

**Table 5-1** Video Subtab Settings and Descriptions

Setting	Description
CPU Usage	<p>Determines the resources available for preprocessing.</p> <ul style="list-style-type: none"> <li>Optimize for Quality: Both the capture card hardware capability and software preprocessing capabilities will be used. This results in the highest quality output.</li> <li>Optimize for Speed: Only capture card hardware capability will be used for preprocessing, leaving the maximum amount of resources available for encoding and distribution. This results in the fastest preprocessing.</li> </ul>

**Table 5-1 Video Subtab Settings and Descriptions (continued)**

Frame Rate	Indicates the maximum frame rate for the selected encoders. Frame Rate cannot be adjusted from the Preprocessor tab.
Max Width	Determined by the maximum value set on the selected encoder tabs. Width cannot be adjusted from the Preprocessor tab.
Max Height	Determined by the maximum value set on the selected encoder tabs. Height cannot be adjusted from the Preprocessor tab.
Frame Type	Displays the frame type assigned on the MPEG-2 encoder tab. If no MPEG-2 encoder is included in the Job Profile, the display defaults to Progressive.
Field Order	<p>Specifies which field will be used as the top field during de-interlacing.</p> <ul style="list-style-type: none"> <li>• Automatic Top will be automatically detected. This is recommended.</li> <li>• First on Top will be used as the top field.</li> <li>• Second on Top will be used as the top field.</li> <li>• Frame Footage does not require de-interlacing.</li> </ul> <p>If you have selected an incorrect field order, it will be evident in the quality of the output. Some lesser-used formats will incorrectly report field order. Also, AVI and other formats may not specify the field order. If setting Field Order to Automatic yields poor results, specify First on Top or Second on Top.</p>
Single Field	<p>Specifies the method used to de-interlace interlaced video before it is encoded.</p> <ul style="list-style-type: none"> <li>• Single Field Only: The top field will be interpolated. Half of the temporal information will be omitted because only information from the first field will be used. Recommended for fast-motion video.</li> <li>• Two Fields Blend: Both fields are blended into a single Progressive field. All temporal information will be maintained. Recommended for slow-moving or stationary video images.</li> </ul>

**Table 5-1** Video Subtab Settings and Descriptions (continued)

Inverse Telecine	<p>Inverse Telecine algorithm tracks the 3:2 pull-down cadence even in portions of the media where, due to a lack of motion, the cadence is difficult to detect. The chance of a telecine phase change is 80% at every edit point.</p> <p><b>Note</b> Inverse Telecine is not compatible with Temporal Smoothing. If Temporal Smoothing is turned on (set greater than 1), then Inverse Telecine cannot be used. Requesting both results in a warning message, and Inverse Telecine is disabled. Inverse Telecine in the Perfect mode can be used when the media is known to have an unchanging telecine phase.</p> <p>This setting is used to reverse the frame insertion performed by the telecine process when film is converted to video. Inverse Telecine will remove inserted frames, which are unnecessary.</p> <ul style="list-style-type: none"> <li>• Off processes video with frames as they are. Telecine frames will be retained, if they are present.</li> <li>• The Cisco MXE 3000 will try to detect the telecine pattern and recreate the original frames. It constantly analyzes and adjusts to discontinuities (due to an edit, for example) in the telecine pattern. This is the most commonly used mode.</li> <li>• Perfect 3:2 analyzes the footage and then adheres to a pattern without dynamically adjusting it. This mode should be used on unedited footage that was created using a 3:2 pull-down process.</li> </ul> <p><b>Note</b> Perfect 3:2 does not work when Audio Drift Compensation is enabled in Audio Preferences.</p>
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**Table 5-1 Video Subtab Settings and Descriptions (continued)**

Add/Remove VBI	<p><b>Note</b> Only use this control when the vertical cropping is turned off.</p> <p>This setting helps maintain proper aspect ratios when converting between media types that do not both require a VBI. For example, if the a broadcast format is being converted to a Web format, the VBI will be stripped from the video before adjusting image size, thus preserving the overall aspect ratio of the media.</p> <ul style="list-style-type: none"> <li>• Yes: VBI will be stripped from VBI sources and added to non-VBI sources.</li> <li>• No: No action taken.</li> <li>• Auto: If the incoming source contains a VBI and the output media does not, it will be added. If the input media has no VBI and the output is to an analog broadcast format, the VBI will be added.</li> </ul> <p>You can use this feature to strip the VBI out and put in such a way that the aspect ratio is maintained when you go from one format to another. We suggest leaving this feature set to the default settings.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• When it is set to Auto, and the input height is 480 (or 486) and the output height is 512, or if the input height is 576 and the output height is 608, 32, or 26, blank VBI lines are added at the end of the preprocessing stage.</li> <li>• If the input is 512 and: <ul style="list-style-type: none"> <li>– VBI is set to Yes, 32 top lines will be cropped off (similar to setting the vertical cropping to 32)</li> <li>– VBI is set to Auto and the output is 480 (or 486) or 32 (or 26) lines will be removed before preprocessing.</li> </ul> </li> <li>• If the input is 608 and: <ul style="list-style-type: none"> <li>– VBI is set to Yes, 32 top lines will be cropped off (similar to setting the vertical cropping to 32)</li> <li>– VBI is set to Auto and the output is 576, 32 lines will be removed before preprocessing.</li> </ul> </li> </ul>
In Point	<p>Marks the point in time, relative to the beginning of the clip, to start encoding. In points and out points are used when only a section of a larger file will be encoded. In points are marked in hh:mm:ss:mmm, where the last section is milliseconds.</p>
Out Point	<p>Marks the point in time, relative to the beginning of the clip, to stop encoding. Out points are marked in hh:mm:ss:mmm, where the last section is milliseconds.</p> <p><b>Note</b> In points and out points are not related to video timecodes. They are measured strictly in time elapsed from the start of the clip. Technically, they are not frame accurate, but allow frame accurate capture because they measure to the millisecond.</p>

**Table 5-1 Video Subtab Settings and Descriptions (continued)**

Fade In	Determines the number of seconds to fade-in from black to full brightness at the beginning of the video clip. Values range from 0 to 10 seconds. Fade In time is appended to the absolute beginning of the preprocessed file including any bumpers that may be added. The default value is 0.
Fade Out	Determines the number of seconds to fade out from full brightness to black at the end of the video clip. Values range from 0 to 10 seconds, with 0 seconds the default. Fade Out time is appended to the absolute end of the preprocessed file including any trailers that may be added.

## Crop

Crop settings are used to trim unwanted material from the outer edges of the incoming video image. All crop settings are expressed in source video pixels, and the default value for each is 8.

Crop settings do not change the frame size of the finished output. Non-uniform crop results in changes to the aspect ratio of the image in the output file. For film-based input that requires a non-uniform crop, it is important to match the encoder output size to the cropped input size manually to avoid distorting the image.

[Table 5-2](#) describes the crop settings.

**Table 5-2 Video Subtab Crop Settings and Descriptions**

Setting	Description
Crop Top	Determines the number of pixels to trim from the top of the incoming video image.
Crop Left	Determines the number of pixels to trim from the left side of the incoming video image.
Crop Right	Determines the number of pixels to trim from the right side of the incoming video image.
Crop Bottom	Determines the number of pixels to trim from the bottom of the incoming video image.

## Bumpers and Trailers

[Table 5-3](#) describes the bumpers and trailers settings.

**Table 5-3 Video Subtab Bumpers and Trailers Settings and Descriptions**

Setting	Description
Bumper	Specifies the file to be used as a bumper at the introduction of the encoded clip. Movie files of any Cisco MXE 3000 supported format or still files saved with a .mov file extension can be used as bumpers.
Trailer	Specifies the file to be used as a trailer to follow the encoded clip. Movie files of any Cisco MXE 3000 supported format or still files saved with a .mov file extension can be used as trailers.

**Table 5-3 Video Subtab Bumpers and Trailers Settings and Descriptions (continued)**

Preprocess	<p>Specifies whether to apply preprocessor settings to the bumper file.</p> <ul style="list-style-type: none"> <li>• <b>Checked:</b> Specifies that preprocessor settings should be applied to the bumper clip. Use the On setting for video clips that have similar requirements to those of the source footage.</li> <li>• <b>Unchecked:</b> Specifies that the bumper clip will not have preprocessor settings applied. The clip will be appended to the beginning of the source footage as it is. Use the Off setting for animated GIFs or other bumper files that do not require the same preprocessing as the source footage.</li> </ul>
Separate Capture from Preprocess	<p>Instructs the Cisco MXE 3000 to separate the real-time audio and video capture step from the preprocessing step. As a result, the Cisco MXE 3000 will not apply the preprocessor setting until the media acquisition is entirely completed.</p> <p>This mode is recommended for encoding jobs with non-standard frame sizes such as 400x300 and/or with heavy preprocessor settings such as higher level of blur or noise reduction. Separating the preprocessing from the capture step guarantees that the preprocessing can be performed even while using the capture card as the input device.</p> <ul style="list-style-type: none"> <li>• <b>Checked:</b> Specifies that the preprocessing will occur in two passes. The first pass will capture the input completely, and the second pass will apply the preprocessing</li> <li>• <b>Unchecked:</b> Specifies that the preprocessing will occur normally, i.e. capture and preprocessing together in the same pass.</li> </ul>
MXF Capture Bit Rate	See also: <a href="#">Capturing from HD Video Sources</a> .

