Matrox RT.X2

User Guide

March 31, 2011

matrox

Digital Video Solutions

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Introducing Matrox RT.X2

This chapter provides an overview of Matrox RT.X2, and describes the available Matrox RT.X2 documentation

Welcome to Matrox RT.X2

Matrox RT.X2 products let you get maximum productivity from Adobe Premiere Pro, and are ideal for corporate communicators, event videographers, project studios, educational facilities, and digital filmmakers. Matrox RT.X2 SD is for users who want to deliver in SD only, while Matrox RT.X2 and RT.X2 LE give you the flexibility to edit, view, and output HD and SD material. For details on all the Matrox RT.X2 products, see the Matrox Video website at www.matrox.com/video.

About this manual

This manual explains how to use Matrox RT.X2 with the provided Matrox software, including how to use your RT.X2 system with Adobe Premiere Pro.

Note Throughout the Matrox RT.X2 documentation, the term "RT.X2" refers to RT.X2, RT.X2 LE, and RT.X2 SD, unless indicated otherwise.

Style conventions

The following style conventions are used in this manual:

- The names of files, directory paths, and manuals appear in *italics*. For example:
  - The data is stored in the *sample.wav* file.
  - The file is located in your *C:\Windows\System* directory.
  - Please refer to your *Matrox RT.X2 Installation Manual*.
- Menus and commands that you need to choose are displayed in the form **Menu > Command**. For example, **File > Save** means click **File** in the menu bar, then click **Save** in the menu that appears.
- The names of keys are displayed in small capital bold letters, such as the **CTRL** key.
- A plus (+) sign is used to indicate combinations of keys and/or mouse operations. For example:
  - **CTRL+C** means to hold down the **CTRL** key while pressing the **C** key.
  - **SHIFT+click** means to hold down the **SHIFT** key while you click an item with the mouse.

How video formats are expressed

With the exception of NTSC and PAL, all SD and HD video formats are expressed in the Matrox RT.X2 documentation and dialog boxes as follows:

VRp or **i** or **PsF** @ **n fps**

Where:

- **VR** is the vertical resolution. For 1440×1080 video, however, both the horizontal and vertical resolutions are specified.
- **p** or **i** or **PsF** represents progressive, interlaced, or progressive segmented frame video.
- @ **n fps** is the frame rate in frames per second.

Here are some examples:

- **486p @ 23.98 fps**   Represents 720×486 progressive video at 23.98 frames per second.
- **720p @ 59.94 fps**   Represents 1280×720 progressive video at 59.94 frames per second.
- **1440x1080i @ 29.97 fps**   Represents 1440×1080 interlaced video at 29.97 frames per second. This format is used for HDV 1080i material.
- **1080i @ 29.97 fps**   Represents full-size 1920×1080 interlaced video at 29.97 frames per second.

Other documentation

In addition to this user guide, the following Matrox RT.X2 documents are available:

- *Matrox RT.X2 Installation Manual*   Provides detailed instructions for installing your Matrox RT.X2 hardware and software, including how to connect your external devices to the RT.X2 breakout box.
- *Matrox RT.X2 Release Notes*   Provides any important last-minute information and known issues.

Your notes

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Calibrating Your DVI Monitor for Video

This chapter explains how to use the Matrox DVI Calibration Utility to calibrate your Matrox RT.X2 DVI monitor for video.

Overview

✎ **Note**   This chapter does not apply to RT.X2 LE or RT.X2 SD.

The Matrox DVI Calibration Utility is a unique tool designed to calibrate your DVI monitor so that it performs like a traditional broadcast video monitor. This utility provides a wizard that walks you through the calibration process using specially designed patterns to effectively identify and compensate for the processing errors that may be present in your DVI monitor. The Matrox DVI Calibration Utility calibrates your monitor's black and white levels, white point, gamma response, and hue and chroma.

ⓘ **Important**   To use the Matrox DVI Calibration Utility, your DVI monitor must support a display resolution of at least 1280×720.

This utility is optimized for calibrating DVI monitors that display the DVI output from RT.X2 at its exact resolution without any scaling. If the DVI output is scaled by your monitor, a blue-only filter will be required to calibrate your monitor's color (hue and chroma). In this case, you must use a third-party blue-only filter (for example, a blue gel filter, or blue-only calibration glasses) that completely blocks out all colors except for blue.

✎ **Note**   This utility is best viewed at a display resolution of 1280×800 or higher.

Calibrating your DVI monitor

The Matrox DVI Calibration Utility provides on-screen instructions to calibrate your DVI monitor. At the end of the calibration process, you must save your calibration settings to a file. Once saved, the calibration settings are automatically loaded as your system's current calibration settings. If you're calibrating more than one DVI monitor, you can calibrate and save settings for each monitor and load the corresponding settings at any time (see). You can later choose to enable or disable the loaded calibration settings (see).

The Matrox DVI Calibration Utility uses the Matrox WYSIWYG Control Panel to display the specially designed patterns that are required to calibrate your DVI monitor. Therefore, you'll need to configure your Matrox WYSIWYG output settings as explained in this section. For more information about using the Matrox WYSIWYG Control Panel, see .

ⓘ **Important**   When running the Matrox DVI Calibration Utility, make sure that you don't run any other application that uses your Matrox RT.X2 hardware, such as Adobe Premiere Pro, or any other application that displays Matrox WYSIWYG output.

⟹ **To run the Matrox DVI Calibration Utility:**

1 Ensure that your DVI monitor is connected to the DVI output on your RT.X2, turn the DVI monitor on, and allow it to warm up for about 20 or 30 minutes.

2 Right-click the 📺 icon on your Windows taskbar and configure your Matrox WYSIWYG output settings as follows:

– **Enable WYSIWYG Output** must be selected.

– Choose **Output Configuration** and on the **Video Output** page, set the DVI output to **RGB - calibrated**. This is required in order to run the Matrox DVI Calibration Utility and output the adjusted RGB DVI video to your DVI monitor.

– All other required Matrox WYSIWYG output settings will be automatically set by the DVI Calibration Utility.

3 Click **OK** to save your video output settings.

4 Right-click the 📺 icon on your Windows taskbar, and choose **Matrox DVI Calibration Utility**.

5 Follow the onscreen instructions to calibrate your DVI monitor.

6 When prompted at the end of the calibration process, save your calibration settings to a file anywhere on your system. Once saved, your settings are automatically loaded as your system's current DVI calibration settings. You can later choose to enable or disable the loaded calibration settings (see "Enabling and disabling the Matrox DVI calibration settings" on page 8).

📝 **Note** The calibration settings file is saved as an *.mtx* file. If you cancel the DVI calibration, or close the utility at any time before saving the calibration settings, the current calibration settings will be lost.

Loading Matrox DVI calibration settings

After calibrating your DVI monitor and saving your calibration settings to a file (see "Calibrating your DVI monitor" on page 6), the calibration settings are automatically loaded as the current DVI calibration settings for your system. You can, however, load another DVI calibration settings file at any time, but only one calibration settings file can be loaded for your system at any given time. Once loaded, you can enable or disable the calibration settings (see "Enabling and disabling the Matrox DVI calibration settings" on page 8).

📝 **Note** If your system has multiple users, the loaded calibration settings apply to the logged on user only.

1   Right-click the ▥ icon on your Windows taskbar, choose **Output Configuration** and on the **Video Output** page, set the DVI output to **RGB - calibrated**.

2   Click **OK** to save your video output settings.

3   Right-click the ▥ icon on your Windows taskbar, and choose **Matrox DVI Calibration Utility**.

4   From the **Welcome** page, click **Load Settings**.

5   When prompted, select your desired *.mtx* calibration settings file, and then click **Open**.

Enabling and disabling the Matrox DVI calibration settings

The DVI calibration settings that are loaded for your system (see "Loading Matrox DVI calibration settings" on page 7) can be enabled or disabled. When using a program that supports Matrox RT.X2 video output, you can configure the Matrox video output settings for that program to enable or disable the loaded DVI calibration settings. For example, you can configure the RT.X2 video output settings that you want to use with Adobe Premiere Pro as explained in "Specifying your video output settings" on page 16.

When you set the DVI video output to **RGB - calibrated**, the video that is output from the RT.X2 DVI output will have the color settings that are saved in the currently loaded calibration file. To disable the loaded calibration settings and output DVI video from RT.X2 with its native color settings, set the DVI video output to **RGB - native**.

📝 **Note**   When you configure your Matrox WYSIWYG output settings, the settings apply to all programs that display Matrox WYSIWYG output. This means that when you set the DVI video output to **RGB - calibrated** using the Matrox WYSIWYG Control Panel, the currently loaded calibration settings will be applied when you preview DVI video using any program that displays Matrox WYSIWYG output, such as Adobe After Effects. For more information about using the Matrox WYSIWYG Control Panel, see "Configuring the Matrox WYSIWYG Control Panel" on page 114.

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Defining Your Adobe Premiere Pro Settings

This chapter explains how to define various settings for using Matrox RT.X2 with Adobe Premiere Pro. This includes creating a new Matrox project, and specifying your sequence and export settings.

Running antivirus software with Adobe Premiere Pro

To avoid having dropped frames or other performance issues when working with your Matrox project, make sure that you disable any antivirus scanning of files while running Adobe Premiere Pro. If possible, schedule your antivirus scanning at a time when you're not using Premiere Pro, such as overnight or on the weekend.

Setting your system's volume levels

To properly capture and play back audio in Adobe Premiere Pro, make sure you've set appropriate recording and playback volume levels for your system as follows:

1 Right-click the speaker icon on the Windows taskbar and choose **Playback Devices**.

Tip If you don't see the speaker icon, right-click the Windows taskbar and choose **Properties**. In the **Notification Area**, indicate that you want the **Volume** icon to be shown.

2 From the list of available devices, double-click the device that you want to use with your Matrox RT.X2 system.

3 Click the **Levels** tab, and for each of the controls (**Line-in**, **Microphone**, etc.) make sure the volume slider is at an appropriate level, such as at midpoint. As well, make sure that each control is **not** muted.

Note If you have an active audio stream connected to an input on your audio card via the RT.X2 breakout box, you must mute the input to avoid hearing the audio when you're not working in Premiere Pro.

4 Click **OK**, and click the **Recording** tab.

5 From the list of available devices, double-click the device (input) that you want to use as the audio source, such as **Line-in**, with your Matrox RT.X2 system.

6 Click the **Levels** tab, and make sure the volume slider is at an appropriate level, such as at midpoint.

7 Repeat steps 5 and 6 for every audio input source that you intend to use with your Matrox RT.X2 system. For example, if you intend on recording audio from a microphone, set the volume levels for the **Microphone** input.

8 Click **OK**.

Creating a new Matrox project

Creating a new Matrox project involves specifying the location of your scratch disks and selecting a Matrox sequence preset. For more information about using the Matrox sequence presets for working with different types of sequences, see Appendix B, "Matrox RT.X2 Workflows."

⇒ **To create a new Matrox project:**

1 Start Adobe Premiere Pro and click the **New Project** icon. The **New Project** dialog box appears. You can leave all the settings on the **General** page at the default settings. For details on changing these settings, see your Adobe Premiere Pro documentation.

2 Click the **Scratch Disks** tab, and use the **Browse** button to select an appropriate A/V drive for each scratch disk type. When specifying the location of your scratch disks, make sure you follow the recommendations in your Adobe Premiere Pro documentation. For example, store your video and audio files on a separate hard drive dedicated to your media assets.

🖈 **Tip** Specifying the same scratch disk settings for all your projects will help shorten the amount of time it takes to open new or existing projects.

3 From the **Location** list, select where you want to save your project.

4 In the **Name** box, specify a name for your project.

5 Click **OK** to save your settings. The **New Sequence** dialog box opens on the **Sequence Presets** page.

6 Under **Available Presets**, select the preset that matches the type of sequence you want to create from the appropriate **Matrox** folder. For example, if you want to create an NTSC sequence and work in a standard 4:3 editing environment, expand the **720×486** and **NTSC** folders under **Matrox - SD**, then select the **Standard** preset.

    Remarks

    – To work with PAL DV clips, make sure that you select a Matrox DV-PAL preset.

    – Matrox RT.X2 SD supports creating SD sequences only. Therefore, the Matrox HD presets are not available on RT.X2 SD.

7 In the **Sequence Name** box, specify a name for your sequence.

8 Click **OK** to apply the settings.

📝 **Note** If you want to export your sequence to a DV-1394 device other than DVCPRO HD, you need to copy or import your Matrox sequence into a native Adobe Premiere Pro sequence. For more details about exporting to tape, see "Exporting your sequence to tape" on page 39.

Defining your player settings

By default, each monitor in Adobe Premiere Pro (Source Monitor, Program Monitor, Trim Monitor, etc.) uses the Adobe Player to play material. However, in order to also preview the video simultaneously on your video monitor when working with Matrox RT.X2, your player settings need to be set to use the Matrox Player. To do this, choose **Edit > Preferences > Player Settings** and choose **Matrox Player** as the default player.

Remarks

- When using the Multi-Camera Monitor to preview a multi-camera sequence, you can choose between single-camera preview (active camera only) and quad-camera preview (all four camera previews) on your video monitor. For single-camera preview, select **Show Preview Monitor** in the Multi-Camera Monitor menu. For quad-camera preview, clear **Show Preview Monitor**.

- You can also use the Matrox Player to preview video played back from the timeline on your video monitor when working in Adobe Encore. To set the default project player to **Matrox Player** in Adobe Encore, go to the **Advanced** page of the **Project Settings** dialog box.

Displaying warnings in Adobe Premiere Pro's Events panel

Matrox RT.X2 uses Adobe Premiere Pro's **Events** panel to issue certain error messages and warnings. To display these, choose **Window > Events**. For more information about using the **Events** panel, see your Adobe Premiere Pro documentation.

A note about realtime playback capabilities

In most cases, Matrox clips and clips supported by Adobe Premiere Pro that match the frame size and aspect ratio of your sequence will play back in real time. For example, an XDCAM EX or P2 720p @ 29.97 fps clip will be realtime in any Matrox 720p sequence. You can also apply various realtime effects to your clips as explained in Chapter 4, "Setting Up Realtime Effects with Adobe Premiere Pro."

When Premiere Pro requires clips to be rendered, a red render bar appears above the clips on the timeline. After playing back your sequence, a red bar will appear over any sections of the sequence that have dropped frames. To ensure that you don't have dropped frames when you export your sequence to tape, you should play back your sequence and render all sections that have a red render bar before performing your export.

Remarks

- For the best quality output when previewing a sequence that has an interlaced video format, make sure that you choose **Display Both Fields** in the Program Monitor menu.

- If you set the playback resolution in the Program Monitor to anything other than full resolution, a yellow render bar may appear above realtime sections of the timeline. However, these sections will still play back in real time.

Defining your sequence settings

The **Matrox Playback Settings** dialog box has several pages that you can use to specify various settings for editing in Adobe Premiere Pro on Matrox RT.X2. When you select a Matrox sequence preset, a Matrox editing mode is automatically set for your sequence, and many settings are optimized for editing on Matrox RT.X2.

(i) **Important**   The general and DV-1394 output settings in the **Matrox Playback Settings** dialog box apply to your entire project. The video output settings, however, are specific to your sequence. Any video output settings you specify for a particular video format will be applied the next time you create a new Matrox sequence in that same format. If you change any of the video output settings, the new settings will be applied to all previously created sequences that have that video format in your project. For example, if you create a new NTSC sequence, the settings you apply for that new NTSC sequence will also be applied to any previously created NTSC sequences in your project.

Specifying your general settings

To specify your general sequence settings on Matrox RT.X2:

1 Choose **Sequence > Sequence Settings** and click the **Playback Settings** button.

2 Click the **General** tab.

General | Video Output | DV-1394 Output

Scrubbing Mode
Frame

Video Luma Level
Broadcast

A/V Sync Adjustment
D   0

Error Reporting
☐ Report dropped frames on playback

Sequence Playback
☑ Postroll after stop
☑ Accelerate playback of non-realtime segments

Realtime Engine
☑ Enable Matrox RT technology
  Premiere Pro Accelerated Effects
  ☑ Accelerate effects and transitions
  ☑ Accelerate Motion

3 Under **Scrubbing Mode**, select **Frame**, **1st Field**, or **2nd Field** to indicate whether you want to display frames or only one field when you scrub a sequence in the **Timeline** panel. For example, you may want to scrub the first or second field to eliminate the flickering that can be seen in your picture when you pause while scrubbing interlaced video. Scrubbing fields can also be used to check for any dropped fields that may have occurred in your video during a telecine process.

📝 **Note**   The scrubbing mode will be set to **Frame** if you're working with a sequence that has a progressive video format.

4 Under **Video Luma Level**, select the type of processing that you want to be applied to luminance levels in your video when rendering and previewing video in a sequence:

– **Broadcast**   Processes video using the standard legal range of luminance levels for broadcast video. Any super black or super white luminance levels (that is, levels that fall below the standard black level or exceed the standard white level) are clipped.

– **Post Production**   Processes video for post production. Any super black or super white luminance levels in your video are retained.

5 Under **A/V Sync Adjustment**, drag the slider to adjust the A/V synchronization of clips played back in a sequence. If your audio starts later

than the associated video, increase the A/V sync value. Alternately, if your audio starts before the associated video, decrease the A/V sync value. Be aware that if you decrease the value too much, you may experience audio crackling.

Note   To return the slider to it's default setting, click its **D** button. This button is available for all sliders in the Matrox dialog boxes.

6   Under **Error Reporting**, select **Report dropped frames on playback** if you want to be warned each time frames are dropped when you play back video from the **Timeline** panel. Otherwise, clear this option.

Note   Once playback of the sequence has stopped, a red bar will appear over segments of the sequence that have dropped frames, even if you don't choose to report dropped frames. To ensure that your sequence will play back without dropped frames, you should render all sections identified with red bars as explained in your Adobe Premiere Pro documentation.

7   Under **Sequence Playback**, indicate how you want your sequence to be played back:

 – **Postroll after stop**   Applies postroll when you stop playback of a sequence. If you clear this option, the playback will stop at the current-time indicator, and you'll see a slight jump in the video output when the playback stops (but the correct frame will be displayed).

 – **Accelerate playback of non-realtime segments**   Improves playback performance of non-realtime segments, such as Adobe native effects. Clear this option only if you experience issues while playing back non-realtime segments of a sequence.

8   Under **Realtime Engine**, you can select the options you want for using Matrox RT technology:

 – **Enable Matrox RT technology**   Select this to enable Matrox RT technology, which provides realtime Matrox effects and acceleration of many Premiere Pro effects. You can clear this option if you want the realtime performance of your project to depend only on the capabilities of Premiere Pro and your computer system.

 – **Premiere Pro Accelerated Effects**   Select the options you want for your realtime/accelerated Premiere Pro effects (available only when Matrox RT technology is enabled):

 • **Accelerate effects and transitions**   Select this if you want realtime playback of Premiere Pro effects and transitions that support this feature as explained in Chapter 4, "Setting Up Realtime Effects with Adobe Premiere Pro." Because Matrox emulates Premiere Pro's native version of these effects and transitions, if you don't like the emulation you can clear this option to revert to Premiere Pro's native version that requires rendering.

Defining your sequence settings

- **Accelerate Motion**   Select this if you want realtime playback of Premiere Pro's Motion effect. You can clear this option to turn off the Matrox acceleration and revert to Premiere Pro's version that requires rendering.

9 Click **OK** to save your settings and return to the **Sequence Settings** dialog box.

Specifying your video output settings

You can specify various settings to configure your video output signals from the RT.X2 breakout box.