## Capturing from HD Video Sources

The Cisco MXE 3000 supports captures from HD video sources using AJA video capture cards. As set in Tools > Preferences > Deck Control Preferences > Video Format, the following modes are currently supported: 1080i 59.94/50Hz and 720p 59.94/50Hz.

As set in the Preprocessor > Video subtab > CPU Usage, HD captures can only operate in two modes: Optimized for Speed and Separate Capture from Preprocess.

- **Optimized for Speed:** The incoming video is processed by a lower-quality video scaler (if necessary) bypassing the main preprocessing pipeline. This is useful for encodes that do not require any scaling.
- **Separate Capture from Preprocess:** Use this setting for higher quality encodes that require scaling and other preprocessing features. In this mode, a two-stage preprocessing is employed. On the first stage, the incoming video is encoded into a high-bitrate MPEG2/I-frame only MXF format. The actual MXF bitrate is set on the Preprocessor tab > MXF Capture Bit Rate. The valid bitrate range is 50 to 300 Mbits. On the second stage, a regular file-based preprocessing is executed off that MXF file. At this point, all user-selected preprocessing settings are applied. The intermediate MXF file can be kept or deleted, depending on whether you check the MXF Capture box on the Tools > Preferences > General Preferences tab or the Distribution > Output tab. Currently there is no distribution option available for the intermediate file.

**Limitations:**

- The HD AJA cards have to be installed in the 64-bit PCI slots capable of passing data at HD rates. A high-performance PCI slot should yield ~230MBytes/sec or better.
- Only I-frame-only HD MPEG2 immediate encodes can be performed in the Optimized for Speed mode. There are not enough CPU cycles to perform immediate Long-GOP encodes. This may change over time when faster CPUs hit the market.
- In Separate Capture from Preprocess mode, the bitrate of the intermediate MXF file can substantially affect the capture performance/sustainability. Use the lowest bitrate that meets your needs. Slower disks may contribute to capture overruns.

**Note**

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Currently, the Cisco MXE 3000 does not support VBI processing of any kind for HD captures.

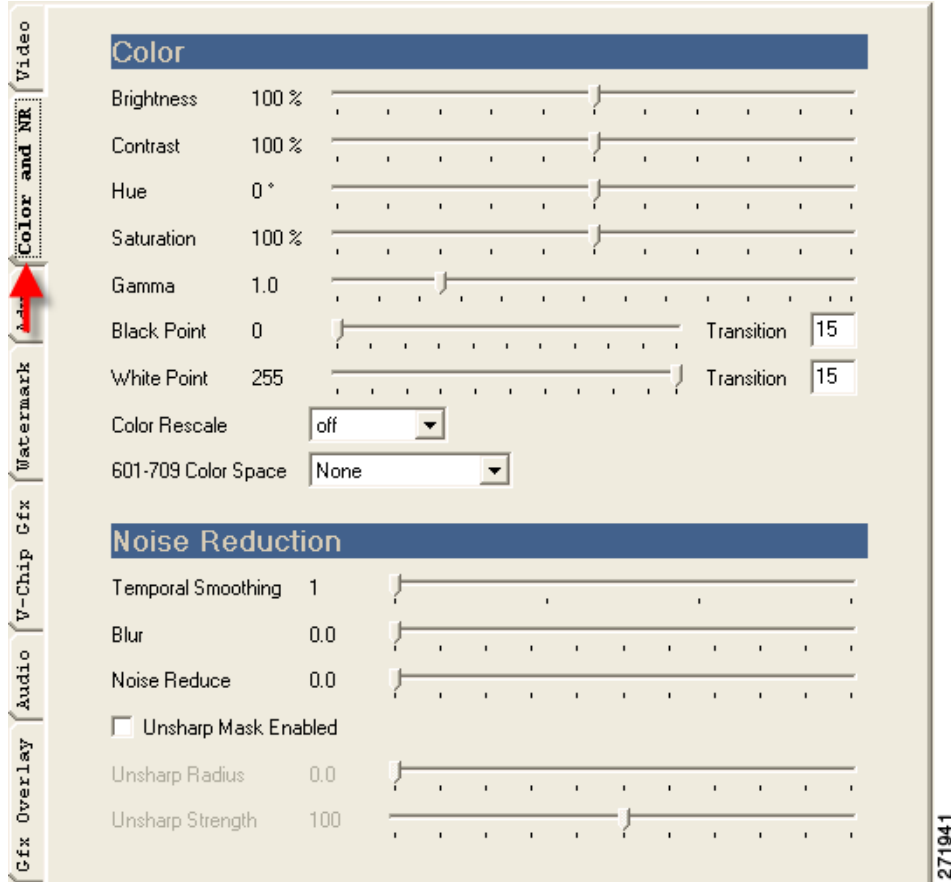
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## Color and Noise Reduction Settings

The Color and Noise Reduction subtab, shown in [Figure 5-4](#), is used to modify the following settings that will affect the image quality of the video clip prior to encoding:

- [Color](#)
- [Noise Reduction](#)

Figure 5-4 Preprocessor Tab: Color and Noise Reduction Subtab



## Color

Table 5-4 describes the color settings.

**Table 5-4** Color Settings and Descriptions

Setting	Description
Brightness	Adjusts luminance as measured against the source video. Slider values range from 50% (half as bright) to 150% (one and a half times as bright). The total value range is from 0 to 200%. Default value is 100%, which leaves brightness unchanged.
Contrast	Adjusts separation between the blackest black and the whitest white. Slider values range from 50% to 150%. The total valid range is 0 to 200%. The default value is 100%, which leaves color unchanged.
Hue	Adjusts hue of colors in the video from red (decrease) to green (increase). Slider values range from $-10^{\circ}$ to $+10^{\circ}$ . The total value range is $-180^{\circ}$ to $+180^{\circ}$ . The default value is $0^{\circ}$ .
Saturation	Adjusts the amount of color in the video image expressed as a percentage of source video color. Slider values range from 50% to 150%. The total valid value range is 0 (remove all color) to 200 (double the color). The default value is 100%.

**Table 5-4 Color Settings and Descriptions (continued)**

Gamma	Adjusts the mid-range (gray) luminance values of the video. This adjusts the luminance of mid-range colors, leaving black and white values unchanged. The mapping is applied in RGB space and each color channel independently receives the color correction. Slider values range from 0 to 40. The total value range is 0 to 255. The default value is 1.0.
Black Point	<p>Defines the threshold for 100% black. Any pixel below the number entered here will be converted to black. Slider values range from 0 to 40. The total valid value range is from 0 to 255. The default value is 0. Setting black point higher will reduce detail in the dark areas of the video increasing compression quality.</p> <p>Transition: Sets the amount of smoothing between black and surrounding colors. Black Point affects only pixels below the threshold set. Lower the value to maintain the sharpest transition, or increase the value for smoother transition. Values are 0 to 255. The default value is 15.</p>
White Point	<p>Defines the threshold for 100% white. All pixels above the number entered will be converted to white. Values range from 0 to 255. The default value is 255. Setting the white point lower will reduce detail in the light areas of the video, increasing compression quality.</p> <p>Transition: Sets the amount of smoothing between white and surrounding colors. Lower the value to maintain the sharpest transition, or increase value for smoother transition. Values are 0 to 255. The default value is 15.</p>
Color Rescale	<p>Determines whether color will be expanded from video levels (16-235) to computer levels (0-255). Default value is Yes. Most video formats set 100% black (7.5 IRE) to 16 when mapped to 8 bit sampling and 100% white (100 IRE) to 235. Most computers set 100% black to 0 and 100% white to 255. Color rescale expands the range by mapping 16 to 0 and 235 to 255 to ensure that the color range is optimized for computer display.</p> <ul style="list-style-type: none"> <li>• On: Luminance and color levels will be expanded from video levels (16-235) to computer levels (0-255). This is the default setting.</li> <li>• Off: Luminance and color levels will be unchanged from video levels (16-235).</li> </ul> <p>If encoded video looks murky, with no true blacks or true whites, Color Rescale may be Off when it should be On. If encoded video has too much black and white, one possible cause may be that Color Rescale is On when it should be Off.</p>
601-709 Color Space	<p>Determines how color will be adjusted during conversion from HD to SD or SD to HD.</p> <ul style="list-style-type: none"> <li>• 601(SD) – 709(HD)</li> <li>• 709(HD) – 601(SD)</li> </ul>

## Noise Reduction

Table 5-5 describes the Noise Reduction settings.

**Table 5-5** Noise Reduction Settings and Descriptions

Settings	Descriptions
Temporal Smoothing	Defines how frames are combined for interframe smoothing. This setting specifies the number of input frames to average when constructing an output frame. Values range from 1 to 4 frames in terms of the input frame rate from the source. The default value is 1, which results in no smoothing (a frame compared to itself will be an exact match).
Blur	Specifies how much to blur the source footage. Slider values range from 0 to 4.0. The total value range is 0 to 10.0. Blur is generally used at lower bit rates to reduce image detail, which improves the overall appearance of the finished clip at high compression rates.  Blurring degrades the image but enables better compression.
Noise Reduce	Used to remove small, irregular detail from the source video. The range of values refers to the size of the detail to be removed. Slider ranges are 0 to 3.0. The total valid values range from 0 to 6.0. The default value is 0.
Unsharp Mask Enabled	Used to enhance edge detail in the image without enhancing other detail. If checked, the Unsharp Radius and Unsharp Strength sliders are activated. <ul style="list-style-type: none"> <li>Checked: Indicates that Unsharp Mask smoothing will be used. This reduces compression efficiency, but can improve perceived clarity of the image.</li> <li>Unchecked: Indicates that Unsharp Mask smoothing will not be used. This is the default value.</li> </ul> Unsharp Mask reduces compression efficiency, but can improve the perceived quality of the image. This is recommended for some video formats, such as VHS, and for multigenerational images where a sharper image is desired.
Unsharp Radius	Used only when Unsharp Mask is set to Yes. Increase the value to increase sharpening on larger objects within the image. Slider values range from 0 to 8.0. Default is 0.
Unsharp Strength	Used only when Unsharp Mask is set to Yes. Increase the setting to add strength to the sharpening effect. Slider values range from 0 to 200. The total range of valid values is 0 to 200. Default value is 100.

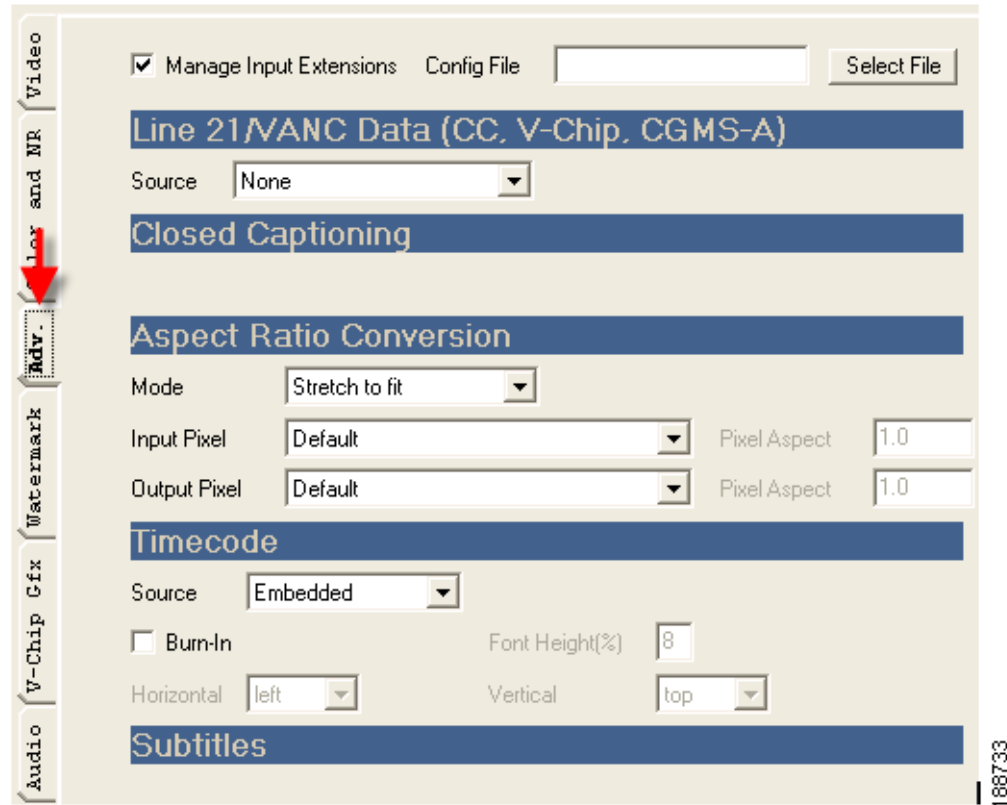
## Advanced Settings

The Preprocessor Advanced subtab, shown in Figure 5-5, allows you to adjust the following settings:

- [Manage Input Extensions/Enable UGV Extensions](#)
- [Line 21/VANC Data](#)
- [Closed Captioning](#)
- [Aspect Ratio Conversion](#)

- Timecode
- Subtitles

Figure 5-5 Preprocessor: Advanced Subtab



## Manage Input Extensions/Enable UGV Extensions

Table 5-6 describes the Manage Input Extensions settings.

**Table 5-6** *Advanced: Manage Input Extensions/Enable UGV Extensions*

Setting	Description
Manage Input Extensions	<p>This option allows you to handle file extensions based on a configuration file.</p> <p>First, follow these instructions:</p> <ol style="list-style-type: none"> <li>1. Create and save a file that matches the XML format in the following example:           <p>Proprietary File Handling XML</p> <pre>&lt;extensions&gt;   &lt;extension input="ts" treat-as="mpg" /&gt;   &lt;extension input="" treat-as="gxf" type="directshow" /&gt;   &lt;extension input="mp4" type="directshow" /&gt;   &lt;extension input="avi" type="quicktime" /&gt; &lt;/extensions&gt;</pre> <p>In the example above:</p> <ul style="list-style-type: none"> <li>• Line 2 tells the Cisco MXE 3000 to treat .ts extensions as .mpg extensions and to decode them using the default pipeline.</li> <li>• Line 3 tells the Cisco MXE 3000 to treat files without an extension as .gxf (Grass Valley) files and to decode them using DirectShow.</li> <li>• Line 4 tells the Cisco MXE 3000 to use DirectShow to decode .mp4 files.</li> <li>• Line 5 tells the Cisco MXE 3000 to use QuickTime to decode .avi files.</li> </ul> </li> <li>2. From the Cisco MXE 3000 Client User Interface Preprocessor tab, select the Advanced tab.</li> <li>3. Check the new Manage Input Extensions box, click the Select File button, and browse to the new XML file (created in Step 1).</li> </ol> <p><b>Note</b> Currently, the “treat-as” option cannot be combined with type=“quicktime”</p>

## Line 21/VANC Data (CC, V-Chip, CGMS-A)

You can select to add Line 21/VANC settings to the output by specifying the source from the options described in [Table 5-7](#).

**Table 5-7** Line 21/VANC Settings and Descriptions

Source Setting	Description
VBI (Line 21)	<p>The Cisco MXE 3000 passes the Line 21 information found in the Vertical Blanking Interval (VBI) of the source media to the encoded output. The output encoding differs depending upon the selected option.</p> <ul style="list-style-type: none"> <li>• CC pass thru to VBI</li> <li>• CC pass thru to MPEG user data</li> </ul>
Embedded (Line 21 /VANC)	<p>The Cisco MXE 3000 passes the closed captioning information found in the MPEG user data of the source media (currently only in MPEG-2 based .mov and intermediate .ref files) and in an embedded VANC track (currently only in Avid DNxHD .mov files) to the encoded output. The output encoding differs depending upon the selected option.</p> <ul style="list-style-type: none"> <li>• CC pass thru to VBI</li> <li>• CC pass thru to MPEG user data</li> </ul>

## Closed Captioning

This feature is not supported currently by the Cisco MXE 3000.

## Aspect Ratio Conversion

The Aspect Ratio Conversion tools provide several methods for scaling media between various formats. For example, an image with a 4:3 aspect can be converted to a 16:9 aspect, or vice-versa.

The Cisco MXE 3000 makes use of pixel aspect ratio information in the conversions and uses default assumptions about the pixel aspect ratio based on the pixel dimensions of an image. For example, an image size of 720x480 or 720x486 is assumed to be SD NTSC, and is assigned the NTSC pixel aspect ratio of 0.9. For complete control, the user may explicitly set both the input media pixel aspect ratio and the pixel aspect ratio for the preprocessor output image.

The input dimensions are read from the input media. The preprocessor output dimensions are set by the encoder which receives the preprocessed video. Remember that in the case where the preprocessor is supplying data for more than one encode, it produces the largest of the requested dimensions. The Aspect Ratio Conversion tools specify how to convert the input media to the preprocessor output.

Select one of the following options from the Mode drop-down described in [Table 5-8](#).

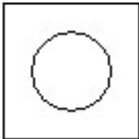

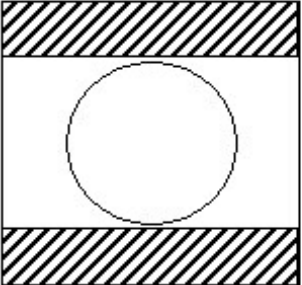
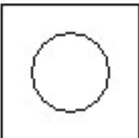

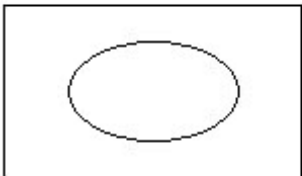
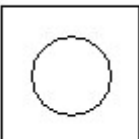

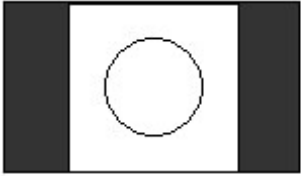
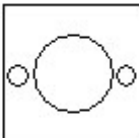

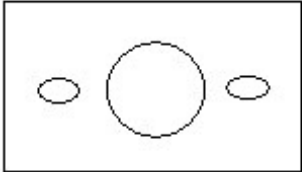
**Table 5-8 Aspect Ratio Conversion Settings and Descriptions**

Setting	Description
Mode	<ul style="list-style-type: none"> <li data-bbox="634 394 1471 520">• <b>Stretch to fit:</b> This mode stretches or shrinks source media format to the dimensions of the preprocessor output. There is no adjustment to preserve the original aspect ratio of the image. The pixel aspect ratio settings are not used.</li> <li data-bbox="634 533 1471 751">• <b>Cropping:</b> This mode changes image size without stretching the image. The Cisco MXE 3000 scales the image linearly, so that the output image is completely covered. The input and output image edges match in either the horizontal or vertical direction. Some of the image is lost to cropping in the other direction. The cropping is done equally from top and bottom or right and left. Cropping mode uses the supplied pixel aspect ratio information.</li> <li data-bbox="634 764 1471 989">• <b>Letterbox, Curtains:</b> This mode linearly scales the images until they are completely held within the boundaries of the output dimensions. Unused space in the vertical direction introduces black bars (letterboxing) equally on the top and bottom of the output image. Alternately, if there is unused space horizontally, black bars (curtains) appear on the left and right sides of the output image. Letterbox/Curtains mode uses the supplied pixel aspect ratio information.</li> <li data-bbox="634 1001 1471 1192">• <b>Non-linear Stretch:</b> This mode stretches the image more at the edges and not at all in the center. The non-linear stretching is in the horizontal direction; the vertical scaling is linear. This option can, for example, provides a full 16x9 output image from 4x3 source with no distortion near the image center. Non-linear stretch mode uses the supplied pixel aspect ratio information.</li> </ul>
Input Pixel / Output Pixel	<p data-bbox="623 1207 1471 1360">These allow you to inform the Cisco MXE 3000 of the input and output formats for the purpose of setting the pixel aspect ratios. With the default option, the Cisco MXE 3000 makes certain assumptions based on the image dimensions. With the custom option, you can explicitly set other numerical values for the pixel aspect ratios.</p>

## Aspect Ratio Conversion Examples

Examples are shown in [Figure 5-6](#).