⇒ **To specify your video output settings**:

1 Choose **Sequence > Sequence Settings** and click the **Playback Settings** button.

2 Click the **Video Output** tab.
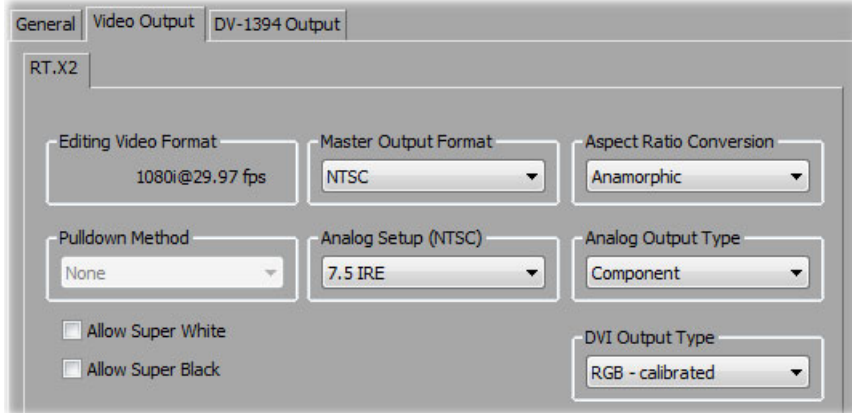
3 Under **Master Output Format**, select the video format you want for all video outputs from the RT.X2 breakout box. Depending on the video format of your sequence, you may not be able to change the master output format.

4 If the **Aspect Ratio Conversion** list is available, such as when the video output for an HD sequence is downconverted to NTSC or PAL, select one of the following settings for the video output:

– **16x9 Letterbox**   Outputs the widescreen 16:9 picture in letterbox mode by adding black bars at the top and bottom of the picture for display on a standard 4:3 television screen.

– **Anamorphic**   Outputs the widescreen 16:9 picture as horizontally compressed 4:3 video, which retains the picture's full vertical resolution for display on a widescreen television. To display the video with the

correct proportions on an NTSC or PAL monitor, select the 16:9 display setting on the monitor.

5 If the **Pulldown Method** list is available, select the pulldown method you want to be applied to your output video (**Standard 2:3** or **Advanced 2:3:3:2**). Depending on the frame rate of your sequence and the current master output format, a pulldown method may automatically be selected.

6 Under **Analog Setup (NTSC)**, select the setup level you want for your NTSC analog video:

  – **0 IRE** Applies a setup level of 0 IRE. You should select this option only when working with a commercial DV device that uses the Japanese analog NTSC setup of 0 IRE. For example, if the video appears too bright when you play back DV clips on your NTSC monitor, you can change the setup to 0 IRE to output your DV clips at the correct brightness.

  – **7.5 IRE** Applies the standard NTSC setup level of 7.5 IRE.

7 Under **Analog Output Type**, select the type of analog video output you want. If you're outputting SD analog video, you can select **Component** or **Composite & S-Video**. If you're outputting HD analog video, the analog output type will be set to **Component**.

8 Select **Allow Super White** to allow the highest luminance level of your video output to exceed the standard maximum white level. Select **Allow Super Black** to allow the lowest luminance level of your video output to fall below the standard black level.

Note Super white and super black should not be allowed when producing your final video production for broadcast.

9 Under **DVI Output Type**, select the type of DVI video that you want to be sent from RT.X2's DVI output (not applicable to RT.X2 LE or RT.X2 SD):

  – **RGB - calibrated** Outputs adjusted RGB DVI video using the currently loaded Matrox DVI calibration settings for your DVI monitor. For details on calibrating your DVI monitor and loading calibration settings using the Matrox DVI Calibration Utility, see Chapter 2, "Calibrating Your DVI Monitor for Video."

  – **RGB - native** Outputs native RGB DVI video that does not apply any calibration compensation. Select this when you want to disable the currently loaded Matrox DVI calibration settings and output DVI video from RT.X2 using its native color settings for previewing video on your DVI monitor.

10 Click **OK** to save your settings and return to the **Sequence Settings** dialog box.

Selecting your DV-1394 output settings

You can choose to output a Matrox sequence over the 1394 interface to perform an export to a DVCPRO HD device.

Note DV-1394 export to DVCPRO HD is supported for 1080i @ 25 fps, 29.97 fps, and 720p @ 59.94 fps sequences only. For more information about exporting to a DVCPRO HD device, see "Exporting to a DVCPRO HD device using DV-1394 device control" on page 43.

To select your DV-1394 output settings:

1 Choose **Sequence > Sequence Settings** and click the **Playback Settings** button.

2 Click the **DV-1394 Output** tab.
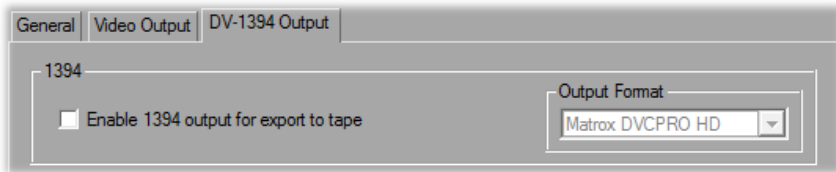
3 Select **Enable 1394 output for export to tape** if you want your sequence to be output over the 1394 interface when you perform an export to tape (that is, when you choose **File > Export > Export to Tape**). This lets you record your sequence to a DVCPRO HD device.

Important Because this option requires additional system resources, you may find that when this option is selected some effects that were previously realtime will drop frames and require rendering (you'll see a red bar over these segments after playing back your sequence). Therefore, you should select this option **only** when you want to export your sequence to a DVCPRO HD device.

4 Click **OK** to save your settings and return to the **Sequence Settings** dialog box.

Defining your video preview settings

When you select a Matrox sequence preset, an appropriate preview file format and codec are automatically set for previewing your video on Matrox RT.X2.
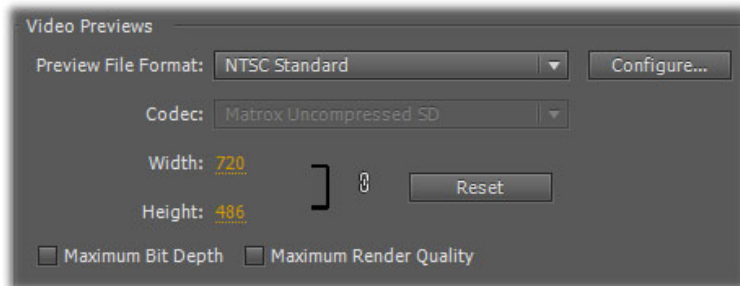
Depending on your sequence's video format, you can select a different codec to render your video previews. For details on configuring Matrox codec settings, see "Configuring the Matrox DVCPRO HD codec" on page 122, "Configuring the Matrox Uncompressed codecs" on page 122, and "Configuring the Matrox MPEG-2 I-frame codecs" on page 123.

Remarks

- When you configure a Matrox uncompressed codec (SD or HD resolution), make sure that you select 8-bit as your bit depth and set the scan mode to match your sequence's video format. For example, if you are working with a progressive sequence, set the bit depth to **8-bit** and the scan mode to **Progressive**.

- The Matrox DVCPRO HD codec is supported for rendering video previews in 1080i @ 25 fps and 29.97 fps projects only. When you configure the Matrox DVCPRO HD codec, make sure that you choose the frame rate that matches your sequence's video format.

- When selecting a standard or widescreen preview file format for an SD sequence, make sure that you select the format that matches your sequence's video format, such as **NTSC Standard** for a Matrox NTSC standard sequence.

- The Matrox MPEG-2 I-frame codec is not supported for rendering video previews in Matrox NTSC and 486p sequences. As an alternative for these sequences, you can set the preview file format to **I-Frame Only MPEG** to render your video previews using the Adobe MPEG I-frame codec.

For details on specifying additional settings for your video previews, see your Adobe Premiere Pro documentation.

Defining your capture settings

The **Matrox Capture Settings** dialog box has pages that you can use to specify your settings for capturing video and audio in Adobe Premiere Pro on Matrox RT.X2. If you want to capture material using RS-422 device control, see "Setting up Matrox RS-422 device control" on page 37. If you want to capture material from a DV-1394 device using device control, you can use Adobe DV/HDV device control as explained in your Adobe Premiere Pro documentation.

Note   When you specify your capture settings on Matrox RT.X2, VU meters can be displayed to let you monitor your audio input levels. For more information, see "Monitoring audio levels for capture" on page 27.

Specifying your video capture settings

Matrox RT.X2 lets you capture your video to various formats depending on the video format of your sequence. For example, if you're working with an SD sequence, you can capture to a DV format such as DVCPRO to create *.avi* files for use in your Premiere Pro projects. For certain HD sequences, you can capture DVCPRO HD material natively over the DV-1394 interface to an *.avi* file.

When working with an SD sequence, you can also choose to capture video to an *.m2v* file for DVD authoring using Adobe Encore. For details about specific limitations when capturing to Matrox *.m2v* files, see "Notes about capturing to Matrox .m2v files" on page 28.

To specify your settings for capturing video in Adobe Premiere Pro on Matrox RT.X2:

   1 Choose **Project > Project Settings > General**.

   2 From the **Capture Format** list, select **Matrox AVI** to capture to an *.avi* file, or **Matrox M2V** to capture to an *.m2v* file (for SD sequences only).

Note   If you want to capture DV material other than DVCPRO HD natively over the 1394 interface, you need to use a native Adobe Premiere Pro DV or HDV capture format. For details on how to capture material in Adobe Premiere Pro, see your Adobe Premiere Pro documentation.

3 Click the **Configure** button, then click the **Video Capture Settings** tab.
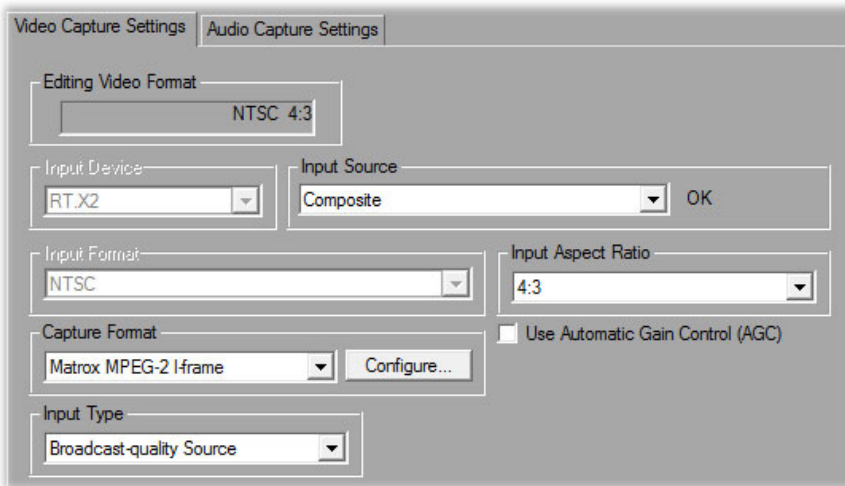
4 Under **Input Device**, select the device from which you want to capture material (this may be automatically set for you based on your sequence's video format):

- **RT.X2, RT.X2 LE,** or **RT.X2 SD** to capture material from an analog source connected to your RT.X2 breakout box.

Note Analog input is not supported for 486p, 576p, 720p, 1440×1080p, and 1080p sequences.

- **DV-1394** to capture material from a DV-1394 device connected to your system. For capture to a Matrox *.avi* file, DV-1394 input is supported only for native DVCPRO HD capture when working with 1080i, 1080p @ 29.97 fps, and 720p @ 23.98 fps, 25 fps, 29.97 fps, and 59.94 fps sequences. For capture to a Matrox *.m2v* file, DV-1394 input is supported for all SD sequences.

Note Capturing audio from a DV-1394 device is not supported for a 720p @ 25 fps sequence.

5 If you selected the RT.X2 breakout box as your input device, from the **Input Source** list, select the type of input you want to capture (**Component**, **Composite**, or **S-Video**). This will be set to **Component** when capturing analog video for an HD sequence (not supported on RT.X2 SD).

Remarks

- If you selected **DV-1394** as your input device, the name of the DV-1394 device connected to your system will appear in the **Input Source** box.
- If Matrox RT.X2 can't detect your source device when you start a capture, you'll receive an error message. Either black video will be captured or the

Defining your capture settings

capture won't be able to start until a valid input signal is present. In either case, you must make sure that your source device is switched on and properly connected to your system to properly capture the video.

6 From the **Input Format** list, select the video format that matches your source video. Depending on your sequence's video format, you may not be able to change the input format. If needed, Matrox RT.X2 will apply an appropriate pulldown method to convert the incoming video to your sequence's video format. For example, if your sequence's video format is 1080p @ 23.98 fps and you set the **Input Format** to **1080i@29.97fps**, a standard reverse pulldown (2:3 cadence) will be applied to capture the video to 1080p @ 23.98 fps.

7 From the **Input Aspect Ratio** list, select the aspect ratio of your SD source video (4:3 or 16:9). For example, to capture video that was recorded using the standard TV screen format, select **4:3**. To capture video that was recorded using the widescreen 16:9 format, select **16:9**. If you're capturing video for an HD sequence, the **Input Aspect Ratio** will be set to **16:9**.

8 Under **Capture Format**, select your desired capture format from the list. If you're capturing DVCPRO HD material to an *.avi* file from a DV-1394 device, the video will be captured natively over the DV-1394 interface and the **Capture Format** will be set to **Native DVCPRO HD**. If you're capturing to an *.m2v* file, the **Capture Format** will be set to **Matrox MPEG-2 IBP**.

✎ **Note**   The capture formats that are available in the **Capture Format** list depend on the video format of your sequence. For more information, see

– **Matrox DV/DVCAM**   Captures video to DV or DVCAM format.

– **Matrox DVCPRO**   Captures video to DVCPRO format.

– **Matrox MPEG-2 I-frame**   Captures video to MPEG-2 intra-frame format using the 4:2:2 Profile @ Main Level at a selected data rate (SD resolution only). For the best results when capturing video clips on which you'll be applying chroma key effects, you should use this codec instead of a DV codec.

– **Matrox MPEG-2 I-frame HD**   Captures video to MPEG-2 intra-frame format using the 4:2:2 Profile @ High Level at a selected data rate (HD resolution only). This is the only capture format available to capture analog video for 1440×1080i and 1080i sequences.

9 If you're capturing to a Matrox MPEG-2 format, click the **Configure** button to configure your MPEG-2 settings. For details on the available settings, see Once you've configured your settings, click **OK** to return to the **Matrox Capture Settings** dialog box.

10 If you're capturing Panasonic VariCam material, select **Enable VariCam capture** (supported only for a 720p @ 23.98 fps or 25 fps sequence). Matrox RT.X2 will remove the redundant (filler) frames from the VariCam input during capture and create a clip in the same format as your sequence for editing.

(i) **Important**   When you select **Enable VariCam capture**, audio cannot be captured. When batch capturing VariCam clips, you must indicate that you want to capture video only by selecting **Video** on the **Logging** pane of the **Capture** panel under **Setup.**

11 Select **Use Automatic Gain Control (AGC)** if you want the gain of your composite or S-Video input signal to be adjusted automatically to compensate for very bright or dark images. This improves the brightness or contrast of your picture.

12 From the **Input Type** list, select the type of equipment you're using for capture:

– **Broadcast-quality Source**   Select this if your source device is broadcast-quality. This setting provides the best capture results for most devices.

– **Consumer-quality Source**   Select this if you're having problems capturing video because your source device doesn't meet broadcast-quality standards. For example, the capture may be interrupted when you try to capture from certain composite and S-Video devices, especially from low-quality VCRs. If this happens, selecting **Consumer-quality Source** will allow the video to be captured, but you may experience dropped frames during the capture.

✎ **Note**   For any change to the input type to take effect, you must restart Premiere Pro and open your project again.

13 Click **OK** to save your settings and return to the **Project Settings** dialog box.

Defining your capture settings

Specifying your audio capture settings

You can specify various audio capture settings, such as to specify your input source and the type of audio files (either stereo *.wav* or mono *.wav*) that you want to create when capturing audio on Matrox RT.X2.

Remarks

- When you capture to an *.avi* file on Matrox RT.X2, the clip's video and audio are saved to the *.avi* file, and the clip's audio is also saved to one or more separate *.wav* files. You could choose to edit the separate *.wav* files using audio post-processing software, such as Adobe Soundbooth.

- When you capture to an *.m2v* file on Matrox RT.X2, the clip's associated audio is always saved to one or more separate stereo *.wav* files.

⟹ **To specify your settings for capturing audio in Adobe Premiere Pro on Matrox RT.X2:**

1 Choose **Project > Project Settings > General**.

2 From the **Capture Format** list, select **Matrox AVI** to capture to an *.avi* file, or **Matrox M2V** to capture to an *.m2v* file (for SD sequences only).

3 Click the **Configure** button, then click the **Audio Capture Settings** tab:
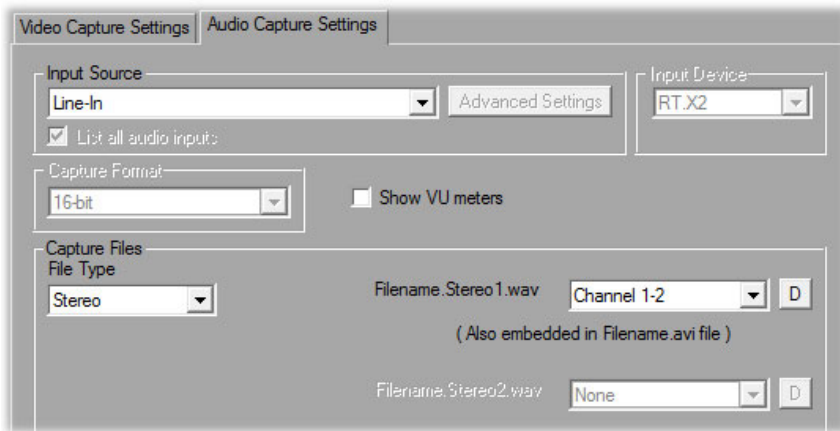
4 If you selected the RT.X2 breakout box as your video input device (see "Specifying your video capture settings" on page 20), you must also select the source from which you want to capture audio. Your audio source **must** match the audio input where you connected the cable labeled TO AUDIO CARD IN from your RT.X2 breakout box as explained in your *Matrox RT.X2 Installation Manual*. For example, if you plugged the TO AUDIO CARD IN connector into the Line-In jack (or corresponding jack) on your sound card, select **Line-In** from the **Input Source** list.

Remarks

– If all available audio inputs don't appear in the **Input Source** list, select **List all audio inputs**. If your audio input connection does not appear in the list, you must unplug the TO AUDIO CARD IN connector and connect it to an audio input on your sound card that appears in the list.

– If your analog audio source appears with an * beside it in the list, your sound card does not have matching audio inputs and outputs. In this case, choose the audio source with an * that matches your audio input, make sure that your source is playing back audio, and click **Advanced Settings**. In the provided dialog box, select an analog audio passthrough. If you can hear audio, then you've selected the correct analog audio source and passthrough. If you can't hear audio, try selecting a different analog audio source and/or passthrough.

– The **Capture Format** (bit-depth) for your captured audio files is set to **16-bit**.

5 If you want the VU meters to be displayed each time you configure your Matrox RT.X2 capture settings or open the **Capture** panel, select **Show VU meters**. For details on using the VU meters, see .

6 Under **Capture Files**, indicate whether you want to capture to stereo or mono audio files, and select which channels you want to save to separate .*wav* files.

– From the **File Type** list, select **Stereo** to save your captured audio to stereo .*wav* files, or **Mono** to save your captured audio to mono .*wav* files. If you're capturing an .*m2v* clip, the **File Type** will be set to **Stereo**.

– From the **Filename** lists, select which stereo pairs or mono channels you want to save to your .*wav* files. When capturing from a DV-1394 device, you can capture up to two stereo files or up to four mono files. Select **None** if you don't want a particular .*wav* file to be created. When Matrox RT.X2 saves each .*wav* file, it assigns a .*Stereo.wav* or .*Mono.wav* suffix to the base name you gave for the associated video file. For example, if you've named your video file *MyFile.avi*, the associated stereo audio files would be named *MyFile.Stereo1.wav*, *MyFile.Stereo2.wav*, etc.

Remarks

– The channels that you choose to save to the first stereo.*wav* file or first two mono.*wav* files will be embedded in the associated .*avi* file. When you import your .*avi* file to the **Project** panel, the clip's separate .*wav* files will also be imported, and the embedded audio in the .*avi* file will be ignored. The clip's .*avi* file and first associated .*wav* file, however, will appear as a single Movie clip in your project. The embedded audio in the .*avi* file will be used only if the .*avi* file does not have any associated .*wav*

files. Therefore, if you perform audio post processing on your *.avi* files, make sure you delete the associated *.wav* files so that only the embedded audio in the *.avi* files will be used in your project.

– When performing an audio-only capture, Matrox RT.X2 supports capture of only one stereo pair. Your first stereo or first two mono channels will be saved to a single stereo *.wav* file (any other channels will be ignored). When RT.X2 saves the *.wav* file of an audio-only capture, it does not assign the *.Stereo.wav* suffix to the filename.

7 Click **OK** to save your settings and return to the **Project Settings** dialog box.

Monitoring audio levels for capture

If you select **Show VU meters** on the **Audio Capture Settings** page, each time you configure your Matrox RT.X2 capture settings or open the **Capture** panel to start a capture in Adobe Premiere Pro, VU meters will be displayed to let you monitor the levels of your currently selected audio input source.

Clipping detectors

Peak level indicators
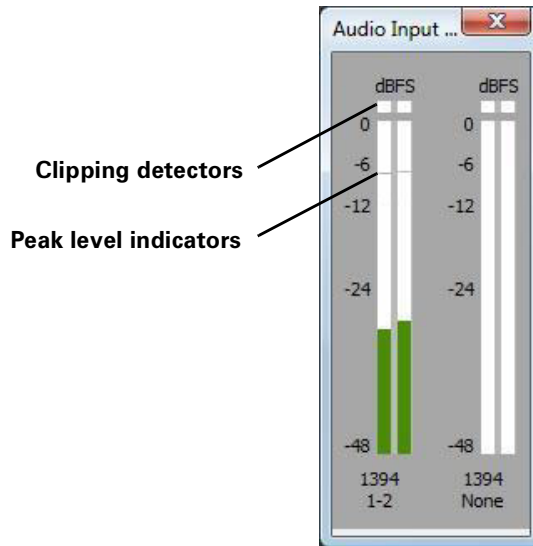
As you play your audio source, the color of the input level is green at or below –12 dBSF, yellow between –12 and –6 dBFS, and red above –6 dBFS. The clipping detectors will "light up" (become red) whenever audio clipping occurs. The peak level indicators are thin lines that show the highest level recently reached. These indicators will show the peak level for about two seconds or until a higher peak level is reached.

If needed, adjust the audio level on your source device to keep the average input level between –30 and –10 dBSF. You can also use Windows Volume Control to adjust your audio input levels as explained in "Setting your system's volume levels" on page 10.

Notes about capturing to Matrox .m2v files

When capturing to Matrox *.m2v* files, keep the following points in mind:

- Automatic scene detection (Scene Detect) is not supported, but batch capture is supported.

- Batch capture to Matrox *.m2v* files is not frame accurate.

- An associated *.xmp* metadata file is created for all captured and logged (offline) *.m2v* clips. These files are created in your specified video capture folder, and contain time code and other information that you provided for your *.m2v* clips, such as tape name, description, and scene. You can open the *.xmp* files in Adobe Bridge. Take care not to delete the *.xmp* files and always keep them with their associated *.m2v* files. Otherwise, you won't be able to batch capture logged *.m2v* clips, and the time code information won't appear for your *.m2v* clips in the **Project** panel.

- Matrox *.m2v* files are to be used for DVD authoring with Adobe Encore. However, if you want to use your Matrox *.m2v* clips in Adobe Premiere Pro, be aware of the following issues:

  - The associated *.wav* files for your *.m2v* clips are not automatically imported to the **Project** panel.

  - When performing a batch capture of *.m2v* clips, the captured video and audio clips won't be automatically imported to the **Project** panel. Because you won't be able to link the logged (offline) clips to the captured files on disk, you'll have to import the batch captured *.m2v* clips manually. As well, if you recapture clips using batch capture, captured video clips will be imported automatically only if you choose to delete the original media files from disk.

  - When you place a Matrox *.m2v* clip on a video track, an empty associated *.wav* clip will be placed on an audio track beneath it. To get rid of this clip, select it in the sequence and choose **Clip > Unlink**. Once you've unlinked the *.wav* from the *.m2v*, you can select the *.wav* clip on the audio track and delete it.

  - It's recommended that you don't add handles (extra frames) to your captured *.m2v* clips. If you do, the handles will be appropriately trimmed from the video when you add the clip to your sequence, but the handles won't be trimmed from the associated audio.

Selecting your MPEG-2 I-frame settings

When you select the Matrox MPEG-2 I-frame or Matrox MPEG-2 I-frame HD format to capture video, you can specify various settings for the MPEG-2 I-frame compression.

To select your MPEG-2 I-frame settings:

1 Click the **Configure** button. This displays a dialog box similar to the following:
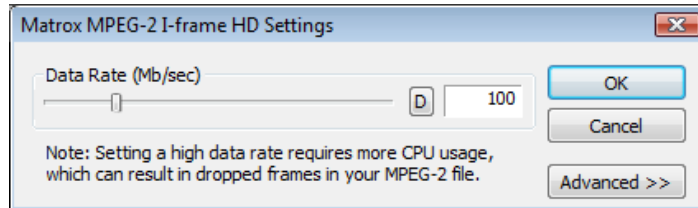
2 Drag the **Data Rate** slider until your desired data rate is displayed. The higher the data rate you select, the better the video quality will be. The range of available data rates depends on whether you're using the Matrox MPEG-2 I-frame HD or SD format.

Important Depending on the capabilities of your system, you may drop frames if you select a data rate higher than 125 Mb/sec.

3 To apply advanced settings to your MPEG-2 I-frame file, click the **Advanced** button.

Note The default advanced settings should provide good results for most applications. We recommend that you change these settings only when needed for special purposes.
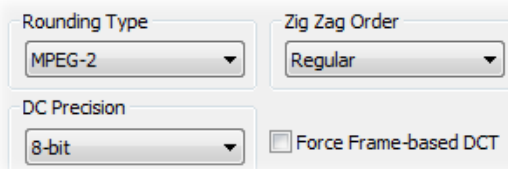
4 Under **Rounding Type**, select one of the following:

  – **MPEG-2** Rounds the AC coefficients up to the nearest whole number when calculating the quantization coefficient.

  – **Matrox Custom** Truncates the AC coefficients to the lowest whole number when calculating the quantization coefficient. In some cases, this setting may yield less artifacts in graphics.

5 Under **DC Precision**, select the bit-depth precision of the DC intra block.

📝 **Note** The higher the DC precision value that's used to capture or render your video, the more likely that the DC content will be increased at the expense of the AC content in the encoded stream. This may result in lowering the overall quality of the compressed stream at a specified data rate.

6 Under **Zig Zag Type**, select one of the following:

– **Regular** Sets the regular (default) zig zag scanning pattern of the AC coefficient of the DCT block as defined in the ISO/IEC 13818-2 (figure 7-2) specification documentation.

– **Alternate** Sets an alternate zig zag scanning pattern of the AC coefficient of the DCT block as defined in the ISO/IEC 13818-2 (figure 7-3) specification documentation. Use this setting when capturing or rendering video at a high data rate (that is, at a data rate of about 50 Mb/sec for SD video, or 100 Mb/sec or higher for HD video).

7 Select the **Force Frame-based DCT** setting to render macroblocks as frames rather than as fields. In some cases, graphics will yield less artifacts if this option is selected.

8 Click **OK** to save your settings.

Selecting your MPEG-2 IBP settings

When capturing video to a Matrox *.m2v* file using Adobe Premiere Pro, the capture format is set to Matrox MPEG-2 IBP. You can specify various settings for the MPEG-2 IBP compression.

⟹ **To select your MPEG-2 IBP settings:**

1 Click the **Configure** button. This displays a dialog box similar to the following:
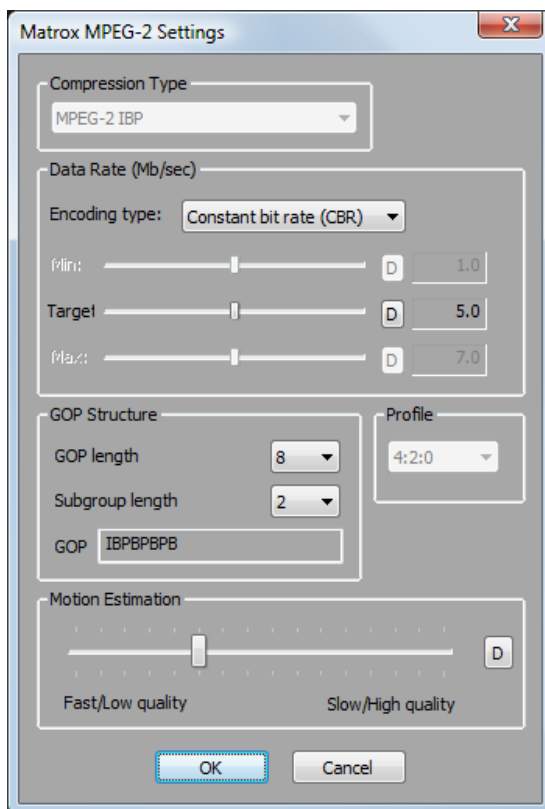
2 Under **Data Rate (Mb/sec)**, you can select the encoding type and data rate for the MPEG-2 IBP compression.

- **Encoding type**   From this list, select one of the following:
  - **Constant bit rate (CBR)**   Video is compressed at your selected target data rate, which is useful when you need to limit or predict the size of your *.m2v* file. However, if your video is very complex (such as scenes with many colors or sharp edges), you'll need to select a high data rate to avoid having frames of very blocky video in your file.

- **Variable bit rate (VBR)**   Video is compressed at varying data rates based on the complexity of the video. The target data rate you select is used as the average data rate for the compression.

– **Min**, **Target**, and **Max** sliders   Use these sliders to select your desired data rate. The higher the target data rate you select, the better the video quality will be. Only the **Target** slider will be available if you selected **Constant bit rate (CBR)**. If you selected **Variable bit rate (VBR)**, all three sliders will be available so that you can set the minimum, target, and maximum data rates for the video compression.

Note   Adobe Encore requires CBR-encoded *.m2v* files longer than about two minutes to be transcoded. VBR-encoded *.m2v* files do not require transcoding in Adobe Encore.

3 Under **GOP Structure**, you can customize the GOP structure for the MPEG-2 IBP compression as follows:

– **GOP length**   Determines the number of frames in the GOP (Group of Pictures).

– **Subgroup length**   Determines the subgroup length of B-frames and P-frames in the GOP, after the initial I-frame. For example, a subgroup of 3 appears as "BBP," and a subgroup of 2 appears as "BP." The available subgroup lengths depend on your selected GOP length.

4 Under **Profile**, the **4:2:0** profile is selected, which uses 4:2:0 luminance/chrominance sampling and is suitable for broadcast transmission and distribution on DVD.

5 Under **Motion Estimation**, drag the slider to adjust the quality of the motion estimation used for the video compression. The default setting gives good results for most video. However, if you have a lot of fast motion in your video, such as fast-paced sports footage, you can get better results by dragging the slider to the right (towards **Slow/High quality**). This improves the quality of the motion estimation, but decreases the speed of the video compression. Alternately, if you have mostly slow-paced video, you may want to drag the slider to the left (towards **Fast/Low quality**) to decrease the quality of the motion estimation and speed up the video compression.

6 Click **OK** to save your settings.

Exporting to a Matrox .avi file

Several software codecs are included with Adobe Premiere Pro so that you can export your video to different formats. Your Matrox RT.X2 system adds several Matrox Video for Windows (VFW) codecs to the ones included with Premiere Pro to allow you to export your sequence to a Matrox *.avi* file. For more information about using the Matrox Video for Windows codecs, see Chapter 7, "Using the Matrox Video for Windows Codecs."

If your system includes a Matrox CompressHD card, you can also export your sequence to a Matrox MAX H.264 file as explained in your *Matrox CompressHD Installation and User Guide*.

Remarks

- When batch encoding clips that use the same Matrox VFW codec, they must have the same codec settings. For example, you cannot export multiple clips with the Matrox MPEG-2 I-frame HD codec that have different data rates. You can, however, batch encode clips using different Matrox VFW codecs and clips that use the same Matrox VFW codec with identical codec settings.

- To export clips from a Matrox NTSC or 486p sequence to a 720×480 Matrox *.avi* file using a Matrox VFW DV or MPEG-2 I-frame codec, you must crop the height of the video by applying cropping on the **Source** page of the **Export Settings** dialog box as follows:

GPU-accelerated effects disabled (software only)

Sequence format	Crop settings	
	Export to DV	**Export to MPEG-2 I-frame**
NTSC	Top = 5, Bottom = 1	Top = 5, Bottom = 1
486p	Top = 4, Bottom = 2	Top = 6, Bottom = 0

GPU-accelerated effects enabled

Sequence format	Crop settings	
	Export to DV	**Export to MPEG-2 I-frame**
NTSC	Top = 3, Bottom = 3	Top = 5, Bottom = 1
486p	Top = 4, Bottom = 2	Top = 6, Bottom = 0

⟹ **To export your sequence to a Matrox .avi file:**

    1 Unless you want to export your entire sequence, position the work area bar over the section of the sequence you want to export.

    2 Choose **File > Export > Media**. This opens the **Export Settings** dialog box.
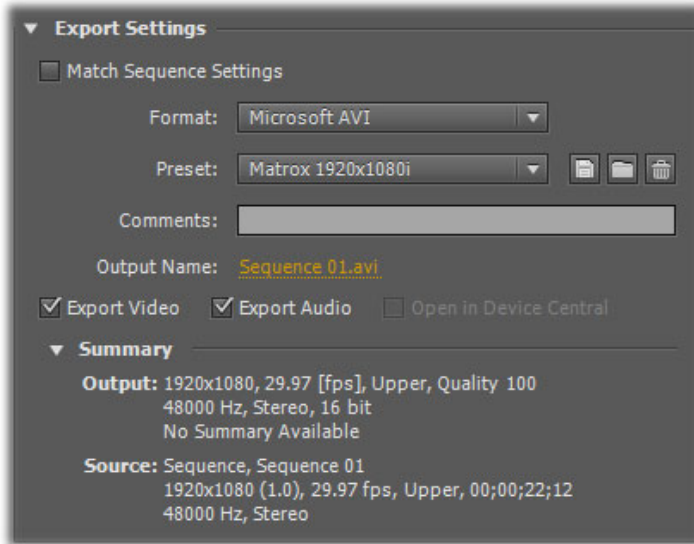
    3 From the **Format** list, select **Microsoft AVI**.

📝   **Note**   The Microsoft AVI format lets you export your sequence using any Matrox VFW codec. Although the Matrox AVI format is also available, it is provided only for exporting a 720p sequence to a Matrox *.avi* file so that you can export the sequence to a DVCPRO HD device. For details, see "Preparing a 720p sequence for export to a DVCPRO HD device" on page 44.

    4 From the **Preset** list, select a Matrox preset that matches the video format you want for your exported file. (If you want to export to 486p format, you can select a Matrox 720×480p preset.)

    5 Select **Export Video** and **Export Audio** if you want to export both video and audio.

📝   **Note**   Exported audio will be embedded in your *.avi* file. Matrox RT.X2 does not support audio-only exports to an *.avi* file.

6 Click the **Video** tab. Under **Video Codec**, you can select the Matrox codec you want, depending on the video format to which you're exporting.

- **Matrox DV/DVCAM**   Renders video to DV or DVCAM format.
- **Matrox DVCPRO**   Renders video to DVCPRO format.
- **Matrox DVCPRO50**   Renders video to DVCPRO50 or D-9 format.
- **Matrox DVCPRO HD**   Renders video to DVCPRO HD format (for 1080i and 720p video only).
- **Matrox MPEG-2 I-frame**   Renders video to MPEG-2 intra-frame format using the 4:2:2 Profile @ Main Level at a selected data rate (SD resolution only).
- **Matrox MPEG-2 I-frame + Alpha**   Renders video to MPEG-2 intra-frame format with alpha using the 4:2:2 Profile @ Main Level at a selected data rate (SD resolution only).
- **Matrox MPEG-2 I-frame HD**   Renders video to MPEG-2 intra-frame format using the 4:2:2 Profile @ High Level at a selected data rate.
- **Matrox MPEG-2 I-frame HD + Alpha**   Renders video to MPEG-2 intra-frame format with alpha using the 4:2:2 Profile @ High Level at a selected data rate.

Exporting to a Matrox .avi file

    – **Matrox Uncompressed SD**   Renders video to 8-bit or 10-bit uncompressed SD format.

    – **Matrox Uncompressed SD + Alpha**   Renders video to 8-bit or 10-bit uncompressed SD format with alpha.

(i) **Important**   To export to NTSC or 486p format using a Matrox Uncompressed SD codec, you must set the frame size to 720×486 using the **Width** and **Height** settings on the **Video** page.

    – **Matrox Uncompressed HD**   Renders video to 8-bit or 10-bit uncompressed HD format.

    – **Matrox Uncompressed HD + Alpha**   Renders video to 8-bit or 10-bit uncompressed HD format with alpha.

7 If you selected a Matrox codec that requires configuration, click the **Codec Settings** button. For details, see "Configuring the Matrox DVCPRO HD codec" on page 122, "Configuring the Matrox Uncompressed codecs" on page 122, and "Configuring the Matrox MPEG-2 I-frame codecs" on page 123.

8 From the **Frame Rate** list under **Basic Settings**, set the appropriate frame rate for the video format to which you are rendering. For example, if you are rendering to 1080i @ 29.97 fps format, set the frame rate to 29.97.

9 From the **Source Range** list in the **Source Panel**, select the range you want to export, such as **Work Area**.

10 Click **Queue** to send your export request to Adobe Media Encoder, or click **Export** to immediately start your export.

For information about other video export settings and using Adobe Media Encoder, see your Adobe Media Encoder documentation.

Exporting a Matrox NTSC or 486p sequence to MPEG-2 for DVD authoring

When you choose **File > Export > Media** to export a sequence, Adobe Premiere Pro provides the MPEG2-DVD export format in the **Export Settings** dialog box, which lets you export your sequence to a DVD-compliant MPEG-2 file suitable for use with most DVD authoring programs, such as Adobe Encore. To export a Matrox NTSC or 486p sequence to a 720×480 MPEG2-DVD format, you must crop the height of the video by applying cropping on the **Source** page of the **Export Settings** dialog box as follows:

• To export an NTSC sequence, set Top = 5, and Bottom = 1

• To export a 486p sequence, set Top = 6 and Bottom = 0

For details on how to export to MPEG2-DVD format, see your Adobe Premiere Pro documentation.

Setting up Matrox RS-422 device control

Matrox RS-422 device control lets you control any device that supports the RS-422 SMPTE time code protocol when capturing or exporting material to tape in Adobe Premiere Pro. To use this device control, you must use an RS-232 to RS-422 adapter cable to connect the serial device control port on your source device or recorder to the serial port on your computer.