**Figure 5-6** Aspect Ratio Conversion Example

	Original Image	Output Image Size	Conversion
Crop			
Stretch to fit			
Letterbox			
Non-linear stretch			

## Watermark Settings

The Watermark subtab, shown in [Figure 5-7](#), allows you to select a file to be used as a graphic watermark (sometimes called a "bug" that normally appears as an overlay in the lower corner of the screen - not to be confused with a forensic watermark as set on the Preprocessor tab > Forensics subtab) and set options for the location and appearance of the watermark.

Figure 5-7 Preprocessor Tab: Watermark Subtab

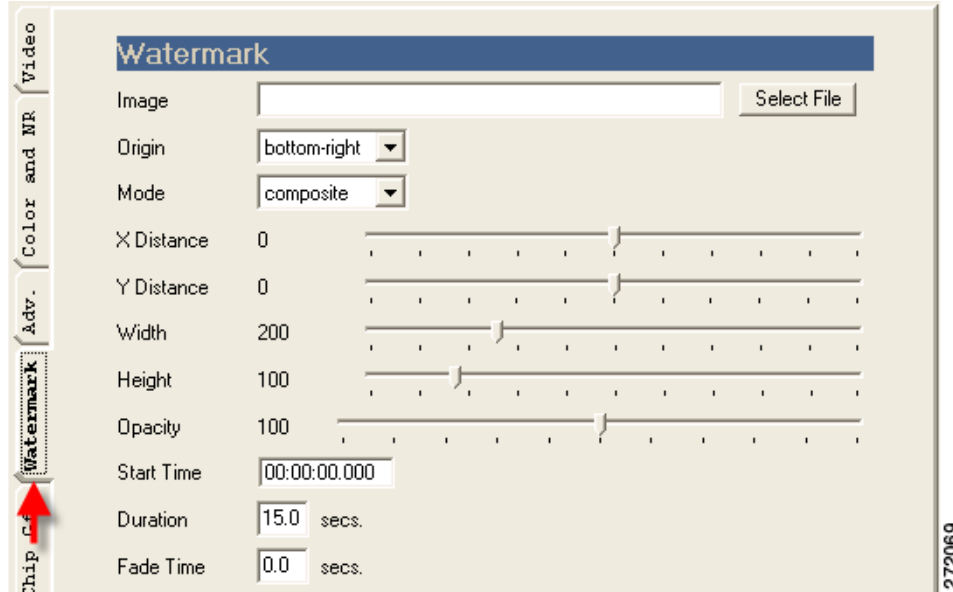


Table 5-9 describes the watermark settings.

Table 5-9 Graphic Watermark Settings and Descriptions

Setting	Description
Image	Determines which image file will be used as a watermark. The drop-down shows files available from the Watermark directory. The format of the watermark file must be .psd, .tga, .pct, or .bmp.
Origin	<p>Identifies the reference point from which X Distance and Y Distance will be measured.</p> <ul style="list-style-type: none"> <li>• Bottom-right: Watermark placement will be relative to the lower right corner of the source image.</li> <li>• Bottom-left: Watermark placement will be relative to the lower left corner of the source image.</li> <li>• Top-right: Watermark placement will be relative to the upper right corner of the source image.</li> <li>• Top-left: Watermark placement will be relative to the upper left corner of the source image.</li> </ul> <p>The watermark placement is expressed in terms of the input stream for ease of use. The Cisco MXE 3000 resizes the watermark accordingly and places it on the encoded output. This is important because the watermark is unaffected by other Preprocessor settings (except fade).</p> <p>If crop settings are set for the incoming video on the Video subtab, watermark placement will be measured from the new edges defined by the crop settings.</p>

**Table 5-9** *Graphic Watermark Settings and Descriptions (continued)*

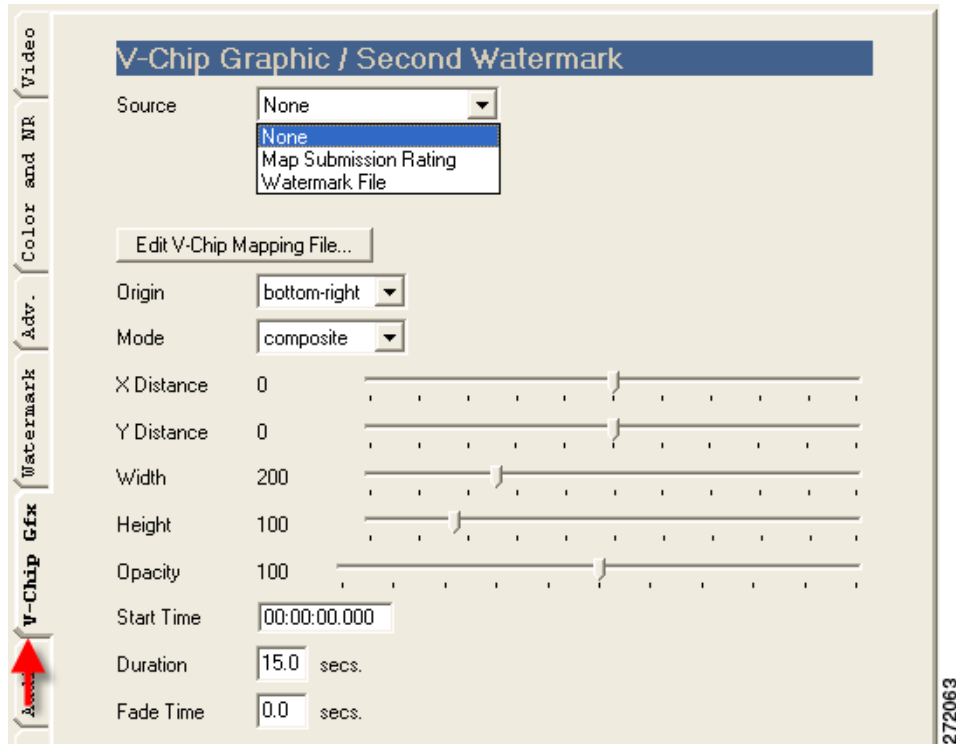
Mode	Determines the display mode for the watermark image. <ul style="list-style-type: none"> <li>• Composite: Straight composite of the watermark onto the source video. If an alpha channel is present, it is used in the compositing.</li> <li>• Luminance: The luminance and hue of the image is altered according to the luminance and hue of the watermark.</li> </ul>
X Distance	Changes the location of the watermark image on the finished output file. This setting changes the placement of the watermark along the horizontal axis of the image. X-distance is expressed in pixels of the source image x coordinate. Allowed values range from -768 to +768. The default value is 0, which places the image at the selected Origin.
Y Distance	Changes the location of the watermark image on the finished output file. This setting changes the placement of the watermark along the vertical axis of the image. Values range from -768 to +768. The default value is 0, which results in no change in the placement of the image.
Width	Determines the width of the watermark in terms of pixels of the source image. Values range from 1 to 768. The default value is 200.
Height	Determines the height of the watermark in terms of pixels of the source image. Values range from 1 to 576. The default value is 100.
Opacity	Determines how opaque or transparent the watermark image will be. The watermark can be made more or less noticeable by adjusting the opacity. Values are 0-200%. The default value is 100%. In Composite mode, this is effectively an 'alpha' value, where 100% means full opacity. In Luminance mode this parameter effectively adjusts the strength of the watermark.
Start Time	This entry specifies the time when the watermark will appear, measured from the beginning of the clip. The format is HH:MM:SS.mmm, where the mmm are milliseconds.
Duration	This entry specifies the length of time in seconds that the watermark will be applied.
Fade Time	This entry specifies the length of time in seconds it takes for the watermark to fade-in and fade-out. Fades happen within the duration time of the watermark, so a fade-in begins at the start time, and a fade-out finishes when the duration has expired.

## V-Chip Gfx

V-Chip Gfx can be used to insert a rating watermark based on the job's V-Chip settings, or it can enable a second watermark similar to the Watermark subtab. [Figure 5-8](#) shows the V-Chip Gfx settings.

See also: [Creating a V-Chip Rating Watermark](#).