⟹ **To configure your RS-422 device control settings:**

1 Choose **Edit > Preferences > Device Control**.

2 From the **Devices** list, select **Matrox RS-422 Device Control**.

3 Click **Options** to display the following dialog box:
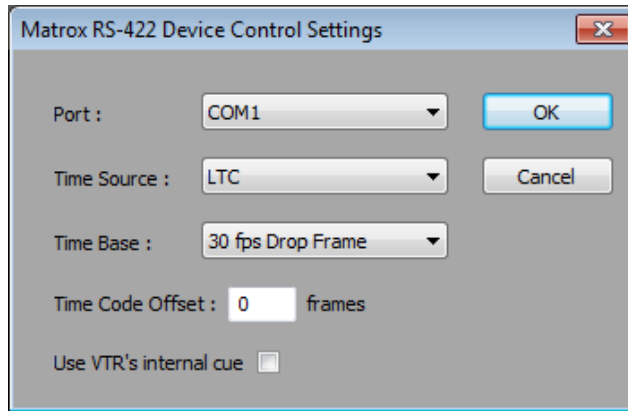
4 From the **Port** list, select the COM port on your computer to which you've connected your device.

5 From the **Time Source** list, select the time source to be used for controlling your device:

- **LTC**   Longitudinal Time Code recorded on a track adjacent to the video (this is the default time source). This type of time code can be read at all tape speeds, except still.

- **VITC**   Vertical Interval Time Code that is recorded onto the vertical blanking interval of the video. This type of time code can be read whenever an image is displayed, but not usually during high-speed operation.

- **LTC+VITC**   Select this if you want your device to decide which type of time code to use in different operational modes. You should select this option only if you're sure that the two types of time code match on your tape.

- **Control Track**   Select this if you want to use only your tape's control track as the time source. Because using the control track is not as reliable

as LTC or VITC for device control, you should select this option only if you're having problems using the time code on your tape.

6   From the **Time Base** list, select the time base that matches your tape, such as **30 fps Drop Frame** if you're using NTSC video with drop frame time code, or **25 fps** if you're using PAL video.

7   Beside **Time Code Offset**, specify the number of frames to adjust the start time for capture and export to tape, if needed. For example, if capture and export to tape are starting three frames too early (that is, three frames before your specified In point), enter a time code offset of 3. Alternately, if capture and export to tape are starting three frames too late, enter a time code offset of -3. For an example of how to calibrate your device for frame-accurate export to tape, see "Obtaining a frame-accurate export to tape using Matrox RS-422 device control" on page 42.

8   Select **Use VTR's internal cue** if the Matrox RS-422 device control is having problems cueing your VTR, such as when you cue to a specific In or Out point. Because using the VTR's internal cueing method slows down the cueing, you should select this option only you're experiencing problems cueing to a time code when using RS-422 device control.

9   Click **OK** to save your settings.

For details on capturing with device control, see your Adobe Premiere Pro documentation. For information about exporting your Matrox sequence to tape, see "Exporting your sequence to tape" on page 39.

Remarks

• You must set your device to Remote or VTR mode.

• You must stripe your tapes with continuous and consecutive time code. You can stripe your entire tape with time code by recording black video for the duration of the tape.

• When capturing material, make sure that you don't specify any preroll or time code offset value in the **Device Control** section of the **Settings** pane. Instead, a preroll of about five seconds will automatically be applied, and you must specify any required time code offset in the **Matrox RS-422 Device Control Settings** dialog box.

Exporting your sequence to tape

To export your Matrox sequence to tape without using device control, simply play back your sequence and record the output from any of the available outputs on your Matrox RT.X2 system. If your recorder supports RS-422 device control, you can export your sequence to tape using Matrox RS-422 device control as explained in the next section, "Exporting to tape using Matrox RS-422 device control."

To export your Matrox sequence to a DVCPRO HD device over the 1394 interface, you can use Adobe DV/HDV device control as explained in "Exporting to a DVCPRO HD device using DV-1394 device control" on page 43. To export to a DV-1394 device other than DVCPRO HD, you must copy or import your Matrox project into a native Adobe Premiere Pro project and use Adobe DV/HDV device control as explained in your Adobe Premiere Pro documentation.

Remarks

- To avoid repeated or missing frames when performing an export to tape with device control, add about five seconds of black video or color bars to the start of your sequence.

- To avoid having discontinuous (broken) time code recorded onto your tape, set your recorder to generate time code internally based on time code already present on the tape (this setting is called INT REGEN on some devices). Don't use free run or external time code regeneration mode.

- To avoid problems when exporting your sequence to tape, make sure that your project's auto-save feature is turned off. To do this, choose **Edit > Preferences > Auto Save** and make sure that **Automatically save projects** is not selected. Once your export is complete, you can turn the auto-save feature back on.

Exporting to tape using Matrox RS-422 device control

With Matrox RS-422 device control, you can perform either an insert or assemble edit to record your Matrox sequence onto tape as follows:

1 Open your project, activate the Matrox sequence that you want to export to tape, and position the work area bar over the section of the sequence that you want to export.

2 If you haven't already done so, play back your sequence and render any non-realtime sections that are identified with a red render bar.

3 Make sure that you've properly connected your recorder and configured Matrox RS-422 device control as explained in "Setting up Matrox RS-422 device control" on page 37.

4 Load a striped recordable tape into your recorder, and set your recorder to Remote or VTR mode.

5 Choose **File > Export > Tape** to display the following dialog box:
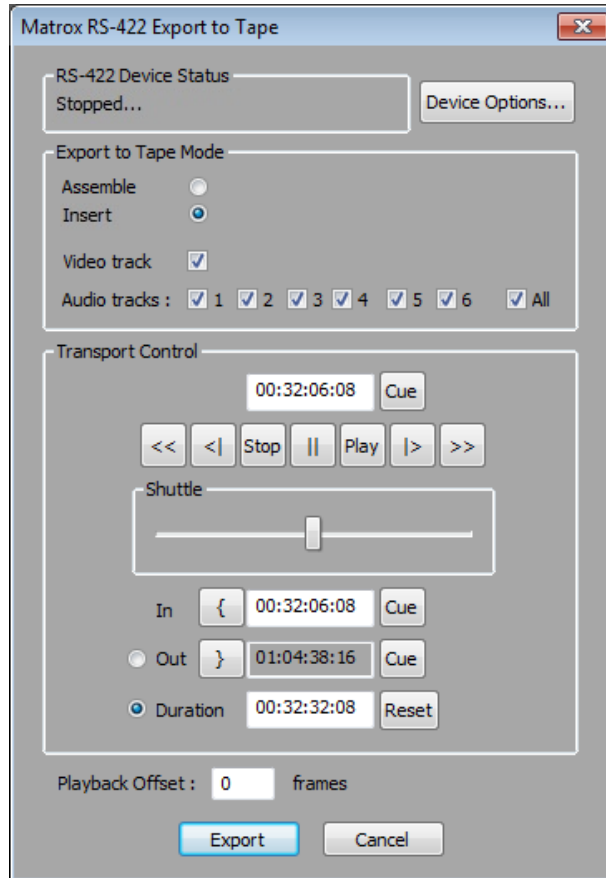
6 To review or change your RS-422 device control settings, click **Device Options**. This displays the **Matrox RS-422 Device Control Settings** dialog box as explained in "Setting up Matrox RS-422 device control" on page 37 (except you won't be able to change the specified port).

7 Under **Export to Tape Mode**, you can specify the type of export you want to perform and the tracks you want to be recorded:

– **Assemble** Records all tracks (video and audio) sequentially onto the tape. The control track and previously recorded material on the tape will be replaced with the material recorded from your sequence.

– **Insert** Records selected tracks (video and/or audio), without affecting the control track. This lets you perform a video or audio dub. For

Chapter 3, Defining Your Adobe Premiere Pro Settings

example, you can choose to record only video, only selected audio tracks, or video and selected audio tracks from your sequence.

Note Check your device's documentation to determine its recording capabilities for assemble and insert editing. Some recorders may not support insert editing.

8 Use the transport controls to play back your tape. The current time code of your tape appears in the text box above the transport controls. You can also use the **J**, **K**, and **L** shortcut keys to control the shuttle. Press **J** to shuttle left, **L** to shuttle right, and **K** to stop. Pressing **J** or **L** multiple times increases the speed of the shuttling.

9 Specify where you want the recording to start and stop on your tape as follows:

– Click the **Set In Point** button ($\{$) to specify where you want the recording to start, or enter the required time code in the **In** box.

– Click the **Set Out Point** button ($\}$) to specify where you want the recording to stop, or enter the required time code in the **Out** box. Alternately, you can select **Duration** and enter the duration you want for the recording. The Out point will then be calculated for you. By default, the duration is set to the duration of the work area. You can click **Reset** at any time to set the duration back to the duration of the work area.

Note When **Out** is selected, the duration is calculated based on your selected In and Out points. When **Duration** is selected, the Out point is calculated based on your specified In point and duration.

10 If needed, enter the number of frames to offset the playback of your sequence beside **Playback Offset.** For example, if the playback starts too late and you're missing the first three frames of your sequence recorded on the tape, enter an offset of -3. If the playback starts too early and the first three frames of your sequence are repeated, enter an offset of 3.

Important Before adjusting the **Playback Offset**, you should first make any required adjustment to the **Time Code Offset** for your device as specified in the device control settings. For an example of how to calibrate your device for frame-accurate export to tape, see "Obtaining a frame-accurate export to tape using Matrox RS-422 device control" on .

11 Click **Export** to start the export to tape.

Obtaining a frame-accurate export to tape using Matrox RS-422 device control

In order to obtain a frame-accurate export to tape when using Matrox RS-422 device control, there are two different settings that you may need to adjust:

- The **Time Code Offset** in the **Matrox RS-422 Device Control Settings** dialog box determines when your device starts recording on the tape. If the recording doesn't start on the tape at your specified In point, you can adjust this offset so that the recording starts earlier or later.

- The **Playback Offset** in the **Matrox RS-422 Export to Tape** dialog box determines when your sequence starts playing back. Depending on your system, you may need to adjust this offset so that your sequence starts playing back earlier or later.

Here's an example of how to calibrate your RS-422 device for frame-accurate export to tape:

1 Stripe an NTSC tape with continuous and consecutive time code starting at 00:00:00:00.

2 Create a new Matrox NTSC sequence with a bars and tone clip about ten seconds long containing time code starting at 00:00:00:00. Make sure you place the clip at the start of your sequence.

✎ **Tip** You can create a bars and tone clip by right-clicking in the **Project** panel and choosing **New Item > Bars and Tone**. You can add time code to the clip by applying a Timecode effect as explained in your Adobe Premiere Pro documentation.

3 Set up Matrox RS-422 device control with the **Time Code Offset** set to 0 (see).

4 Export your sequence to tape and set the In point for the recording to 00:00:10:00 and the **Playback Offset** to 0 (see).

5 When the export to tape is finished, play back your tape and check where the recording started. For example, if the bars and tone clip started recording at 00:00:09:25 on your tape (five frames before your specified In point), then you need to set the **Time Code Offset** to 5. Alternately, if the recording started at 00:00:10:05 (five frames after your specified In point), then you need to set the **Time Code Offset** to -5.

6 Make any required adjustment to the **Time Code Offset** in the **Matrox RS-422 Device Control Settings** dialog box, and perform another export to tape with the In point for the recording set to 00:00:30:00 and the **Playback Offset** set to 0.

7 When the export to tape is finished, go to 00:00:30:00 on your tape (the recording should have started at that time code), and check which frame

from your sequence has been recorded. You should see frame 00:00:00:00 from your bars and tone clip at 00:00:30:00 on your tape, with no repeated frames. For example, if frame 00:00:00:00 has been repeated for the next five frames, then your sequence started playing back five frames too early and you need to set the **Playback Offset** to 5. Alternately, if you see frame 00:00:00:05 from your bars and tone clip recorded at 00:00:30:00, then the sequence playback started five frames too late and you need to set the **Playback Offset** to -5.

Exporting to a DVCPRO HD device using DV-1394 device control

When working with a Matrox 1080i @ 25 fps, 29.97 fps, or 720p @ 59.94 fps sequence, you can choose to export your sequence to a DVCPRO HD device over the 1394 interface using Adobe DV/HDV device control.

(i) **Important**   To export a 720p @ 23.98 fps, 29.97 fps, or 59.94 fps sequence to a DVCPRO HD device over the 1394 interface, you must first export your sequence to a Matrox *.avi* file using the Matrox DVCPRO HD codec in 720p @ 59.94 fps format, import your Matrox *.avi* file to a new 720p @ 59.94 fps sequence, and then export your sequence to tape. DV-1394 export to DVCPRO HD is not supported for any other 720p format. For more information, see "Preparing a 720p sequence for export to a DVCPRO HD device" on page 44.

⟹ **To export your sequence to tape over the 1394 interface:**

1 Open the project and activate the sequence you want to export to tape.

2 If you're exporting a 1080i @ 25 fps or 29.97 fps sequence, play back your sequence and render any non-realtime sections that are identified with a red render bar using the Matrox DVCPRO HD codec (see "Defining your video preview settings" on page 19).

3 Make sure your DV-1394 device is properly connected and turned on, and that you've enabled the DV-1394 output for export to tape as explained in "Selecting your DV-1394 output settings" on page 18.

4 If you're using a camcorder, switch it to VTR mode.

5 Load a striped recordable tape into your DV-1394 device.

6 Make sure that you've set up Adobe DV/HDV device control as explained in your Adobe Premiere Pro documentation.

7 Choose **File > Export > Export to Tape**.

For information about exporting your sequence to tape using Adobe Premiere Pro, see your Adobe Premiere Pro documentation.

Preparing a 720p sequence for export to a DVCPRO HD device

In order to export a Matrox 720p @ 23.98 fps, 29.97 fps, or 59.94 fps sequence to a DVCPRO HD device over the 1394 interface, you must first export your sequence to a Matrox *.avi* file using the Matrox DVCPRO HD codec in 720p @ 59.94 fps format as follows:

1 Activate the Matrox sequence that you want to export, and choose **File > Export > Media** to open the **Export Settings** dialog box.

2 From the **Format** list, select **Matrox AVI (for PTT only)**.

3 The **Preset** will be set to **Matrox 720p @ 59.94 fps**. Appropriate export settings are automatically applied, and the codec is set to **Matrox DVCPRO HD** (no configuration settings are required).

4 Click **Export** to start your export.

Once the export has finished, create a new Matrox 720p @ 59.94 fps sequence, import your Matrox *.avi* file, and place it on the timeline. You can now export the new sequence to tape as explained in .

Creating an SD project in 16:9 format

When editing on Matrox RT.X2, you can choose to work with SD source video that's been recorded in either the 4:3 standard TV screen format, or the widescreen 16:9 format.

⟹ **To create an SD project in 16:9 format on Matrox RT.X2, do the following:**

1 Record your video onto tape with your camera set to the widescreen 16:9 format. The video will be recorded as horizontally compressed 4:3 (anamorphic) video.

2 Start Adobe Premiere Pro and create a new Matrox project using the appropriate Matrox widescreen preset, such as NTSC widescreen, for your sequence (see "Creating a new Matrox project" on page 11). This ensures that the effects you create on Matrox RT.X2 will be displayed with the correct proportions when viewed in 16:9 format.

3 Capture your video clips as you normally would. Select the 16:9 display option on your NTSC or PAL video monitor to "unsquish" the video and play it back in widescreen format without distortion.

4 If you create animations, titles, or graphics for your project using a program that lets you set the pixel aspect ratio, use the appropriate setting for 16:9 display:

   – For NTSC or 486p video, set the pixel aspect ratio to 1.185.

   – For PAL or 576p video, set the pixel aspect ratio to 1.422.

   If you can't set the pixel aspect ratio, create your image at 864×486 for NTSC or 486p video, or at 1024×576 for PAL or 576p video. After you've created your image, resize **only** its width to 720. When you resize the image, your text or graphic will appear elongated on your computer screen.

5 Edit your project as you would a standard 4:3 project.

📝 **Note**   Be aware that if your video monitor is displaying in 4:3 format, certain effects may appear elongated because of the horizontal scaling. Setting your monitor to 16:9 will display the effects with the correct proportions.

6 Record your finished project onto tape. Remember that you'll need a monitor capable of displaying material in 16:9 format to properly view your master tape.

Your notes

4

Setting Up Realtime Effects with Adobe Premiere Pro

This chapter explains how to set up realtime Matrox effects such as color corrections and wipes using the Matrox realtime plug-in for Adobe Premiere Pro.

Available effects

The Matrox realtime plug-in for Adobe Premiere Pro lets you set up the following realtime[1] Matrox effects in your Matrox projects[2]:

- Color corrections.
- Chroma key and luma key effects.
- Chroma clamper effect.
- Wipes.

The following Adobe effects are also accelerated for realtime playback:

- Black and white.
- Crop.
- Timecode.
- Motion.
- Video opacity (fades).
- Additive dissolve, cross dissolve, dip to black, and dip to white transitions.
- Speed changes.
- Graphics overlays using single-frame graphics files with an alpha-key channel.

When you install Matrox Mtx.utils, all the Matrox effects are added to Adobe Premiere Pro. You set up Matrox effects in your projects the same way as other effects included with your Adobe software. For example, you apply a Matrox wipe to your clips in Adobe Premiere Pro just as you would any other type of transition, except that the controls provided let you create a Matrox wipe, as explained in this chapter. For instructions on setting up Adobe Premiere Pro effects and transitions, refer to your Adobe documentation.

Tip You can filter the **Effects** panel to show only the effects and transitions that are accelerated by your Matrox hardware by clicking the ▮ button at the top of the **Effects** panel.

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[1] Applying certain Adobe Premiere Pro settings to your clips may require you to render your effects, such as when you apply Field Options, Frame Hold, or Interpret Footage settings.

[2] The Matrox color correction, chroma key, luma key, and chroma clamper effects are also available in Adobe After Effects.

How to apply a Matrox video effect in Adobe Premiere Pro

The Matrox plug-in for Adobe Premiere Pro allows you to apply several Matrox video effects to your clips. To apply a Matrox video effect, drag the desired effect from the **Effects** panel onto the clip in the **Timeline** panel.

By default, the Matrox video effects are found in the **Matrox** bin under **Video Effects**.

Tips

- You can also apply preconfigured Matrox video effects found in the **Matrox Effect Presets** bin under **Presets**.
- If you can't see the **Effects** panel, choose **Window > Effects**. If you can't see the **Effect Controls** panel, choose **Window > Effect Controls**.

How to apply a Matrox video transition in Adobe Premiere Pro

In Adobe Premiere Pro, the Matrox wipe transitions are found in the **Matrox** bin under **Video Transitions** in the **Effects** panel.

There are numerous methods to create transitions in Premiere Pro. Use the method that works best for you to apply your Matrox wipes. For information on applying transitions, see your Adobe Premiere Pro documentation.

Applying a mask to your Matrox effects

The Matrox color correction, chroma key, and luma key effects allow you to add a mask to define the area where you want to apply your effect. For example, you may want to apply a color correction to only one area of your clip and leave the rest of the clip untouched.

⟹ **To adjust the mask properties:**

Click the triangle next to **Mask** to expand the property list.
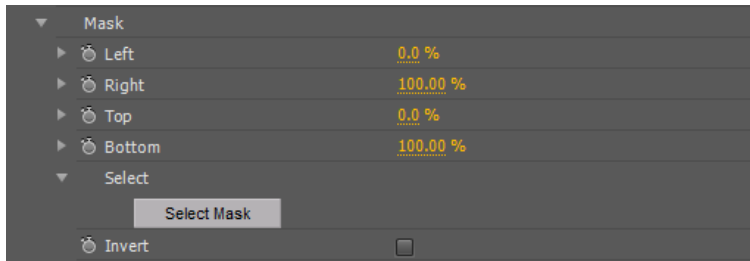
The properties under **Mask** let you control the area on the clip where you want to apply the mask. You can enter the values you want in the text boxes or drag the appropriate sliders (**Left**, **Right**, **Top**, and **Bottom**).