Figure 5-8 Preprocessor Tab: V-Chip Gfx Subtab



## Creating a V-Chip Rating Watermark

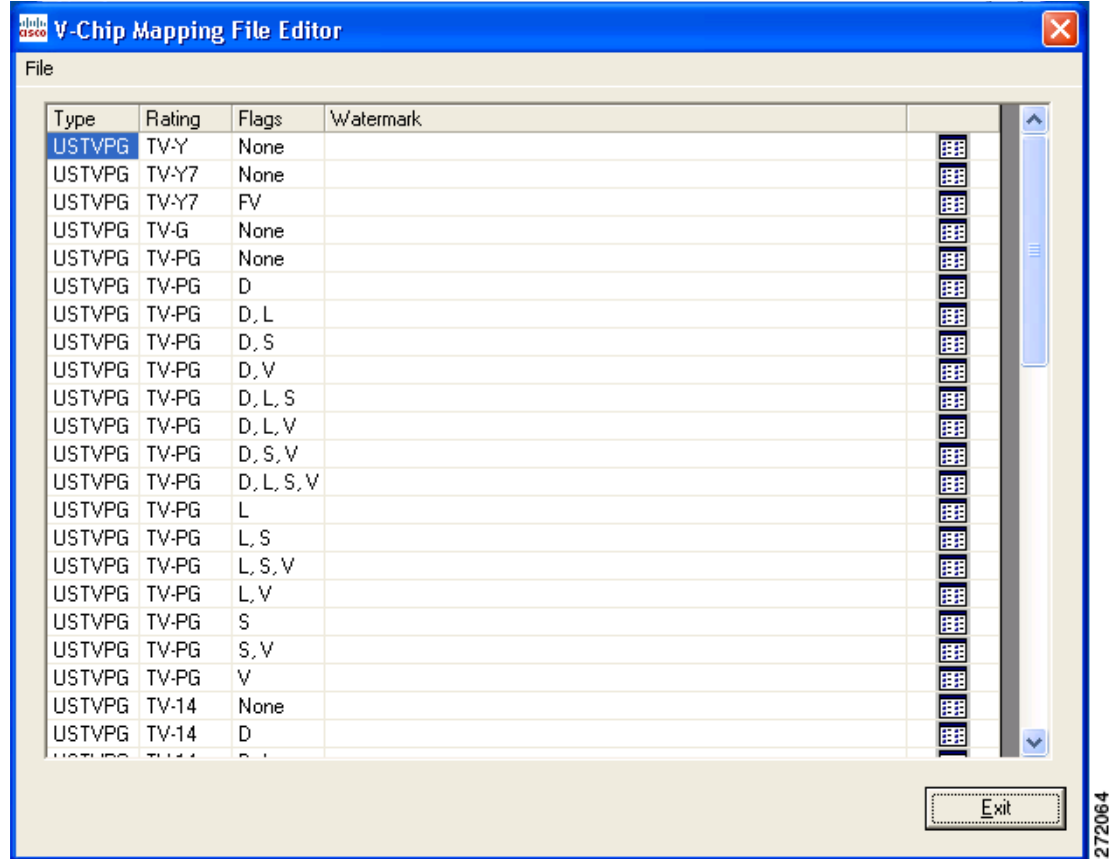
### Procedure

- Step 1** From the File Job tab > Advanced subtab > V-Chip section, set the Rating Type, Rating, and Rating Flags for this job.
- Step 2** On the Preprocessor > V-Chip Gfx subtab, shown in [Figure 5-8](#), from the Source drop-down, select **Map Submission Rating** and select a mapping file.

or

Click the **Edit V-Chip Mapping File** button to define the mapping of each rating to a corresponding image file, shown in [Figure 5-9](#). You must choose an option in the File menu item to open an existing mapping file or create a new one.

Figure 5-9 V-Chip Mapping File Editor



**Step 3** On the V-Chip Gfx subtab, adjust the remaining settings to control the appearance of the rating watermark, as described in [Table 5-10](#).

Table 5-10 V-Chip Graphic / Second Watermark Settings and Descriptions

Setting	Description
Source	<p>The source pull-down menu has three choices:</p> <ul style="list-style-type: none"> <li>None disables the subtab, so no watermark is produced.</li> <li>Map Submission Rating causes the Mapping File entry box to appear, which allows a mapping file to be specified. The mapping file associates different watermark image files with various V-Chip ratings. The V-Chip rating is selected at run time on the File Job tab &gt; Advanced subtab &gt; V-Chip section.</li> <li>Watermark File causes the Image entry box to appear, which allows a single watermark image to be specified. The intent is that this can be used to specify a second watermark image in addition to whatever is specified on the Watermark subtab.</li> </ul>
Edit V-Chip Mapping File	<p>This button brings up a window containing a V-Chip Mapping File template. In order to edit this, you must first select either New or Open from the File menu at the top of the window. The Mapping file is saved with a file name, and this name can be used in the Mapping File entry box described above. The icons on the right side of the V-Chip Mapping File Editor activate file-pickers for the V-Chip rating images.</p>

## Audio Settings

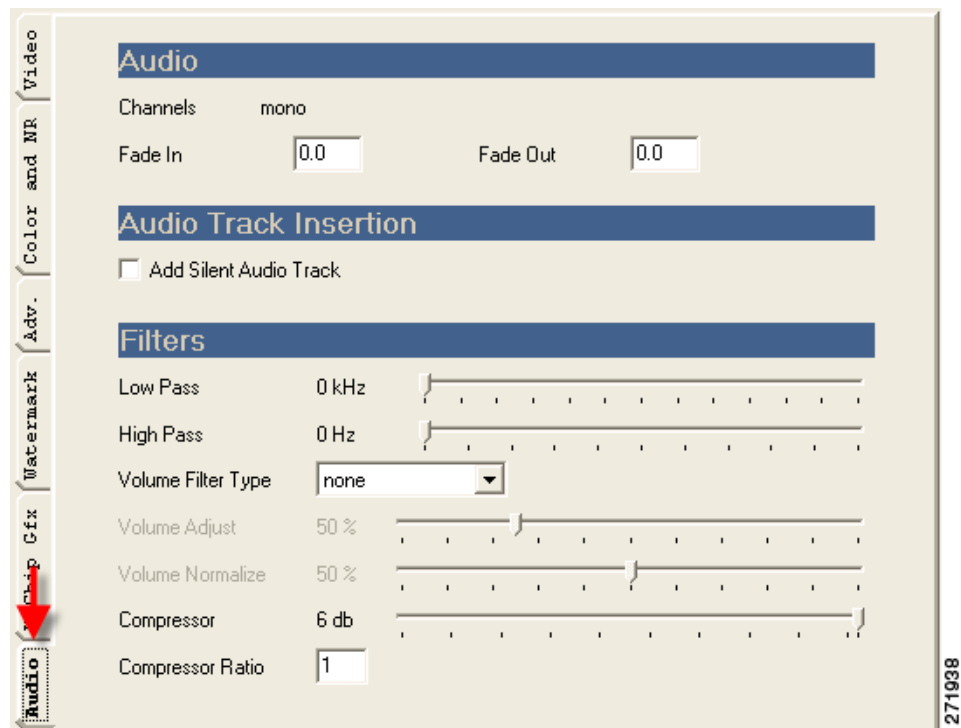
The Audio subtab is used to modify settings after any mixing and mapping and before encoding. These settings affect the audio quality of the video clip.

The Audio subtab, shown in [Figure 5-10](#), allows you to adjust the following settings:

- [Audio](#)
- [Audio Track Insertion](#)
- [Filters](#)

See also: [Assigning Audio Tracks to Final Encoded Output](#).

**Figure 5-10** Preprocessor Tab: Audio Subtab



## Audio

Table 5-11 describes the Audio settings.

**Table 5-11 Audio Settings and Descriptions**

Setting	Description
Channels	Channels will be determined by the encoder profile(s). They will display Mono or Stereo, but this value cannot be changed from the Preprocessor tab. It will be Mono if all of the audio in all encoder tabs is set to Mono. If any encoder audio is set to Stereo, the output will be Stereo.
Fade In	Amount of time allotted for linear fade-in from silence at beginning of clip. Defined in seconds. Values range from 0 to 10 seconds with 0 seconds as the default. Default value is 0.0 seconds.
Fade Out	Amount of time allotted for linear fade-out to silence at the end of clip. Defined in seconds. Values range from 0 to 10 seconds with 0 seconds the default.

## Audio Track Insertion

When checked, this option inserts a silent audio track into the decoded output of the Preprocessor. This insertion only occurs if the source file does not contain any audio tracks. If the source file contains audio tracks, this option is ignored.

If an encoder profile is set up to encode audio but the source file does not contain audio, the encoder will fail. A silent audio track can be inserted to provide an audio source to any encoders that expect/require audio.

## Filters

Table 5-12 describes the Filter settings.

**Table 5-12 Filter Settings and Descriptions**

Setting	Description
Low Pass	Suppresses samples above the frequency assigned. Expressed in kilohertz. Slider range is 0 to 24. The default value is 0, which disables the filter. The term Low Pass indicates that lower frequencies are allowed to pass. Audio compression codecs work more efficiently when higher frequencies are suppressed.
High Pass	Suppresses frequencies below a certain frequency. Expressed in kilohertz (kHz). Slider range is 0 to 200. The default value is 0. The term High Pass indicates that high frequencies are allowed to pass. Some types of noise or hum may be present at lower frequencies. Suppressing this noise can improve compression efficiency.

**Table 5-12 Filter Settings and Descriptions (continued)**

Volume Filter Type	<p>Defines how the loudness of the audio is controlled. Specific Filter Type choices can activate a slider control in the lower part of the window.</p> <ul style="list-style-type: none"> <li>• None: No adjustment is made.</li> <li>• Adjust: Specifies the percentage by which the volume will be amplified or attenuated. The units are linear (waveform) units.</li> <li>• Normalize: Specifies the percentage of the full scale that the typical volume should match. The Normalize setting is single-pass: it does not look at the entire audio clip. Instead, it uses a measure of the volume obtained in a fading window of approximately 10 seconds duration. Values range from 0 (silent) to 100 (maximum volume).</li> <li>• 2-Pass Normalize: The entire clip is scaled so that the maximum sample in the clip is normalized to the given value. The 2-pass normalization is valid only with file-based media. Normalization values range from 0 (silent) to 100 (peak sample set to full scale).</li> <li>• 1770 2-pass norm: This option enables audio normalization as defined in the international standard ITU-R BS.1770. The processing is two-pass, meaning that the audio content is scanned once by the Cisco MXE 3000 to measure the loudness, and scanned again to normalize the loudness. ITU-R BS.1770 is commonly used for normalizing 5.1 channel surround-sound media. It may also be used with stereo.</li> </ul> <p>Selecting 1770 2-pass norm displays the Target Volume box. Enter the desired normalization value here in LKFS units, as defined in the standard. These units are similar to dB full-scale units, and are negative. Commonly used values are in the range -17 to -25 LKFS.</p>
Volume Adjust	<p>For the Adjust option, this value specifies the scaling of the output audio. The units are linear (waveform) units as a percentage of the input level. Values are 0% (silent) to 200%, with 50% as the default.</p>
Volume Normalize	<ul style="list-style-type: none"> <li>• For the Normalize option, this value specifies the volume of the output audio. The value is in linear (waveform) units and is a percentage of full scale. Values are 0% (silent) to 100%, with 25% as the default.</li> <li>• For the 2-pass Normalize option, this value specifies the amplitude of the maximum sample in the audio clip. The value is in linear (waveform) units and is a percentage of full scale. Values are 0% to 100%, with 25% as the default.</li> </ul>

**Table 5-12 Filter Settings and Descriptions (continued)**

Compressor	<p>This is a single-pass dynamic range compressor with no look-ahead. Changing this setting is not recommended for use with file-based encoding. The compressor maintains an RMS estimate of the typical audio level with a fading memory time constant of many seconds, and compresses relative to this empirically measured level.</p> <p>The Compressor value is the compression threshold level relative to the typical level measured in decibels of audio power. When the threshold is exceeded, audio loudness is attenuated by the Compressor Ratio. Therefore, lower Compressor values provide more compression. Values are –40 dB to +6 dB.</p>
Compressor Ratio	<p>Determines the amount of attenuation that will occur beyond the point defined in the Compressor threshold field. Values for ratio are 1 (no compression) to 20 (20:1 approaching limit).</p>

## Flash Graphics Overlay

This section includes the following topics:

- [Understanding Graphics Overlay, page 5-27](#)
- [Applying Graphic Overlays, page 5-29](#)
- [Creating a Metadata File, page 5-31](#)
- [Using Animation Controls, page 5-32](#)

## Understanding Graphics Overlay

Cisco MXE 3000 Graphics synchronizes video and metadata with graphic templates during transcoding to produce dynamic multilayered titles, branded graphics, cross promotions, subtitles, captions, and animations. Overlays are suitable for both small screen and large screen applications. Graphic templates are produced with Adobe authoring software used by most creative and design professionals. Editors incorporate built-in scene changes, animations, 8-bit alpha blending, and transitions – all with runtime metadata triggers. Adding graphic overlays to Cisco MXE 3000 output requires two additional inputs:

- A Flash .swf template that defines the attributes of graphical elements including, placement, color, and size. For example, text fields in the template are dynamic variables that are defined at run-time.
- An XML metadata description that defines the specific values for the graphical elements that are to be applied at encoding to the overlay. For example, titling text is supplied so that the same template can be reused on any video clip.

Graphic overlays (geometrical objects, text, metadata text, images, and/or movies) are applied to any Cisco MXE 3000-supported output format. The overlay may be applied to main content, bumpers, and/or trailers. The overlay is applied over media near the end of the preprocessing. The only video preprocessing operation that follows the overlays is forensic watermarking.

You can use any application, including Adobe Flash Pro 8 and Flash Creative Suite 3, Photoshop, and After Effects, that produces an .swf file with version 2.0 ActionScript applications to produce the graphic overlay template. You then create XML metadata control files in a text editor or a custom

application. Using the Cisco MXE 3000 Client User Interface, the graphic overlay template (.swf file) and the metadata (XML) may be applied independently to each segment. The metadata can be applied as a time referenced XML file or can be read from an XML file.

In addition, the Cisco MXE 3000 supports the following file reference methods:

- Path name
- UNC path name
- URL

This section includes the following topics:

- [Spatial Considerations, page 5-28](#)
- [Temporal Considerations, page 5-28](#)
- [End of .swf Movie, page 5-28](#)
- [Rendered Metadata, page 5-28](#)
- [Other Metadata, page 5-28](#)
- [Bumpers and Trailers, page 5-29](#)

## Spatial Considerations

The overlays are always rectangular. They are resized according to the preprocessor output dimension. They are not stretched, so if the image aspect ratio of the overlay and preprocessor output media do not match, the overlay will be sized as large a possible without cropping, meaning that it may not cover all of the output media area. The overlay is centered, so there may be strips on the left and right, or strips on the top and bottom, that are not covered by the overlay.

## Temporal Considerations

The overlay .swf files have a specific frame rate to control playback. This may or may not match the frame rate of the preprocessor output media. In case of a mismatch, the overlay is temporally stretched or compressed to match the output frame rate. Temporal Stretching is done by replicating overlay frames. Temporal Compression is done by discarding overlay frames.

## End of .swf Movie

At the end of an .swf movie, the last frame will continue to be overlaid by default, until the end of the preprocessed output. Other behaviors may be programmed into the .swf file, if needed. For example, an .swf movie can jump back to the beginning and repeat.

## Rendered Metadata

It is possible to change rendered metadata text on the overlay during the preprocessing. This is controlled by a metadata file that specifies lines of text to embed in the overlay at particular times.

## Other Metadata

Metadata can be used to control the Flash overlay movie. For example, it is possible to jump to a different part of the Flash movie. This is set up in the .swf file during the authoring process. A variable is assigned different values to indicate different locations in the .swf movie.

## Bumpers and Trailers

Overlays may also be placed on bumpers and trailers, but they are handled completely independently from the main clip: the information that controls the overlays is specified separately for bumpers and trailers.



### Note

The **Preprocess** box on the **Preprocessor > Video** subtab, shown in [Figure 5-11](#), must be checked for overlays to be placed on bumpers and/or trailers.

## Applying Graphic Overlays

Through the CLUI, the Cisco MXE 3000 allows you to create two kinds of jobs with graphic overlays:

- [Applying Graphic Overlays to a Job with a Job Profile](#)
- [Applying Graphic Overlays to a Job with User-Defined Metadata](#)

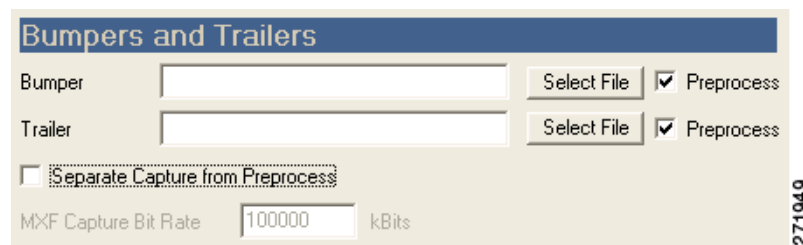
See also: [Viewing the Overlay Metadata Content](#).

## Applying Graphic Overlays to a Job with a Job Profile

### Procedure

- Step 1** From the main menu, click **File > New Job Profile**.
- or
- To add graphic overlays to an existing Job Profile, click **Open Job Profile**.  
A Preprocessor tab displays.
- Step 2** Click the **Video** subtab, and check one or both of the **Preprocess** boxes to the right of Bumper and/or Trailer, shown in [Figure 5-11](#).

**Figure 5-11** Preprocessor: Video Subtab: Checking Bumper and Trailer Preprocess Boxes



- Step 3** Click the **Gfx Overlay** subtab, shown in [Figure 5-12](#).

Figure 5-12 Graphics Overlay Subtab

- Step 4** Under Overlay Content, check the **Enabled** box.
- Step 5** Next to Template File, click **Select File** to locate an .swf template file.
- Step 6** If the .swf requires it, add an .xml file into the Meta-Data File/URL field.
- Step 7** If needed, check the **Enabled** box next to Overlay Bumper and Overlay Trailer.
- Step 8** Select .swf files, and metadata files, if needed.
- Step 9** Continue applying settings to the job, and **Submit** it. See also: [Step 5: Submit the Job](#).

**Note**

The overlay will not be visible in the Preview window but will display in the encoded clip and in the preprocessed .avi intermediate file.

## Applying Graphic Overlays to a Job with User-Defined Metadata

Not to be confused with the graphics overlay metadata, user-defined metadata (UDM) lets you send information to the preprocessor on a job-by-job basis. There are six predefined UDM items that control graphic overlays. These UDM items can override any or all of the overlay parameters set in [Applying Graphic Overlays to a Job with a Job Profile](#).