- **Left** Adjusts the left edge of your mask.
- **Right** Adjusts the right edge of your mask.
- **Top** Adjusts the top edge of your mask.
- **Bottom** Adjusts the bottom edge of your mask.
- **Select Mask** Displays a dialog box in which you can apply your mask settings (see "Using Select Mask" on page 51).
- **Invert** Inverts the mask so that your effect is applied outside the mask, instead of within the mask.

Using Select Mask

To apply a mask to your Matrox effect using the **Select Mask** dialog box, click the triangle next to the **Select** property to expand it, then click the **Select Mask** button:

The **Select Mask** dialog box allows you to apply a mask in two ways:

- Click and drag directly in the **Select Mask** window to create the rectangular area where you wish to apply the mask.

  You can resize the mask area by dragging any side of the rectangle. For example, dragging the right side of the rectangle adjusts the right edge of the mask area. To resize the entire mask area at once, drag one of the corners (the corner that's diagonally opposite the corner you are moving will remain stationary).

- Use the **Left**, **Right**, **Top**, and **Bottom** controls to adjust any edge of your mask by a given number of pixels. You can enter values in the text boxes or drag the sliders to resize your mask area. For example, drag the **Left** slider to adjust the left edge of your mask area.

Creating a Matrox primary color correction

Color correction is important for all productions, whether you want to achieve continuity when cutting between shots, ensure broadcast safe levels, or establish and emphasize a "look." Matrox color correction provides basic proc amp control, three-way color correction complete with master, shadows, midtones, and highlights control, and input and output level control. You can also easily match colors with a reference shot. For more information about color matching, see "Matching colors between two clips" on page 63.
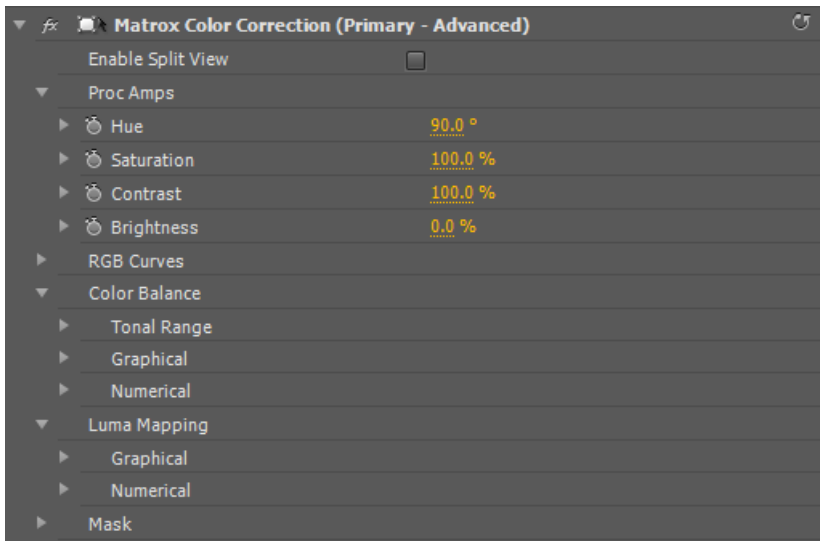
Tip   Adobe Premiere Pro includes a workspace setup that is optimized for working with clips and effects to facilitate color correction. To prepare your workspace for color correction, choose **Window > Workspace > Color Correction**.

⇒   **To set up a Matrox primary color correction:**

Click the triangle next to **Matrox Color Correction (Primary)** or **Matrox Color Correction (Primary - Advanced)** to expand the property list.

Note   The **RGB Curves** and **Tonal Range** settings are available only with the advanced versions of the Matrox primary and secondary color correction effects. Because the advanced versions of these effects require additional system resources, you should apply them only if you want to use the **RGB Curves** or **Tonal Range** settings.

- **Enable Split View**   Select this option to split your clip into two sections in the Program Monitor and on your video monitor. One section will display your clip as you adjust the color correction controls, and the other section of

the clip will remain unchanged. For more information, see "Using Split View" on page 54.

(i) **Important**   This option is for preview only. You should clear it before you render your clip, otherwise the split will appear in your video output.

- **Proc Amps**   The processing amplifier (proc amp) controls allow you to adjust different aspects of your clip:
  - **Hue**   Adjusts the tint of the colors in the image.
  - **Saturation**   Adjusts the saturation (vividness) of the image's colors.
  - **Contrast**   Adjusts the difference in luminance between the lightest and darkest areas of the image.
  - **Brightness**   Adjusts the level of black in the image.
- **RGB Curves**   Lets you use curves to adjust the red, green, and blue color channels of your clip individually, or use a master curve to adjust all color channels simultaneously. For more information, see "Using RGB curves" on page 56.
- **Color Balance**   These controls let you adjust the mixture of colors in your clip.
  - **Tonal Range**   Allows you to fine-tune the tonal ranges of your clip by reducing the range of pixels included for shadows, midtones, or highlights. For more information, see "Adjusting tonal range" on page 58.
  - **Graphical**   Allows you to see a graphical representation of your changes when you adjust the color balance settings. You can also modify most of the color balance settings directly within the graph. For more information, see "Using the color balance graph" on page 59.
  - **Numerical**   Lets you adjust your color balance settings numerically by entering values in the text boxes, or by dragging the corresponding sliders. You can adjust the **Hue**, **Saturation**, and **Luminance** for each tonal range.
    - **Master (Hue**, **Saturation**, and **Luminance)**   Affects all areas of your clip from the lightest white to the darkest black.
    - **Shadows (Hue**, **Saturation**, and **Luminance)**   Affects the darkest areas of your clip.
    - **Midtones (Hue**, **Saturation**, and **Luminance)**   Affects the areas with tones between the darkest and lightest areas of your clip.
    - **Highlights (Hue**, **Saturation**, and **Luminance)**   Affects the lightest areas of your clip.
- **Luma Mapping**
  - **Graphical**   Allows you to see a graphical representation of your changes when you adjust the luma mapping settings. You can also modify the

luminance of your clip directly within the graph. For more information, see "Using the luma mapping graph" on page 65.

– **Numerical** Lets you adjust the luma mapping settings numerically by entering values in the text boxes, or by dragging the corresponding sliders.

• **Input Levels (Black** and **White)** These controls let you fine-tune your clip's brightness and contrast by changing the luminance value that represents black, white, or gray. Doing so expands or compresses the range of luminance levels in your clip, which increases or decreases your clip's tonal range.

For example, by increasing the black value, you set black in your clip to a higher luminance value, which compresses the luminance range and darkens your clip proportionally.

• **Output Levels (Black** and **White)** These controls let you map the values under **Input Levels** to any level of black and white. You can reduce contrast in your clip, or reverse the luminosity of your clip by setting black to a higher value than white.

• **Gamma** Use this to adjust the midtones in your clip without adjusting black or white.

• **Mask** Allows you to apply a mask to your effect. For more information, see "Applying a mask to your Matrox effects" on page 50.

Using Split View

The Split View option allows you to split your clip in two for preview on your Program Monitor and your video monitor. One section displays your clip as you adjust the color correction controls, while the other section of the clip remains unchanged.

There are two ways to enable Split View. You can select the **Enable Split View** option in the **Effect Controls** panel, or work directly in Adobe Premiere Pro's Program Monitor using your mouse.

Working with Split View in the Program Monitor

To activate the Split View controls in the Program Monitor, click the Transform icon ( ) beside the name of the Matrox color correction effect in the **Effect Controls** panel. The Split View button will appear in the upper left corner of the Program Monitor:

Split View button

Enable Split View by clicking the Split View button. You can then drag the handles on the corners of the split rectangle to define the area you want to split. You can also drag the split rectangle to move it to a specific region of your clip. The area within the split view rectangle will display any color correction you make, while the area outside remains unchanged.

In the following example, the split view rectangle has been moved to display the color correction in the area surrounding part of the Chinese character on the wall:
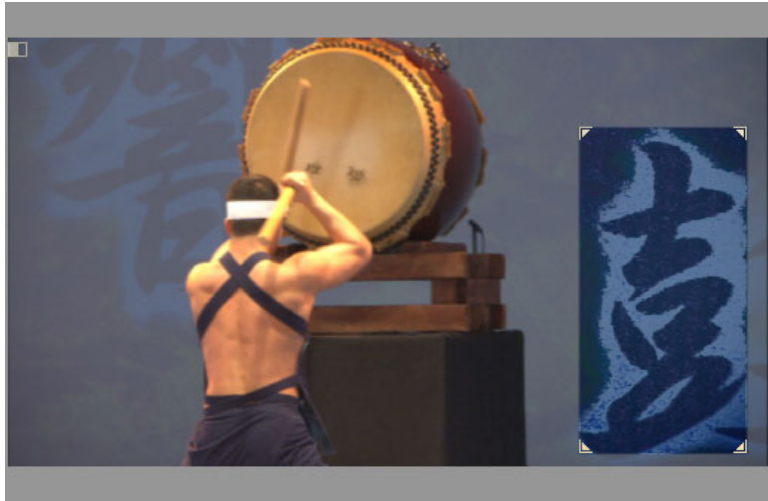
Remarks

• The Split View option is for preview only. You should disable it before rendering your material, otherwise the split will appear in your video output.

• If you enable Split View and create a mask outside the split view rectangle, you will not be able to see it. The mask will only be visible when you move the split view rectangle directly over it. If you invert a mask that is not in the split view rectangle area, the whole clip will be inverted since the mask is ignored.

Creating a Matrox primary color correction

Using RGB curves

✏️ **Note**   The **RGB Curves** settings are available only with the advanced versions of the Matrox primary and secondary color correction effects.

With RGB curves, you can individually adjust the red, green, and blue color channels across the entire tonal range of your clip, or adjust all three color channels simultaneously with a master curve. RGB curves allow you to achieve color effects that would be difficult, if not impossible, to achieve using the **Color Balance** settings, and also give you a high degree of control over the color channels in each tonal range. For example, you can easily add a red, green, or blue tint to your clip, or use the master curve as a way to adjust the brightness and contrast of your clip.

Each curve is displayed on a grid with the horizontal axis representing the input or current pixel value, and the vertical axis representing the output value of the pixel after the curve adjustment is applied. By default, a curve starts as a straight line with two end points, one at the bottom left of the grid (shadows), and the other at the top right of the grid (highlights). Before any adjustments are made, each point on the curve has the same input and output value.
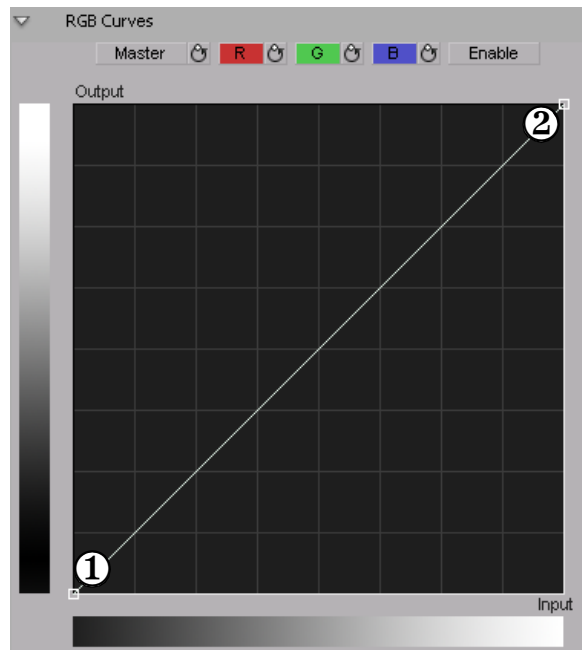
① **Default end point (shadows)**   ② **Default end point (highlights)**

Click the **R**, **G**, or **B** button to select the curve corresponding to the color channel you want to adjust, or click the **Master** button for the master curve, and then drag the curve to obtain your desired effect. For example, click the **R** button and drag the top right end point towards the top left of the grid to increase the slope of the curve and add red to the clip. Drag that same point towards the bottom right of the grid to decrease the slope of the curve and remove red from the clip. Clicking the **Enable** button will show/hide any adjustments you have made to the RGB channels at any time (you do not need to click **Enable** to start adjusting the curves).

Tip For increased precision, hold down the **ALT** key while you drag the curve, or the **CRTL** key to change your cursor into a crosshair that will help you align your curve to the grid.

You can add up to 14 control points to each curve in addition to the two default end points. These control points act as anchors that allow you to lock your curve so adjustments can be applied only to specific tonal ranges. Click on a curve to add control points, and hold the **SHIFT** key while clicking a control point to delete it (end points cannot be deleted). Adjusting the points in the top right area of the grid affects highlights, the middle area affects midtones, and the bottom left area affects shadows. For example, the following S-shaped master curve adds contrast in the midtones range, without creating any completely black or white areas.
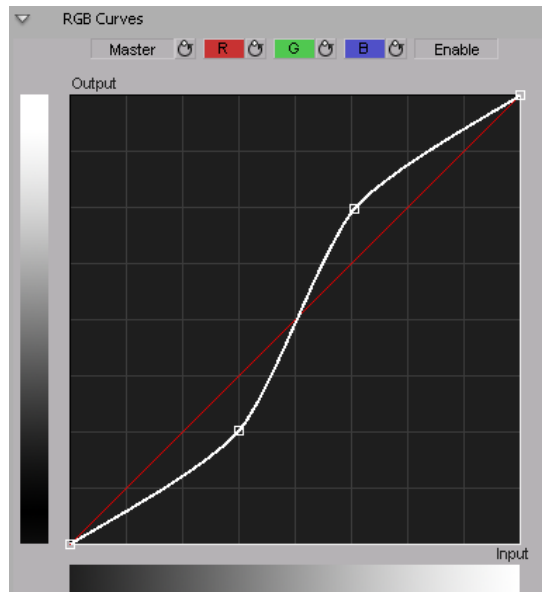
If you want to reset the **Master**, **R**, **G**, or **B** curve to its default setting at any time, click the appropriate Reset button.

Red curve Reset button

Tip   By applying a mask to your clip, you can adjust the RGB channels for that specific area of your clip, or invert the mask to isolate that same area from being affected by your RGB adjustments.
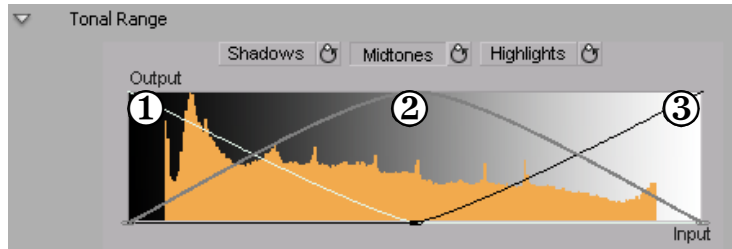
Adjusting tonal range

Note   The **Tonal Range** settings are available only with the advanced versions of the Matrox primary and secondary color correction effects.

Using the tonal range curves allows you to fine-tune the range of pixels that are affected when you make a color correction to the shadows, midtones, or highlights of your clip using the color balance graph. For more information, see

The histogram shows the distribution of pixels in each tonal range of your clip. In the following example, the histogram represents a clip with a high amount of shadows (left), a lesser amount of midtones (middle), and an even lesser amount of highlights (right).


① **Shadows**   ② **Midtones**   ③ **Highlights**

Click the **Shadows**, **Midtones**, or **Highlights** button to select the curve corresponding to the tonal range you want to adjust, and then drag the curve as desired to reduce the number of pixels to be included in each tonal range.

Note   You cannot increase the number of pixels in a tonal range. For example, you can't extend the shadows curve into the highlights range.
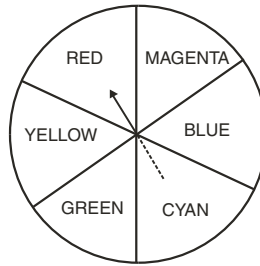
Using the color balance graph

The color balance graph allows you to modify the **Color Balance** settings for each tonal range directly within the color maps. You can also perform an auto balance or a color match using the buttons beneath the color maps. For more information, see "Performing an auto balance" on page 62 and "Matching colors between two clips" on page 63. Depending on which color map you use, you can adjust your clip globally, or only the shadows, midtones, or highlights.
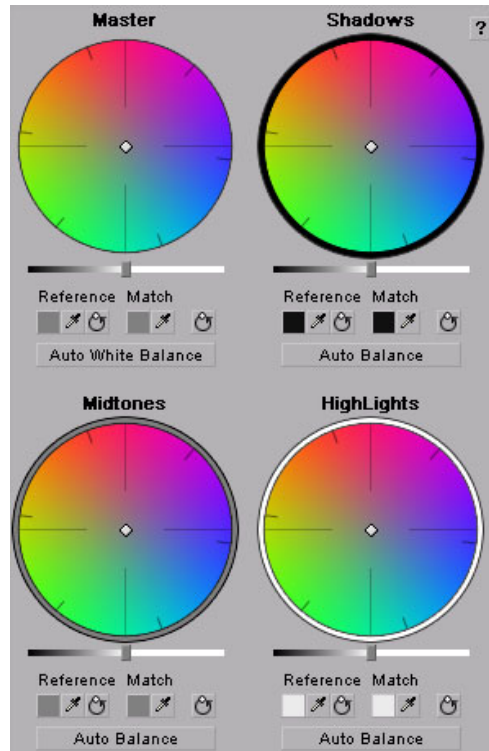
You can drag the handle in the center of any color map to adjust the color balance (**Hue** and **Saturation**) for a specific tonal range, such as to adjust the color balance globally throughout your clip using the **Master** color map, or adjust the color balance of only the shadows using the **Shadows** color map. Drag the handle toward a color you want to increase in your clip, or away from a color you

want to decrease. For example, if you move the handle towards red, you also decrease cyan by the same amount, as shown in the following diagram:

Tip   For increased precision, hold down the **ALT** key while you drag the handle.

If you want to reset the color balance (**Hue** and **Saturation)** setting, click the Reset Color Balance button under the color map you are using.
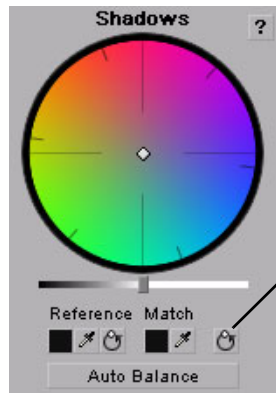
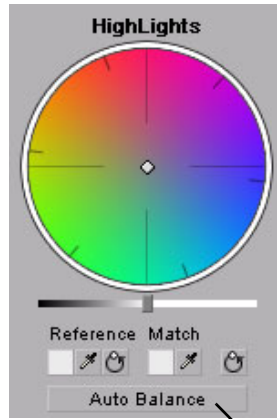**Reset Color Balance button**

To adjust the luminance for a tonal range, drag the corresponding luminance slider under the appropriate color map. For example, if you want to adjust the

luminance for only the shadows, drag the luminance slider under the **Shadows** color map.
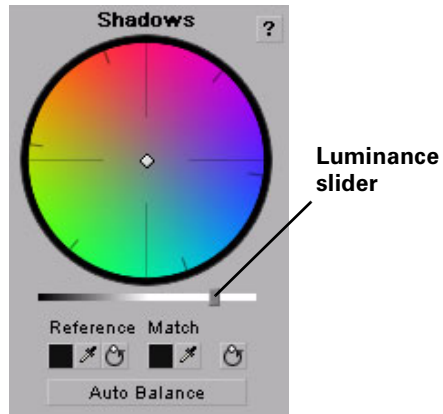
Performing an auto balance

Before matching colors, you can perform an auto balance on your target clip to automatically apply a color shift to your clip to compensate for different lighting conditions. To do this, click the **Auto Balance** button under the corresponding color map and use the eyedropper to select the area you want to correct in your clip. For example, to balance your clip's highlights, click the **Auto Balance** button under the **Highlights** color map, and click (or click and drag) on the lightest area of your clip. The auto balance is performed immediately.


Auto Balance button

Note   To perform an auto white balance, click the **Auto White Balance** button under the **Master** color map, and click (or click and drag) on a white or light gray area of your clip.

Matching colors between two clips

You can perform a color match to match colors between two clips (such as skin tone, sky, etc.). The color match lets you select colors from a reference clip to match to your target clip. You can affect the colors globally (**Master**), or just the **Shadows**, **Midtones**, or **Highlights**.

You can select the colors for your reference color and match color by either clicking the Color Picker button or the eyedropper.

Color Picker button   **Eyedropper**
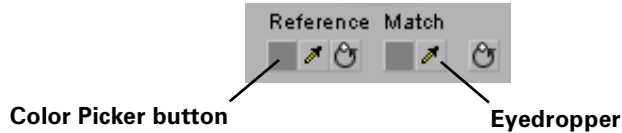
The eyedropper can be used in two ways:

- Click the eyedropper button and click on the desired color in your clip.
- Click the eyedropper button and click and drag anywhere on your clip to create a rectangular area containing the color you want to select. The selected color will be an average of the pixel information contained within the rectangle.

To perform a color match:

1 Prepare your workspace for color correction by choosing **Window > Workspace > Color Correction**.

2 Open your target clip (clip that contains the colors you want to correct) in the Source Monitor.

Note For best results when using a target clip that has multiple effects applied to it, create a nested sequence and open it in your Source Monitor before performing the color match. For more information about creating nested sequences, see your Adobe Premiere Pro documentation.

3 Apply the **Matrox Color Correction** effect to your target clip on the timeline.

4 Use the controls under the Reference Monitor to move to a frame in your reference clip that contains the colors you want to match.

5 Use the controls under the Source Monitor to go to the frame in your target clip that contains the colors you want to match to your reference clip.

6 Select a reference color from your reference clip by using the Reference Color eyedropper under the color map you want to affect (**Master**, **Shadows**, **Midtones**, or **Highlights**).
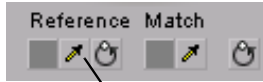
Reference Color eyedropper

7 For example, to match a very dark color in your reference clip to your target clip, click the Reference Color eyedropper under the **Shadows** color map, and click (or click and drag) on the desired color in your reference clip.

8 Select a match color from your target clip in the Source Monitor window by using the Match Color eyedropper under the corresponding color map (**Master**, **Shadows**, **Midtones**, or **Highlights**).
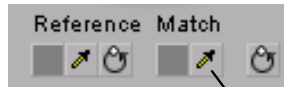
Match Color eyedropper

Using the luma mapping graph

To modify your luma mapping values directly in the graph, click the triangle next to the **Luma Mapping Graphical** property to expand it:

- **Map**   This is the default view when you first expand the **Graphical** property. You can drag the handles in the graph to adjust the **Input** and **Output** levels for black and white, as well as the **Gamma**.
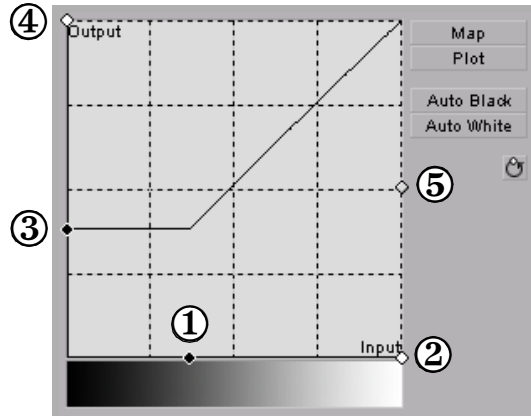
① Input Black Level	② Input White Level	③ Output Black Level	④ Output White Level	⑤ Gamma

- **Plot**   Click this button to plot the luminance values in the current frame of your clip to the histogram (the plot will reflect any color correction changes you've made). Each luminance value present in your image appears as a vertical line in the histogram. A longer line indicates a higher amount of pixels in your image of that line's luminance value. You can drag the handles

in the graph to adjust the **Input** and **Output** levels for black and white, as well as the **Gamma**.
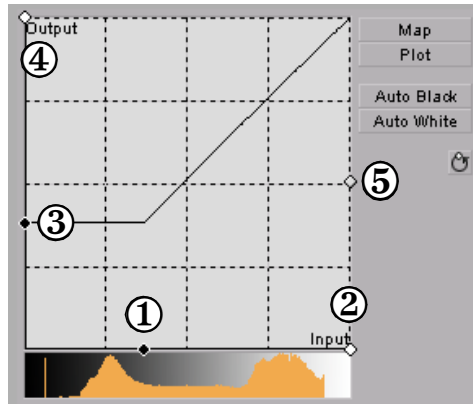

① Input Black Level	② Input White Level	③ Output Black Level	④ Output White Level	⑤ Gamma

- **Auto Black**   Click this to define the darkest pixels in your clip as black. The intermediate luminance values are proportionally redistributed.

- **Auto White**   Click this to define the lightest pixels in your clip as white. The intermediate luminance values are proportionally redistributed.

Note   If you want to restore the default luminance values at any time, click the Restore Default Values button.

Restore Default Values button

Creating a Matrox secondary color correction

Matrox secondary color correction offers all the properties found in Matrox primary color correction, with the added capability of limiting the color correction to a specific range of pixels using the selective key properties. For example, secondary color correction can be used to change the color of a dress, deepen the background sky color, or to achieve an effect where only one object or person remains in color while the rest of the image becomes black and white. For details on how to isolate a color and make the rest of the clip black and white, see "Creating a color pass effect" on page 76.

Tip Adobe Premiere Pro includes a workspace setup that is optimized for working with clips and effects to facilitate color correction. To prepare your workspace for color correction, choose **Window > Workspace > Color Correction**.

To set up a Matrox secondary color correction:

Click the triangle next to **Matrox Color Correction (Secondary)** or **Matrox Color Correction (Secondary - Advanced)** to expand the property list.
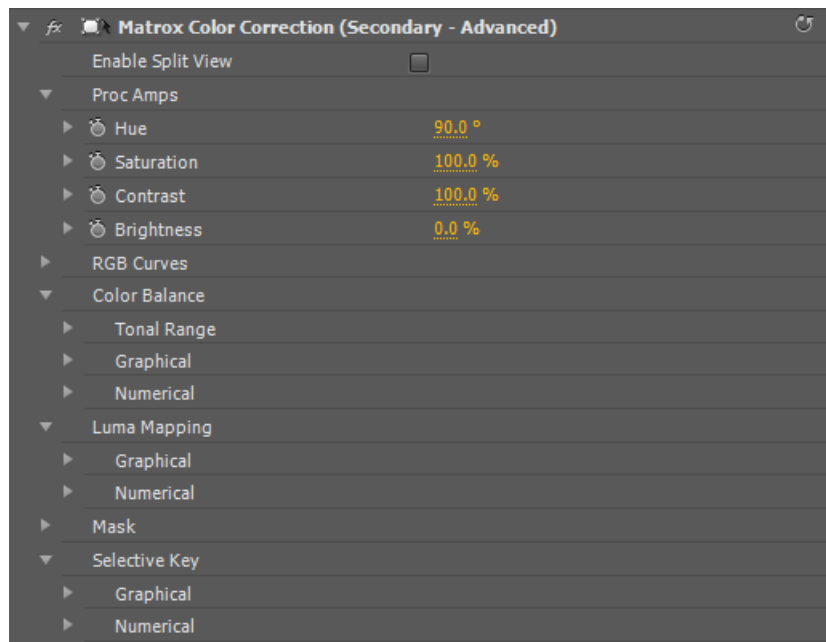
Note The **RGB Curves** and **Tonal Range** settings are available only with the advanced versions of the Matrox primary and secondary color correction effects. Because the advanced versions of these effects require additional system resources, you should apply them only if you want to use the **RGB Curves** or **Tonal Range** settings.

- **Enable Split View**   Select this option to split your clip into two sections in the Program Monitor and on your video monitor. One section will display your clip as you adjust the color correction controls, and the other section of the clip will remain unchanged. For more information, see "Using Split View" on page 54.

- **Proc Amps**   The processing amplifier (proc amp) controls allow you to adjust different aspects of your clip:
  – **Hue**   Adjusts the tint of the colors in the image.
  – **Saturation**   Adjusts the saturation (vividness) of the image's colors.
  – **Contrast**   Adjusts the difference in luminance between the lightest and darkest areas of the image.
  – **Brightness**   Adjusts the level of black in the image.

- **RGB Curves**   Lets you use curves to adjust the red, green, and blue color channels of your clip individually, or use a master curve to adjust all color channels simultaneously. For more information, see "Using RGB curves" on page 56.

- **Color Balance**   These controls let you adjust the mixture of colors in your clip.
  – **Tonal Range**   Allows you to fine-tune the tonal ranges of your clip by reducing the range of pixels included for shadows, midtones, or highlights. For more information, see "Adjusting tonal range" on page 58.
  – **Graphical**   Allows you to see a graphical representation of your changes when you adjust the color balance settings. You can also adjust and modify most of the color balance settings directly within the graph. For more information, see "Using the color balance graph" on page 59.
  – **Numerical**   Lets you adjust your color balance settings numerically by entering values in the text boxes, or by dragging the corresponding sliders. You can adjust the **Hue**, **Saturation**, and **Luminance** for each tonal range.
    - **Master (Hue**, **Saturation**, and **Luminance)**   Affects all areas of your clip from the lightest white to the darkest black.
    - **Shadows (Hue**, **Saturation**, and **Luminance)**   Affects the darkest areas of your clip.
    - **Midtones (Hue**, **Saturation**, and **Luminance)**   Affects the areas with tones between the darkest and lightest areas of your clip.
    - **Highlights (Hue**, **Saturation**, and **Luminance)**   Affects the lightest areas of your clip.

- **Luma Mapping**

- **Graphical**   Allows you to see a graphical representation of your changes when you adjust the luma mapping settings. You can also modify the luminance of your clip directly within the graph. For more information, see "Using the luma mapping graph" on page 65.

- **Numerical**   Lets you adjust your luma mapping settings numerically by entering values in the text boxes, or by dragging the corresponding sliders.

  - **Input Levels (Black** and **White)**   These controls let you fine-tune your clip's brightness and contrast by changing the luminance value that represents black, white, or gray. Doing so expands or compresses the range of luminance levels in your clip, which increases or decreases your clip's tonal range.

    For example, by increasing the black value, you set black in your clip to a higher luminance value, which compresses the luminance range and darkens your clip proportionally.

  - **Output Levels (Black** and **White)**   These controls let you map the values under **Input Levels** to any level of black and white. You can reduce contrast in your clip, or reverse the luminosity of your clip by setting black to a higher value than white.

  - **Gamma**   Use this to adjust the midtones in your clip without adjusting black or white.

- **Mask**   Allows you to apply a mask to your effect. For more information, see "Applying a mask to your Matrox effects" on page 50.

- **Selective Key**   The selective key settings allow you to apply the color correction effect to a specific range of pixels in your clip. Performing a selective key is similar to performing a chroma or luma key, however, with a selective key you are applying color correction to the keyed area instead of transparency. For example, if you use the selective key properties to select red as your **Hue** color, the color correction will be applied to the red regions in your clip. You can enable each keyer (**Hue**, **Saturation**, and **Luma**) individually, or enable all three at the same time to get the desired results.

  - **Graphical**   Allows you to see a graphical representation of your changes when you adjust the selective key **Numerical** settings. You can also modify the settings directly within the graph and perform an auto key. For more information, see "Using the selective key graph" on page 72.

  - **Numerical**   Lets you adjust your key settings numerically by entering values in the text boxes, or by dragging the corresponding sliders.

    - **Hue Key**   This type of key lets you select areas to be keyed (affected by the color correction) based on their hue.

      - **Enable**   Select this to enable the **Hue Key** properties and hue key indicator in the selective key graph.

Creating a Matrox secondary color correction

- **Hue**   Use this to rotate the indicator around the perimeter of the color spectrum so that you can select different hues (colors) on which to key.

- **Aperture**   Use this to widen or narrow the aperture of the indicator to increase or decrease the range of colors on which you want to key.

- **Softness**   Sets the amount of softness applied to the range of colors specified in the aperture region.

- **Saturation Key**   This lets you select colors to be keyed (affected by the color correction) based on their saturation value. Pale colors have a low saturation value, while vivid colors have a high saturation value.

    - **Enable**   Select this to enable the **Saturation Key** properties and saturation key indicator in the selective key graph.

    - **Low Clip**   Use this to select the lower saturation values to be keyed.

    - **Low Gain**   Use this to set the range of saturation values you want to be partially affected based on the value set by the **Low Clip** control. As you increase the **Low Gain** setting, more pixels are partially affected by the color correction. If you decrease the **Low Gain** control, less pixels are partially affected.

        A **Low Gain** setting of 100 provides the widest range for maximum color correction. Alternately, a gain setting of 0 creates a key where saturation values are either completely affected or left untouched. You can think of the **Low Gain** control as defining an "Affected to Untouched" range for keying the pale colors in your image.

    - **High Gain**   This control is similar to the **Low Gain** setting, except you use it to set the range of higher saturation values you want to be partially affected based on the value set by the **High Clip** control. As you increase the **High Gain** setting, less pixels are partially affected by the color correction. If you decrease the **High Gain** setting, more pixels are partially affected. You can think of the **High Gain** control as defining an "Untouched to Affected" range for keying the vivid colors of your image.

    - **High Clip**   This control is similar to **Low Gain**, except you use it to select the higher saturation values to be keyed.

    📝   **Note**   The values you can select using the **Low Clip** and **Low Gain** controls are dependent on the **High Clip** and **High Gain** controls, and vice versa. This prevents the low and high controls from keying on the same values.

- **Luma Key**   This type of key lets you select areas to be keyed (affected by the color correction) based on their luminance value.

    - **Enable**   Select this to enable the **Luma Key** properties and luma key indicator in the selective key graph.

- **Low Clip** Use this to select the lower (darker) luminance values to be keyed. A **Low Clip** setting of 0 represents black, and a setting of 255 represents white. Intermediate settings represent different shades of gray, from very dark to very light gray.

- **Low Gain** Use this to set the range of luminance values you want to be partially affected based on the value set by the **Low Clip** control. As you increase the **Low Gain** setting, more luminance values become partially affected by the color correction.

  A **Low Gain** setting of 100 provides the widest range for maximum color correction. Alternately, a gain setting of 0 creates a key where the luminance values are either completely affected or left untouched. You can think of the **Low Gain** control as defining an "Affected to Untouched" range for keying the dark areas of your image.

- **High Gain** This control is similar to **Low Gain**, except you use it to set the range of luminance values you want to be partially affected based on the value set by the **High Clip** control. You can think of the **High Gain** control as defining an "Untouched to Affected" range for keying the lighter areas of your image.

- **High Clip** This control is similar to **Low Clip**, except you use it to select the higher (brighter) luminance values to be keyed.

📝 **Note** The values you can select using the **Low Clip** and **Low Gain** controls are dependent on the **High Clip** and **High Gain** controls, and vice versa. This prevents the low and high controls from keying on the same luminance values.

- **Invert Key** Select this to invert the key selection, giving you the opposite result of what you originally selected.

- **Show Key as Output** Select this to display the matte used to define your selective key region. This enables you to further refine your key. Areas that are completely affected by the color correction are white, untouched areas are black, and gray areas are partially affected.

- **Expand Outside Mask** Applies the color correction settings outside the mask area. This setting is especially useful when setting up a color pass effect where you have several objects of the same color but want to retain the color for only one object. For more information, see "Creating a color pass effect" on page 76.

**Creating a Matrox secondary color correction**

Using the selective key graph

The selective key graph allows you to modify your selective key settings (**Hue
Key**, **Saturation Key**, and **Luma Key**) directly in the graph. You can also
perform an auto key.

• **Map** This is the default view when you first expand the graphical property.
You can drag the handles to move the indicator to different regions in the
graph to adjust the **Hue Key**, **Saturation Key**, and **Luma Key** settings.
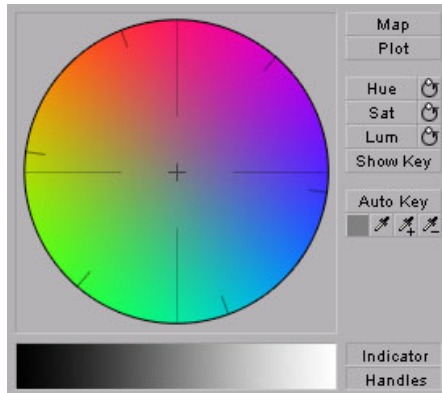
In order to see the indicator and handles, you have to enable the key setting you
want to use. For example, if you want to adjust the **Hue Key** properties, you need
to click the **Hue** button in the selective key graph or select the **Enable** option in
the **Hue Key** numerical properties. In the following graph, the **Hue** properties
have been enabled.
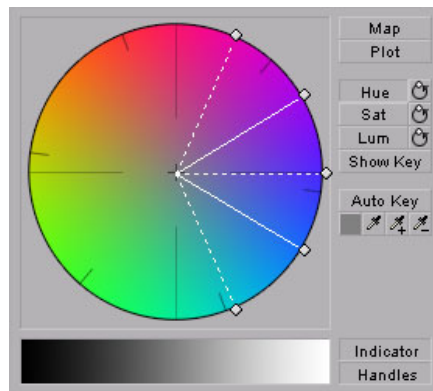
• **Plot** Click this button to plot the colors and luminance values that are
present in the current frame of your clip. You can drag the handles to move
the indicator to different regions in the graph to adjust the **Hue Key**,
Saturation Key, and **Luma Key** properties. The luma plot histogram shows

each luminance value present in your image as a vertical line. A longer line indicates a higher amount of pixels in your image of that line's luminance value.
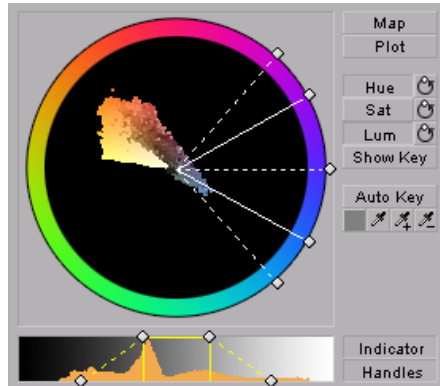
- **Hue**   Click this button to enable or disable the **Hue Key** properties (**Hue**, **Aperture** and **Softness**). When enabled you will be able to see the **Hue Key** indicator and handles to modify the **Hue Key** properties in the selective key graph.
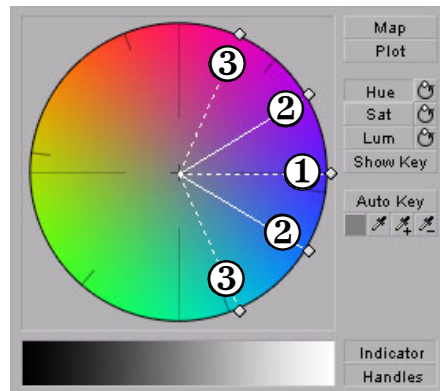
① **Hue**	② **Aperture**	③ **Softness**

- **Sat**   Click this button to enable or disable the **Saturation Key** properties (**Low Clip**, **Low Gain**, **High Gain**, and **High Clip**). When enabled you will

be able to see the **Sat Key** indicator and handles to modify the **Saturation Key** properties in the selective key graph.
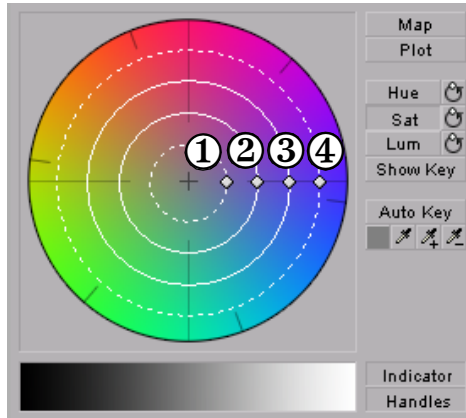
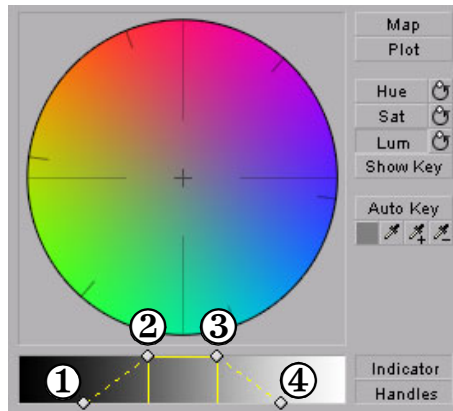| ① Low Clip | ② Low Gain | ③ High Gain | ④ High Clip |

- **Lum**   Click this button to enable or disable the **Luma Key** properties (**Low Clip**, **Low Gain**, **High Gain**, and **High Clip**). When enabled you will be able to see the **Lum Key** indicator and handles to modify the **Luma Key** properties in the selective key graph.

| ① Low Clip | ② Low Gain | ③ High Gain | ④ High Clip |

- For both the **Saturation Key** and **Luma Key** properties, you can lock and move all the handles at the same time in the selective key graph by pressing **SHIFT** and then dragging any handle. If you press **CTRL** you can lock and move either the **Low Clip** and **Low Gain** handles or **High Gain** and **High Clip** handles.