### Procedure

- 
- Step 1** Add a job to the Job Log. See also: [Step 5: Submit the Job](#).
- Step 2** In the Job Log window, click **Edit > Properties**.
- or
- Right-click the job, and click **Properties**.
- The User Defined Metadata options display.
- Step 3** Double-click in the **Value** column to add the file paths of the template and metadata files.



**Note** If a template .swf file is specified, overlays are automatically enabled, regardless of whether or not you checked the corresponding Enable box on the Gfx Overlay subtab, and the file paths set on the Gfx Overlay tab are overridden.

---

- Step 4** Close the **Properties** pop-up, and continue setting the job.
- 

## Viewing the Overlay Metadata Content

The metadata descriptions listed in [Applying Graphic Overlays to a Job with User-Defined Metadata](#), correspond to database items in the "statisticsType" table of the Cisco MXE 3000 DCS database.

You can view the user-defined metadata items in the prefilter section of the Job XML here:

```
<plan>
  <task>
    <parameters>
      <meta-data>
        <udm-item .... />
    </meta-data>
  </task>
</plan>
```

## Creating a Metadata File

The metadata XML file holds metadata items that are transmitted to the Cisco MXE 3000 Graphics Overlay Flash Player at particular times in the preprocessed clip. These metadata items must have names that correspond to variables in the .swf template file. Use a text editor program to create the XML file. The format of the metadata XML file is defined in [Flash Overlay Metadata XML: Overlay Control Commands](#).

## Setting .SWF File Metadata Variables

This XML is used to communicate metadata and other commands affecting the Flash Overlay. It may be sent via a text file, which takes effect when the encoder starts, or via the event port, where changes can be made in real time during the encoding.

A typical packet of Flash Overlay XML is a sequence of events, each surrounded by an <event> tag.

```
<eventList>
  <event>
    <time>26.5</time>
    <data>
      <var>
        <name>reporter</name>
      </var>
    </data>
  </event>
</eventList>
```

```

        <value>John Smith</value>
    </var>
    <var>
        <name>town</name>
        <value>Boston</value>
    </var>
</data>
</event>
</eventList>

```

Table 5-13 describes the tags.

**Table 5-13** Tags and Descriptions

Tag	Description
<eventList>	This tag encloses all the XML for the Flash Overlay metadata.
<event>	This tag encloses metadata to be used at a particular time. Multiple <event> children are allowed for <eventList>
<time>	This tag encloses the time (floating point, seconds since the start of the clip) for the metadata.
<data>	This tag encloses the metadata to be sent to the Flash player at the specified time <var>. This tag encloses a .swf variable name and value. Multiple <var> children are allowed for <event>.
<var>	This tag encloses a .swf variable name and value. Multiple <var> children are allowed for <event>.
<name>	This tag encloses the name of a variable in the Flash .swf file.
<value>	This tag encloses a value for the variable in the Flash .swf file.



**Note**

The metadata in each <event> is transmitted to the Flash Player at the event time. The events need not be listed in temporal order. The Flash Player may not respond instantly to metadata changes.

## Flash Overlay Metadata XML: Overlay Control Commands

Several commands can be embedded in the metadata XML file to control the appearance of the overlay, and can introduce certain types of animation. These commands are not metadata in the same sense as the <name><value> pairs. They are provided as a more convenient alternative to re-authoring the template file.

The commands control when the overlay appears and disappears. You may also create fades, wipes, and slides.

## Using Animation Controls

Graphic overlays (in addition to their related ActionScript) are usually created with an Adobe program such as Flash After Effects or any program that creates an .swf file. In addition, several graphic templates come preloaded on the Cisco MXE 3000.

The Cisco MXE 3000 offers animation controls that allow certain changes to the appearance of the overlay, via metadata XML tags, and without the need to produce another .swf file. Examples of what animation controls allow you to do:

- Easily create fade-in and fade-out or wipes (slides).
- Use a single .swf file for different media clips, changing only the timing of the overlay appearance.
- Use a .swf file to create a semi-transparent "bug" logo that appears periodically over the video.

To create graphic overlays, complete the following procedure.

#### Procedure

- 
- Step 1** To create and adjust graphic overlays, create the .swf file.
- Step 2** Write the ActionScript.
- Step 3** Use a text editor to write the XML file. See also: [Graphic Overlay XML Reference](#).
- 

## Graphic Overlay XML Reference

This section includes the following topics:

- [Basic Structure of the XML File, page 5-33](#)
- [Structure of an Event, page 5-34](#)
- [Times and Timecodes, page 5-34](#)
- [Event Time and Duration, page 5-34](#)
- [The Live Event, page 5-35t](#)
- [Opacity, page 5-35](#)
- [Transition Control, page 5-36](#)
- [Automatic Repetitions, page 5-37](#)
- [Flash Movie Control, page 5-38](#)
- [Overlay Positioning, page 5-38](#)
- [Examples, page 5-39](#)

### Basic Structure of the XML File

Animation controls go in the Flash Overlay Metadata XML file, which looks like this:

```
<eventList>
<event> . . . </event>
<event> . . . </event>
. . .
</eventList>
```

See also: [Flash Overlay Metadata XML: Overlay Control Commands](#).

- The <event> tags may contain metadata items, timing information, and animation controls. Events start at particular times during the video. An event may specify an action that takes place over an extended period of time, not just at one instant.
- Event tags may not be nested inside other event tags.

- The file is read and parsed whenever the file is modified or saved. The overlay algorithm reads and acts on all of the events that preceded the current time. A simple example is using one event to define the timing of the appearance of an overlay, while another event specifies a metadata value.
- While you can use multiple events, they should not overlap temporally if there is a conflict of functionality. If such events overlap, the result is undefined and may not give the desired effect.

## Structure of an Event

An event tag may contain commands to control:

- Metadata definitions: See [Flash Overlay Metadata XML: Overlay Control Commands](#).  
Metadata definitions may be mixed into any event. These are applied at the beginning of the event and "stick", that is, the metadata values are permanent until changed.
- Animation controls: any of the tags below

These control how and when the overlay appears and disappears, how the Flash movie plays, and how it is positioned on the video.

Every event is required to have a <time>, <starttime>, or <stoptime> tag.

## Times and Timecodes

All tags that refer to time may have values given either in seconds (floating point) or as timecodes. Timecodes simply measure a length of time in HH:MM:SS:ff format instead of seconds; they do not reference any timecode embedded in the media. For example, the <duration> tag may hold a timecode that simply specifies the length of time in HH:MM:SS:ff format. The semicolon notation HH;MM;SS;ff may also be used with the standard meaning (two frames dropped every minute except for every 10th minute). Timecode values should only be used with PAL or NTSC output rates.

For example, <starttime>21.333</starttime> is equivalent to <starttime>00:00:21:10</starttime> (with an NTSC output rate).

The following tags will accept either timecodes or seconds (\* means wildcard):

<time>,<starttime>,<stoptime>,<duration>,<fade>,<wipe->,<slide->,<repeat-period>,<repeat-duration>,<repeat-stoptime>

## Event Time and Duration

[Table 5-14](#) describes and provides examples for the tags.

**Table 5-14** *Event Time and Duration Tags and Descriptions*

Tags and Examples	Description
<starttime> 20.0< /starttime> or <time>	The start time of the event, in seconds, measured from the beginning of the clip. The example shows a start time of 20.0 seconds. <time> may be used as shorthand for <starttime>.

**Table 5-14** *Event Time and Duration Tags and Descriptions (continued)*

<code>&lt;duration&gt; 30 &lt;/duration&gt;</code>	The duration of the event in seconds. By default, the duration is infinite. The example shows a duration of 30 seconds. By default, overlays are removed at the end of the duration, although the details are controlled by the <code>&lt;off-transition&gt;</code> tag.
<code>&lt;stoptime&gt; 50.0 &lt;/stoptime&gt;</code>	May be used instead of <code>&lt;duration&gt;</code> . The duration is the difference between <code>&lt;stoptime&gt;</code> and <code>&lt;starttime&gt;</code> . If the <code>&lt;duration&gt;</code> tag also appears, the shortest time will be used.

## The Live Event

### `<live/>`

- This special tag indicates that the commands enclosed in this event tag are executed immediately. Metadata definitions will be immediately sent to the Flash player renderer for immediate inclusion in the overlay. The `<live/>` tag takes precedence over any `<starttime>` or `<time>` tag in the same event. When the metadata file is saved, the Cisco MXE 3000 will detect this and read the `<eventList>`. The `<live>` event will be assigned a start time equal to the current time.
- The XML file with a `<live/>` tag should have only one event. If there are multiple live events, only the last one in the file will be used.
- The `<live/>` event is reinitialized every time the metadata file is written or saved, so if the metadata file is written while the live event is active, that event may be restarted.
- You can use the `<duration>` tag or `<stoptime>` tag to define the duration of the live event.
- You can use transitions, `<on-transition>` or `<off-transition>`, to make the overlay appear or disappear. Note that in the live case, all transitions are of the `<lag/>` variety; the `<lead/>` and `<center/>` tags have no effect.

## Opacity

### `<opacity-percent> 50 </opacity-percent>`

- This tag defines the maximum opacity for an event. 100 means total opacity, which is the default. You can set this number lower, for example to 50%, to get a semi-transparent overlay for the duration of the event. A partial opacity multiplies any partial opacity due to fade-in or fade-out.

## Transition Control

Table 5-15 describes and provides examples for the tags.



### Note

**Combinations:** It is legal to combine a fade with a wipe or a slide transition, as long as the transition times match. If they do not, the fade time is discarded and the wipe or slide time is used for the fading as well.