Chapter 4, Setting Up Realtime Effects with Adobe Premiere Pro

Note   If you want to reset the hue, saturation, and luma key properties to the default settings at any time, click the appropriate Reset button.

**Saturation Key
Reset button**

Hue	
Sat	
Lum	

- **Show Key**   Click this button to display the matte used to define your selective key region. This enables you to further refine your key. Areas that are completely affected by the color correction are white, untouched areas are black, and gray areas are partially affected.

- **Auto Key**   Click this button to automatically key on the most common color at the current frame (except gray). Selecting **Auto Key** affects values for the **Hue Key**, **Saturation Key**, and the **Luma key** properties. Alternately, you can use the auto key eyedropper to select a color on which you want to key.

Auto Key

**Auto key
eyedropper**
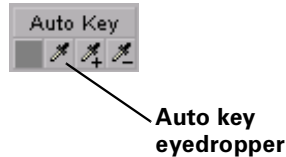
- The auto key eyedropper can be used in two ways:
  - Click the eyedropper button and click on a color on which you want to key.
  - Click the eyedropper button and click and drag anywhere on your clip to create a rectangular area containing the color on which you want to key. The selected color will be an average of the pixel information contained within the rectangle.

You can further refine your auto key color by using the plus and minus eyedroppers.

Auto Key

**Plus and minus
eyedroppers**
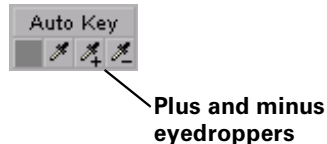
For example, if you selected light red as your auto key color and would like a dark red color in your clip to be included in the auto key, you can use the plus eyedropper to select that dark red in your clip. To remove colors from your auto key, use the minus eyedropper.

Note   The Show Key mode and any color correction applied will be temporarily deactivated in the Program Monitor when using an eyedropper.

**Creating a Matrox secondary color correction**

This allows you to see the original colors of your clip before any modifications were made.

- **Indicator**   Click this button to turn the indicator lines on or off.
- **Handles**   Click this button to turn the handles for the indicator lines on or off.

Creating a color pass effect

You can use the Matrox secondary color correction to create a color pass effect to convert your clip to black and white, with the exception of one specified color. This can be useful if you want to isolate a single color to make it prominent.

In the following example, the pink color of the girl's shirt has been retained, while the rest of the clip has been converted to black and white:
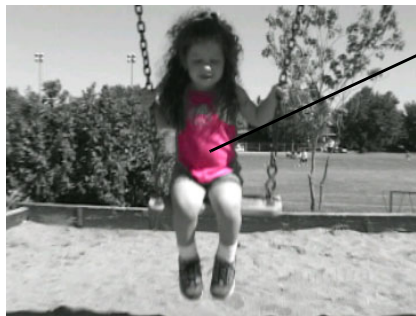
Pink shirt is isolated, while the rest of clip is grayscale.

⇒ **To perform a color pass effect:**

1 Click the Auto Key eyedropper in the selective key graph and click and drag anywhere on your clip to create a rectangular area containing the color you want to isolate.

2 Under **Proc Amps**, set the **Saturation** to 0.

3 Select **Invert Key**.

If you have more than one object of the same color but you want to isolate only one of those objects, you can apply a mask and use the **Expand Outside Mask** option to isolate the area that contains the color you want to remain intact. For example, if you have a clip that has two roses that are the same red and you would like only one of them to remain red, you can do the following.

⇒ **To perform a color pass effect using the Expand Outside Mask option:**

1 Click the auto key eyedropper in the selective key graph and click and drag anywhere on your clip to create a rectangular area containing the color you want to isolate.

2 Under **Proc Amps** set the **Saturation** to 0.

3 Select **Invert Key**.

4 Apply a mask surrounding the colored object you want to remain intact (see the next section, "Applying a mask to your Matrox effects).

5 Select **Expand Outside Mask**.

Overview of the Matrox chroma key effects

You can apply a Matrox chroma key or chroma key shadow effect to make certain areas of a foreground image transparent based on a color in that image, so that an underlying image can show through.

In the following example of a chroma key effect, our foreground image is a video clip of a woman sitting in front of a green backdrop, and our underlying image is a video clip of a sand dune:

Foreground image

+
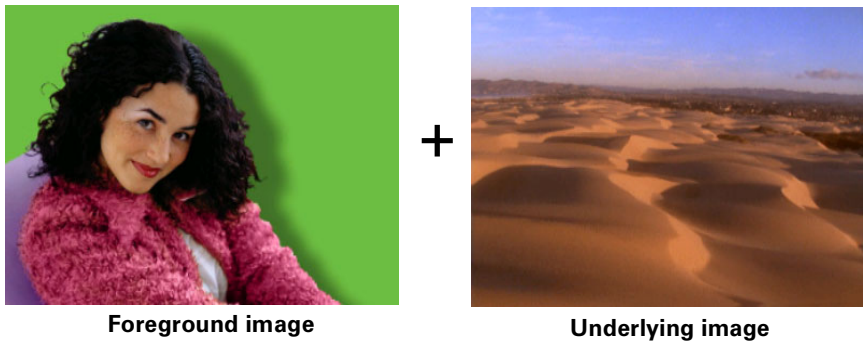
Underlying image

By chroma keying on the particular shade of green in the backdrop of the foreground image, the backdrop area becomes transparent and the corresponding area of the underlying image shows through in the composite image as follows:

=

Result of chroma key

(i) **Important** The chroma key shadow effect includes controls for fine-tuning shadows in your effect. It is best to use the chroma key shadow effect when you are performing a chroma key without any additional effects. If you want to apply

additional effects to your chroma key, you will get more desirable results by using the chroma key effect without shadow controls. For example, if you want to apply an Adobe Motion effect to your chroma key, you should use the chroma key effect and not the chroma key shadow effect.

Creating a chroma key or chroma key shadow effect

To set up a Matrox chroma key or chroma key shadow effect, click the triangle next to **Matrox Chroma Key/Matrox Chroma Key Shadow** to expand the property list:
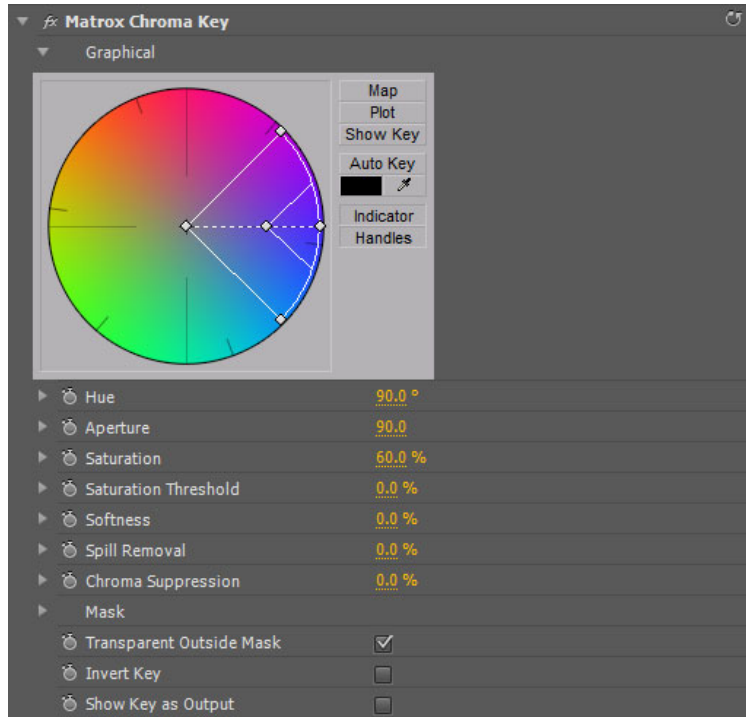
- **Graphical**   Provides a graphical representation of the chroma key controls that you can use to select your key colors, and also lets you perform an auto key.
  - **Map**   Lets you select your key colors within a circular graph that contains a color spectrum.
  - **Plot**   Displays a plot of the colors present in your clip so that you can select the particular colors on which you want to key.

    – **Show Key**   Click this button to display the matte used to create your key effect. This enables you to further refine your key. For example, when you display the matte, your key color (such as green) appears as black, and opaque areas appear as white. If you notice some white spots that you want to key, you can adjust the key controls until the undesired white spots disappear.

    – **Auto Key**   Click this button to automatically key on the most common color at the current frame in your clip (except gray).

For details on selecting key colors within the graph or performing an auto key, see "Using the chroma key graph to modify key colors and perform an auto key" on page 81.

✎ **Note**   You must expand the **Graphical** property in order to see the indicator when adjusting the chroma key controls.

- **Hue**   Use this to rotate the indicator around the perimeter of the color spectrum so that you can select different hues (colors) on which to key.

- **Aperture**   Use this to widen or narrow the aperture of the indicator to increase or decrease the range of colors on which you want to key.

- **Saturation**   Use this to select colors that have a particular saturation value. Pale colors have a low saturation value and are located at or near the center of the spectrum. Vivid colors have a high saturation value and are located at or near the perimeter of the spectrum. Because pale colors have low saturation, you'll find them more difficult to key on than the vivid colors.

- **Saturation Threshold**   Use this to proportionally increase or decrease the region outside of your saturation range. This controls how closely the **Saturation** value must match the key color before a region becomes transparent.

    For example, after applying a chroma key effect to a foreground image that includes dark areas or shadows that you want to preserve in your effect, you may find that these areas have become semi-transparent. By adjusting the **Saturation Threshold**, you can eliminate the key color from these dark areas, so that they'll become completely opaque.

- **Softness**   Use this to soften the edges of your key by blending parts of your foreground image with your underlying image. This makes certain areas of your foreground image partially transparent instead of completely transparent or opaque.

- **Spill Removal**   Use this to remove the contamination (spill) that your key color may leave on or around the edges of your foreground image. Spill is usually caused by light reflecting from your solid color backdrop (key color) onto your foreground image. **Spill Removal** replaces your key color from the "spill areas" with the opposite color in the spectrum, which returns a more natural look to these areas.

Creating a chroma key or chroma key shadow effect

- **Chroma Suppression**   Use this to remove any tint that your key color imposes on your foreground image. For example, if your solid color backdrop (key color) is green and you are using a person in your foreground image, the person's skin may have a green tint. You can adjust the **Chroma Suppression** to replace the green tint with the opposite color in the spectrum to return the person's skin to a more natural-looking color.

✎ **Note**   The following properties (**Luminance** and **Shadow Suppression**) are only available in the chroma key shadow effect.

- **Luminance**   Use this to adjust the luminance of your shadow. Negative values increase the brightness of the shadow, while positive values decrease the brightness.

- **Shadow Suppression**   Use this to make shadows in your clips less apparent. A higher value indicates less shadow.

- **Mask**   Allows you to apply a mask to your effect. For more information, see "Applying a mask to your Matrox effects" on page 50.

- **Transparent Outside Mask**   Select this option to apply transparency outside the mask area. This allows you to define a mask area where you want the keying to be performed, and show only your underlying image outside the mask. For more information, see "Applying a mask to your Matrox effects" on page 50.

- **Invert Key**   Select this to invert the key selection, giving you the opposite result of what you originally selected.

- **Show Key as Output**   Select this to display the matte used to create your key effect. This enables you to further refine your key. For example, when you display the matte, your key color (such as green) appears as black, and opaque areas appear as white. If you notice some white spots that you want to key, you can adjust the key controls until the undesired white spots disappear.

Using the chroma key graph to modify key colors and perform an auto key

To modify your key colors directly within the chroma key graph or perform an auto key, click the triangle next to the **Graphical** property to expand it:

- **Map**   This is the default view when you first expand the **Graphical** property. You can drag the handles in the color spectrum to move the indicator to different regions in the cube to adjust the **Hue**, **Aperture**, **Saturation**, and **Saturation Threshold**.
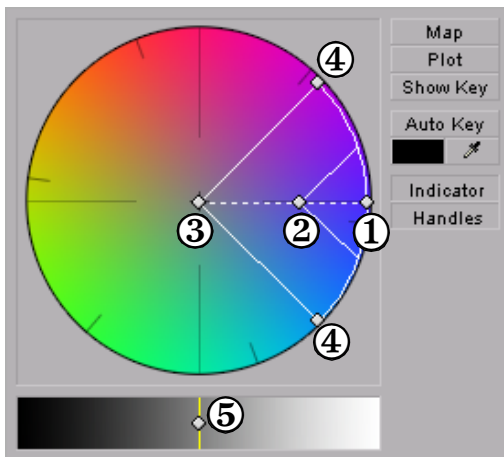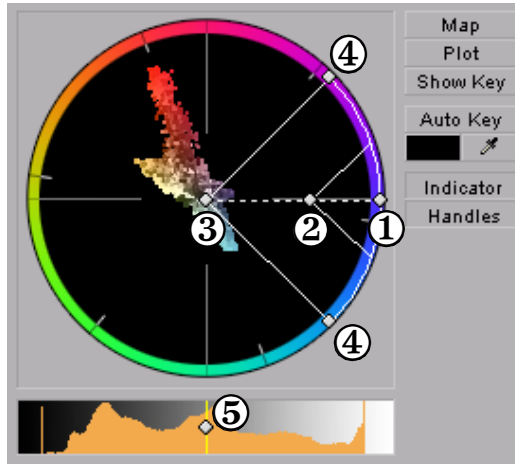

① **Hue**	② **Saturation**	③ **Saturation Threshold**	④ **Aperture**	⑤ Luminance

Note   This graph will contain a luminance spectrum only if you are creating a chroma key shadow effect. You can drag the handle in the luminance spectrum to adjust the **Luminance**.

- **Plot**   Click this button to plot the colors and luminance values that are present in the current frame of your clip. You can drag the handles in the chroma plot graph to move the indicator to different regions in the graph to adjust the **Hue**, **Aperture**, **Saturation**, and **Saturation Threshold**. The luma plot histogram shows each luminance value present in your image as a

vertical line. A longer line indicates a higher amount of pixels in your image of that line's luminance value.

> **Note**   The **Plot** graph will contain a luma plot histogram only if you are creating a chroma key shadow effect. You can drag the handle in the luma plot histogram to adjust the **Luminance**.

① **Hue**   ② **Saturation**   ③ **Saturation Threshold**   ④ **Aperture**   ⑤ **Luminance**

- **Show Key**   Click this button to display the matte used to create your key effect. This enables you to further refine your key. For example, when you display the matte, your key color (such as green) appears as black, and opaque areas appear as white. If you notice some white spots that you want to key, you can adjust the key controls until the undesired white spots disappear.

- **Auto Key**   Click this button to automatically key on the most common color at the current frame (except gray). Selecting **Auto Key** affects values for **Hue**, **Aperture**, **Saturation**, and **Saturation Threshold**. If your clip consists of a uniform key color that is evenly lighted, **Auto Key** will usually give you a good-quality chroma key. Alternately, you can use the eyedropper to select a color on which you want to key.

You can use the eyedropper in two ways:

– Click the eyedropper button and click on a color on which you want to key.

Chapter 4, Setting Up Realtime Effects with Adobe Premiere Pro

– Click the eyedropper button and click and drag anywhere on your clip to select a rectangular area containing colors on which you want to key.

Note   The Show Key mode and any chroma key applied will be temporarily deactivated in the Program Monitor when using the auto key eyedropper. This allows you to see the original colors of your clip before any modifications were made.

- **Indicator**   Click this button to turn the indicator on or off.
- **Handles**   Click this button to turn the handles for the indicator on or off.

Overview of the Matrox luma key effect

You can apply a Matrox luma key to make certain areas of a foreground image transparent based on the luminance in that image, so that an underlying image can show through.

In the following example of a luma key effect, two video clips are combined to produce the effect of two cowboys riding through fire. Our foreground image is a video clip of a ring of fire against a black background, and our underlying image is a video clip of two men riding horses:

Foreground image

Underlying image

By luma keying on the particular luminance (brightness) of the black areas in the foreground clip, these areas become transparent and the corresponding areas of the underlying image show through in the composite image as follows:
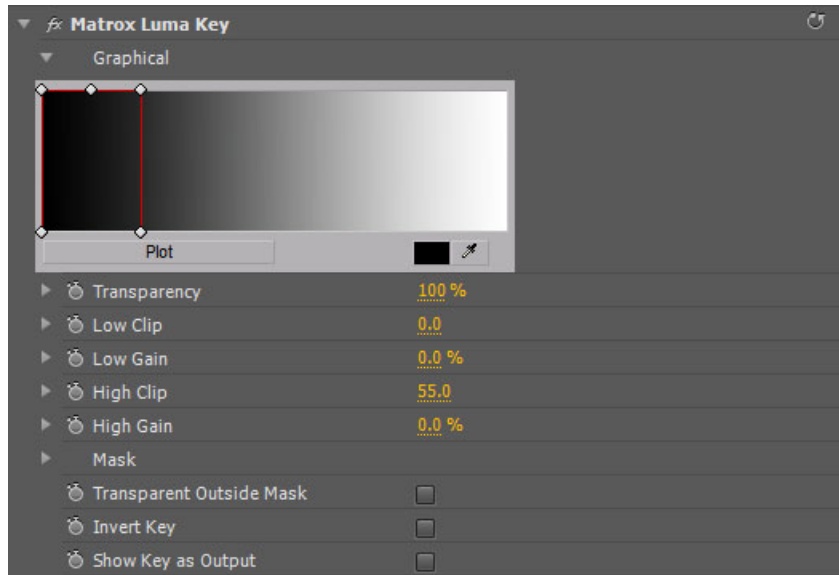

Result of luma key

Creating a luma key effect

To set up a Matrox luma key effect, click the triangle next to **Matrox Luma Key** to expand the property list:

- **Graphical**   Allows you to see a graphical representation of your changes when you adjust the property settings. You can adjust the luma key properties directly in the graph to select the luminance values on which you want to key. For more information, see .