**Table 5-15** Transition Control Tags and Descriptions

Tags and Examples	Descriptions
<on-transition> and <off-transition>	These are tags that enclose details of how the transitions happen. By default, the overlay is applied at the start time (this is the on-transition) and removed at the end of the event duration (off-transition). However, these tags can alter this behavior by introducing fades and wipes.
<fade> 1.2 </fade>	This child tag specifies a fade time in seconds, either fade-in or fade-out, depending on whether the parent is an on-transition or an off-transition. The example shows a fade lasting 1.2 seconds
<wipe-right> 1.5 </wipe-right>	This child tag specifies a wipe time in seconds. The wipe travels from left to right. The example shows a wipe lasting 1.5 seconds.
<wipe-left> 2 </wipe-left>	This child tag specifies a wipe time in seconds. The wipe travels from right to left. The example shows a wipe lasting 2.0 seconds.
<wipe-up> 2 </wipe-up>	This child tag specifies a wipe time in seconds. The wipe travels from bottom to top. The example shows a wipe lasting 2.0 seconds.
<wipe-down> 2 </wipe-down>	This child tag specifies a wipe time in seconds. The wipe travels from top to bottom. The example shows a wipe lasting 2.0 seconds.
<slide-right> 1.5 </slide-right>	This child tag specifies a slide time in seconds. The slide travels right from the left. The example shows a slide lasting 1.5 seconds.
<slide-left> 2 </slide-left>	This child tag specifies a slide time in seconds. The slide travels left from the right. The example shows a slide lasting 2.0 seconds.
<slide-up> 2 </slide-up>	This child tag specifies a slide time in seconds. The slide travels up from the bottom. The example shows a slide lasting 2.0 seconds.
<slide-down> 2 </slide-down>	This child tag specifies a slide time in seconds. The slide travels down from the top. The example shows a slide lasting 2.0 seconds.
<lag/>	This child tag specifies that the transitions will lag the event time, that is, the transition begins at the event time. This is the default behavior, unless the <lead> or <center> tags appear.

**Table 5-15 Transition Control Tags and Descriptions (continued)**

<lead/>	This child tag specifies that the transitions will lead the event time, that is, the transition will start early and will complete at the event time.
<center/>	This child tag specifies that the transitions will be centered around the event time, that is, it will start before the event time and finish after the event time.
<nonlinear> 2.0 </nonlinear>	This changes the animation of a transition, making it go faster at one end and slower at the other. It affects fades, wipes, and slides. A value of 1 corresponds to the linear transitions that are used by default. Higher values slow the animation close to the time when the overlay is fully on, and accelerates the animation close to the time when the overlay is fully off. Recommended values are 2.0 to 3.0. Slides, in particular, benefit greatly with nonlinear motion.

## Automatic Repetitions

Table 5-16 describes and provides examples for the tags.

**Table 5-16 Automatic Repetition Tags and Descriptions**

Tags and Examples	Descriptions
<repeat-period> 60.0 </repeat-period>	This specifies that the event will automatically repeat after a delay time given in seconds. The example shows a repeat time of 60 seconds, that is, every 60 seconds after the first occurrence of the event, it will be repeated. Repeating goes on forever, unless constrained with one of the tags below.
<repeat-count> 5 </repeat-count>	This specifies the number of times the event will occur. It is infinite by default. A value of 1 means the event happens one time (as if there were no <repeat-period> tag). A value of 0 turns off the event. The example shows that the event will occur a total of 5 times.
<repeat-duration> 250 </repeat-duration>	This specifies that the event will repeat for a certain period of time given in seconds. When this time expires, the current repetition of the event will complete, and no further repetitions will occur. The example shows a period of 250.0 seconds. If the repeat period was 60 seconds, then this example specifies a total of five occurrences of the event.
<repeat-stoptime> 300 </repeat-stoptime>	This specifies that the event will repeat until the video time exceeds a value given in seconds. When this time is exceeded, the current repetition of the event will complete, and no further repetitions will occur. The example shows that the repetition in progress at 300.0 seconds will be the last one.

## Flash Movie Control

Pausing the Flash player is independent of the overlay process. If the Flash movie is paused, the last Flash frame continues to be used for overlay. By synchronizing <pause> and <resume> with overlay transitions, it is possible to make the movie resume the playback from the same point where the movie stopped when the overlay was removed.

These are 'sticky' states, meaning once an overlay is paused, it will remain paused until there is a resume event, regardless of the presence of other events. Events that do only pause or resume may overlap other events.

Table 5-17 describes the tags.

**Table 5-17 Flash Movie Control Tags and Descriptions**

Tags	Descriptions
<pause/>	Stop the Flash player rendering.
<resume/>	Start the Flash player running from the point at which it was paused.

## Overlay Positioning

Table 5-18 describes the tags.

**Table 5-18 Overlay Positioning Tags and Descriptions**

Tags	Descriptions
<offset-right-pixels>*0</x-offset-right-pixels>	Offsets the overlay horizontally by a given number of pixels. The default is 0.
<offset-left-pixels>*0</x-offset-left-pixels>	Offsets the overlay horizontally by a given number of pixels. The default is 0.
<offset-up-pixels>*10</y-offset-up-pixels>	Offsets the overlay vertically by a given number of pixels. The default is 0.
<offset-down-pixels>*10</y-offset-down-pixels>	Offsets the overlay vertically by a given number of pixels. The default is 0.
<offset-x-pixels>*0</x-offset-x-pixels>	Offsets the overlay vertically by a given number of pixels. The default is 0.
<offset-y-pixels>*0</x-offset-y-pixels>	Same as <offset-up-pixels>
<offset-right-percent>*0</x-offset-right-percent>	Offsets the overlay horizontally by a percent of image width. The default is 0.
<offset-left-percent>*0</x-offset-left-percent>	Offsets the overlay horizontally by a percent of image width. The default is 0.
<offset-up-percent>*10</y-offset-up-percent>	Offsets the overlay vertically by a percent of image height. The default is 0.
<offset-down-percent>*10</y-offset-down-percent>	Offsets the overlay vertically by a percent of image height. The default is 0.
<offset-x-percent>*0</x-offset-x-percent>	Same as <offset-right-percent>
<offset-y-percent>*0</x-offset-y-percent>	Same as <offset-up-percent>

## Examples

This section includes the following examples:

- [Basic Overlay Event](#)
- [Centering the Transitions](#)
- [Spanning Events](#)
- [Flash Rendering Delays](#)
- [Complex Repeating Event](#)

### Basic Overlay Event

This overlay starts at 2 seconds and ends at 2+8=10 seconds, with a 1.5 second fade-in at 2 seconds and a 1.5 second fade-out beginning at 10 seconds. The overlay is completely removed at 11.5 seconds.

```
<event>
<starttime>00:00:02:00</starttime>
<duration>8.0</duration>
<on-transition>
<fade>1.5</fade>
</on-transition>
<off-transition>
<fade>1.5</fade>
</off-transition>
</event>
```

### Centering the Transitions

```
<event>
<starttime>00:00:02:00</starttime>
<duration>8.0</duration>
<on-transition>
<center/>
<wipe-right>1.5</wipe-right>
</on-transition>
<off-transition>
<center/>
<wipe-left>1.5</wipe-left>
</off-transition>
</event>
```

### Spanning Events

It is possible to use one event to turn on the overlay and use a separate event to turn off the overlay, as in this example. In this example the opacity-percent tag is used, and the value 70 must match in both events or there will be a discontinuous opacity change at 5.0 seconds.

```
<event>
<opacity-percent>70</opacity-percent>
<starttime>1.0</starttime>
<on-transition>
<fade>0.5</fade>
</on-transition>
</event>

<event>
<opacity-percent>70</opacity-percent>
<stoptime>5.0</stoptime>
<off-transition>
<fade>0.5</fade>
```

```
</off-transition>
</event>
```

### Flash Rendering Delays

The details of the Flash movie may impact the timing of overlay animation.

Some Flash .swf files do not check the metadata values on every frame, so there may be a significant delay between the time a packet of metadata ( <data> ... </data> ) is sent, and the time it appears in the overlay. One way to deal with this problem is to set up an event to transmit the metadata before it is needed. The example below shows how to send the metadata at time 0 and apply the overlay at time 1, ensuring that the Flash movie is updated before it is overlaid.

```
<event>
<data> <name>scene</name> <value>R</value> </data>
<starttime>0</starttime>
<duration>0</duration>
</event>
<event>
<starttime>1</starttime>
<on-transition/>
</event>
```

### Complex Repeating Event

```
<event>
<data>
<var> <name>name</name> <value>Transition Test 1</value> </var>
<var> <name>name2</name> <value>Transition Test 2</value> </var>
<var> <name>title</name> <value>Graphic Overlay 1</value> </var>
<var> <name>title2</name> <value>Graphic Overlay 2</value> </var>
</data>
<starttime>0</starttime>
<duration>00:00:02:25</duration>
<repeat-period>00:00:04:10</repeat-period>
<repeat-duration>00:00:20:00</repeat-duration>
<offset-down-percent>8</offset-down-percent>
<offset-right>10.0</offset-right>
<on-transition>
<slide-down>00:00:01:00</slide-down>
<fade>00:00:01:00</fade>
<nonlinear>2.0</nonlinear>
<lag/>
</on-transition>
<off-transition>
<fade>00:00:01:00</fade>
<wipe-left>00:00:01:00</wipe-left>
<lead/>
</off-transition>
</event>
```