- **Transparency**   Use this control to set the transparency level of your key effect. Higher values indicate higher transparency. For example, a **Transparency** value of 100 makes the keyed area in your foreground image completely transparent, leaving the underlying image visible.

- **Low Clip**   Use this to select the lower (darker) luminance values to be keyed. A **Low Clip** setting of 0 represents black, and a setting of 255 represents white. Intermediate settings represent different shades of gray, from very dark to very light gray.

- **Low Gain**   Use this to set the range of luminance values you want to be partially transparent based on the value set by the **Low Clip** control. As you increase the **Low Gain** setting, more luminance values become partially transparent to give you a softer-edged key.

  A **Low Gain** setting of 100 provides the widest range for maximum softness. Alternately, a gain setting of 0 creates a hard key where the luminance values are either completely transparent or opaque. You can think

of the **Low Gain** control as defining a "Transparent to Opaque" range for keying the dark areas of your foreground image.

- **High Clip**   This control is similar to **Low Clip**, except you use it to select the higher (brighter) luminance values to be keyed.

- **High Gain**   This control is similar to **Low Gain**, except you use it to set the range of luminance values you want to be partially transparent based on the value set by the **High Clip** control. You can think of the **High Gain** control as defining an "Opaque to Transparent" range for keying the lighter areas of your foreground image.

   The values you can select using the **Low Clip** and **Low Gain** controls are dependent on the **High Clip** and **High Gain** controls, and vice versa. This prevents the low and high controls from keying on the same luminance values.

- **Mask**   Allows you to apply a mask to your effect. For more information, see "Applying a mask to your Matrox effects" on page 50.

- **Transparent Outside Mask**   Select this option to apply transparency outside the mask area. This allows you to define a mask area where you want the keying to be performed, and show only your underlying image outside the mask. For more information, see "Applying a mask to your Matrox effects" on page 50.

- **Invert Key**   Select this to invert the key selection, giving you the opposite result of what you originally selected

- **Show Key as Output**   Select this to display the matte used to create your key effect. This enables you to further refine your key settings. For example, when you display the matte, areas of your clip that are completely transparent appear as black, and opaque areas appear as white. If you notice some white spots that you want to key, you can adjust the key controls until the undesired white spots disappear.

Using the luma key graph

The luma key graph contains a luminance spectrum and a luminance eyedropper. You can drag the handles in the luminance spectrum to adjust the **Transparency**, **Low Clip**, **High Clip**, **Low Gain**, and **High Gain** properties.


Eyedropper

You can select luminance values on which to key by adjusting the **Low Clip** and **High Clip** handles, or you can use the luminance eyedropper to automatically pick the luminance value you want to key on. The eyedropper can be used in two ways:

- Click the eyedropper button and click on the color with the desired luminance value in your clip.

- Click the eyedropper button and click and drag anywhere on your clip to create a rectangular area containing the luminance values you want to select. The selected luminance will be an average of the luminance values contained within the rectangle.

Note   Any luma key displayed in the Program Monitor will be temporarily deactivated when using the luminance eyedropper. This allows you to see the colors of your clip before any modifications were made.

You can also adjust the softness of your key with the **Low Gain**, **High Gain**, and **Transparency** handles. All these adjustments affect the shape and size of the luminance selector as follows:
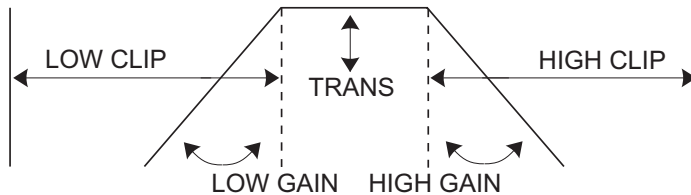
- **Plot**   Click this button to see the luminance spectrum with a plot that shows each luminance value present in your image as a vertical line in the histogram. A longer line indicates a higher amount of pixels in your image of that line's luminance value. You can drag the handles in the luma plot spectrum to adjust the **Transparency**, **Low Clip**, **High Clip**, **Low Gain**, and **High Gain** properties. Any adjustments made affect the shape and size of the luminance selector in the **Luma Plot**.
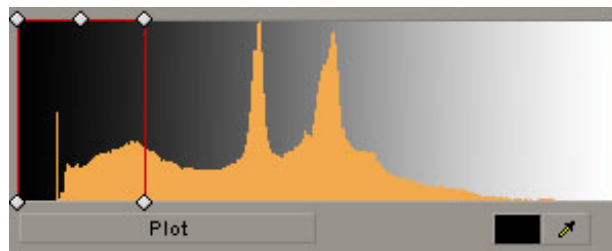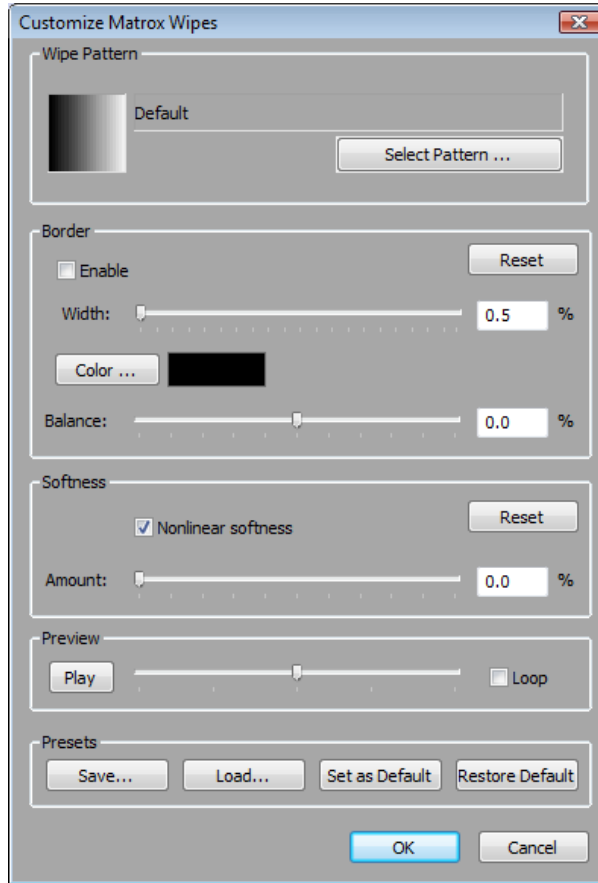
Creating a wipe transition

The Matrox wipe transitions support standard dissolves, SMPTE wipes, and organic wipes with soft edges and color borders.

⟹ **To set up a Matrox wipe transition:**

Click the transition's icon in your sequence, then click the **Custom** button in the **Effect Controls** panel. This opens the **Customize Matrox Wipes** dialog box:

1. Under **Wipe Pattern**, click the **Select Pattern** button and choose a pattern for your wipe.

2. If you would like to add a border to your wipe, select **Enable** under **Border**.

   – **Width**   Lets you adjust the width of your border by dragging the slider or entering a percentage in the text box.

   – **Color**   Click this button to select a color for your border.

- **Balance**   Lets you adjust the prominence of the border between image A and image B. For example, positive values make the border more prominent in image B, while negative values make the border more prominent in image A.

- **Reset**   Click this button to restore the default **Border** values.

3   Use the controls under **Softness** to create a soft edge on the border of your wipe.

- **Nonlinear softness**   This option is selected by default. You may find it useful to clear this option when using certain wipe patterns. For example, nonlinear softness often provides better results when creating SMPTE wipes, while linear softness is usually preferable when creating organic wipes.

- **Amount**   Lets you adjust the amount of softness by dragging the slider or entering a percentage in the text box. The higher the value, the less sharp the edge of your border or wipe will become.

- **Reset**   Click this button at any time to restore the default **Softness** values.

4   Use the controls under **Preview** to preview your wipe transition:

- Drag the slider beside the **Play** button to scrub through your transition.

- Click the **Play** button or press the **SPACEBAR** to play back your transition. Select **Loop** if you'd like the wipe to play back continuously until you click **Stop**.

You can adjust the wipe settings as your transition is playing to immediately see the result of your changes.

5   Use the controls under **Presets** to save and load your wipe transition settings. You can also create default settings for your wipe transitions.

- **Save**   Allows you to save your organic wipe settings to a file for future use. When you click the **Save** button, the **Save As** dialog box opens and allows you to name your effect and save it as a Matrox wipe transition (*.mwt*) file.

- **Load**   Click this button to load a previously created *.mwt* file.

- **Set as Default**   Sets your current wipe settings as the default settings for Matrox wipe transitions.

- **Restore Default**   Click this button to restore the default settings you specified using the **Set as Default** button.

For more information about setting up transitions, see your Adobe Premiere Pro documentation.

Creating a wipe transition

Using the Matrox chroma clamper effect

You can use the Matrox chroma clamper effect to ensure that when you've applied effects that perform color space conversion on part of a clip, the clip's colors remain constant throughout. Some Adobe Premiere Pro native effects perform color space conversions (YUV to RGB) that will clip RGB values to the acceptable range of 0-255 per color component. The clipping, however, is usually only required on clips that have very bright or highly saturated colors.

For example, if you split a clip that contains very bright or highly saturated colors and apply an Adobe basic 3D effect to one portion of the clip, you may notice minor color differences between the two halves on your video monitor. Applying the Matrox chroma clamper effect to the portion of the clip that does not have the Adobe effect ensures that colors remain constant throughout the clip.

Selecting your speed control method

You can choose the type of speed control that's best suited for individual clips in your Premiere Pro projects. You can apply the **Frame Blend** option to a clip, which interpolates between the video fields or frames, and typically works well on standard or slow-paced video and camera pans. For fast action video you may get better results by clearing this option.

To change the speed control method for a clip in the **Timeline** panel, right-click the clip and select **Frame Blend** to use the speed control method that's recommended for standard or slow-paced video and camera pans, or clear this option for fast-action video.

5

Using Matrox A/V Tools

This chapter explains how to use Matrox A/V Tools to capture clips, grab single-frame images, and play back clips in a clip list.

About Matrox A/V Tools

Matrox A/V Tools is an application that allows you to capture and play back clips. With A/V Tools, you can:

- Capture analog video from your camera or VTR into *.avi* files on your computer.
- Use onscreen transport controls to navigate quickly and easily through clips on disk.
- Grab single-frame images and save them as *.tga* files, such as to create photo montages.
- Change the order of clips in your clip list by simply dragging and dropping clips into the sequence you want.

Starting Matrox A/V Tools

1 Choose **Start > Programs > Matrox Mtx.utils > Matrox AV Tools**.

2 The **Options** dialog box pops up every time A/V Tools starts. For information about the settings in the **Options** dialog box, see "Defining your A/V Tools options" on page 96. To close the **Options** dialog box and start working with A/V Tools, click **OK**.

Using the Matrox A/V Tools interface

Once you've specified your A/V Tools options, a dialog box similar to the following appears:
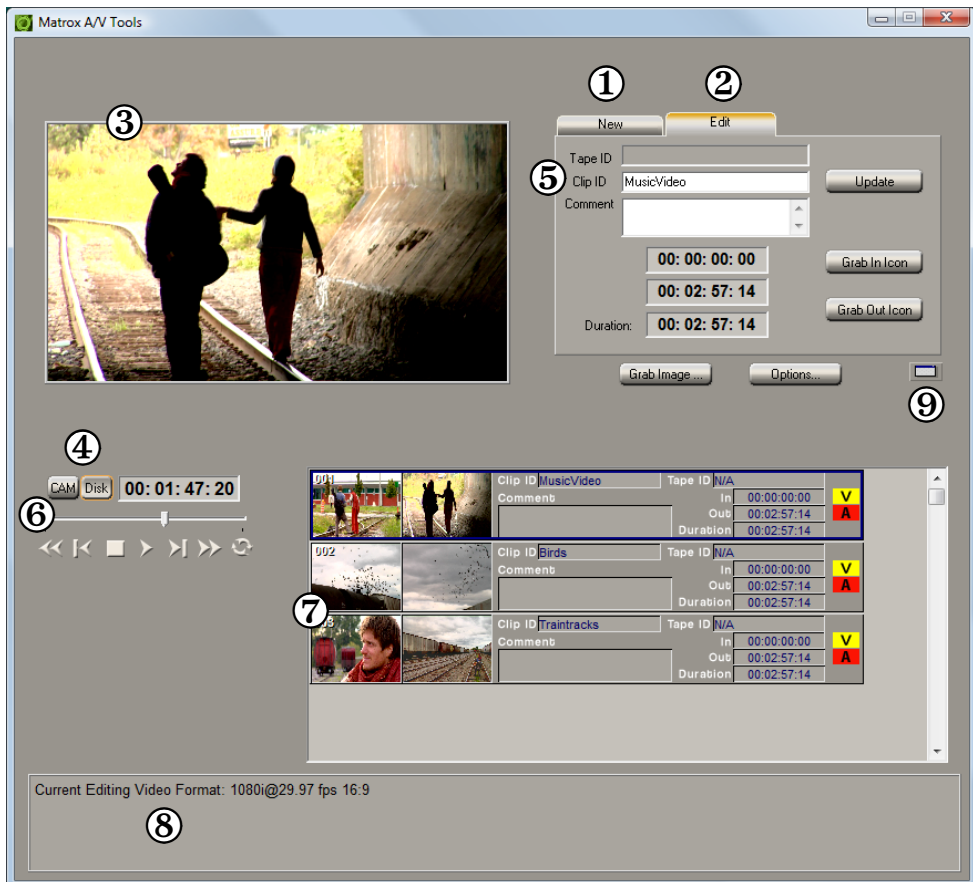
Here's a brief description of the **A/V Tools** dialog box:

① **New tab**   Use this tab to capture new clips to add to your clip list. See "Capturing clips" on page 105.

② **Edit tab**   Use this tab to edit clips, and update clip information. For details, see "Editing clips" on page 106.

③ **Preview Window**   Allows you to preview video from your camera, VTR, or clips on disk. The preview is also displayed on your video monitor.

④ **CAM and Disk buttons**   These buttons let you switch between the following modes:

- **CAM** mode lets you capture live video from your camera, or video on tape.
- **Disk** mode lets you play back captured clips in your clip list.

⑤ **Clip identification area**   This section contains several items to help you identify your clips.

- **Tape ID**   Displays the name that you've assigned to the tape in your VTR.
- **Clip ID**   Displays the base name for your new clips when using the **New** tab, or the name of the currently selected clip when using the **Edit** tab. For details, see "How A/V Tools assigns clip names" on page 105.
- **Comment**   Lets you enter comments that help you distinguish between clips in your clip list.

⑥ **Transport controls**   A set of common transport controls that lets you easily navigate through clips on disk. For more information, see "Navigating through clips with the transport controls" on page 94.

⑦ **Clip list**   A numbered list of clips and their properties. As you capture clips in A/V Tools, your clips are automatically added to the clip list. The clip list can be docked to the **Matrox A/V Tools** dialog box or float freely as a resizable window. For more information on using the clip list, see "Working with the clip list" on page 107.

⑧ **Status bar**   Displays information about the operation you're currently performing in A/V Tools, such as clip information and if frames are dropped during a capture.

⑨ **Float/dock clip list button**   This button lets you dock the clip list to the **Matrox A/V Tools** dialog box, or detach the clip list so that you can move and resize it. For more information, see "Detaching and resizing the clip list" on page 109.

Using the A/V Tools pop-up menu

When you right-click anywhere in the clip list, a pop-up menu appears containing commands for working with A/V Tools. All commands present in the A/V Tools pop-up menu are described in this chapter.
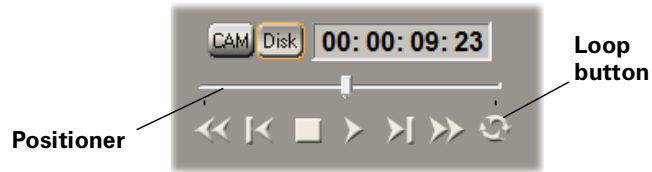
Navigating through clips with the transport controls

A/V Tools includes a common set of transport controls for navigating through clips on your hard drive when working in **Disk** mode.

Note   The transport controls are disabled in **CAM** mode.

The transport controls are much like those on your VTR:

Most of these controls perform standard transport functions, but some can be used for special tasks:

- **Scrub**   Drag the slider on the **Positioner** to scrub through any clip in your clip list. Audio will be silent when you scrub a clip.
- **Cue to In or Out point on disk**   Click the **Rewind** or **Fast Forward** button to cue to the beginning or end of a clip on disk.
- **View frame-by-frame**   Click the **Frame Reverse** or **Frame Advance** button.
- **Play a clip on disk repeatedly**   Click the **Loop** button, then click the **Play** button.

Keyboard Shortcuts	
Disk mode	K
Play	B
Rewind	Z
Fast Forward	X
Frame Advance	' (apostrophe)
Frame Reverse	; (semicolon)
Stop	V
Loop	A

Using the Matrox A/V Tools interface

Changing the time code display

A value in a time code field can be displayed as a time code or a specific number of frames. The first time you run A/V Tools, the fields display time codes. To toggle between the two formats, press **CTRL+SHIFT** while the insertion point (flashing vertical bar) is in any time code field.

For example, when working with NTSC clips, you could change a value of 24:04 (24 seconds, 4 frames) to 724 frames by pressing **CTRL+SHIFT**, and then switch back to time codes again by pressing **CTRL+SHIFT**.

The time code format of your tape is indicated by the separator between the seconds and frames digits in the time code fields as follows:

- A colon (**:**) indicates non-drop frame.
- A semicolon (**;**) indicates drop frame.

Defining your A/V Tools options

Before capturing or playing back clips with A/V Tools, you need to specify various options, such as your editing video format and your capture and playback settings.

⇨ **To define your options for A/V Tools:**

    1 Click the **Options** button.
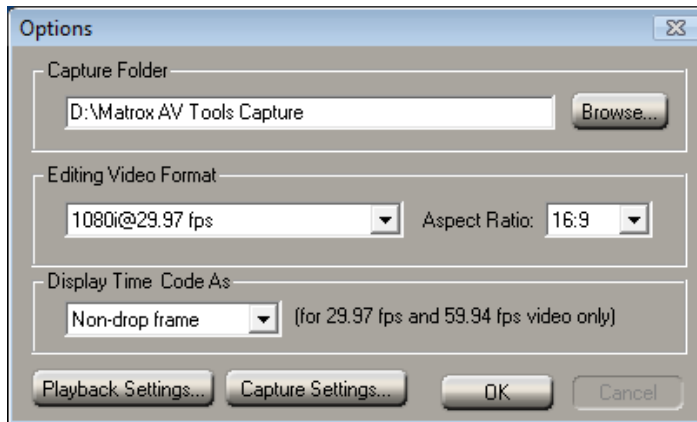
✎ **Note** The **Options** dialog box automatically pops up every time A/V Tools starts.

    2 Under **Capture Folder**, specify the folder where you want to store your captured clips. For more information, see "Selecting your capture folder" on page 98.

3 Under **Editing Video Format**, select the video format and aspect ratio you want for your clips. For example, select NTSC and 4:3 if you want to capture and play back NTSC clips with a standard 4:3 aspect ratio.

Remarks

– When you select an editing video format, many of the playback and capture settings are predetermined for you. All clips are captured to your selected video format, and clips added to the clip list must have the same frame size and frame rate. You can mix interlaced and progressive clips that have the same frame size and frame rate in a clip list.

– Once your editing video format has been defined, it cannot be changed. You can run multiple instances of A/V Tools if you want to capture or play back clips with a different video format.

– Your editing video format will automatically change if you load a *.dvl* file with a different format. For more information see, "Saving and loading a clip list" on page 107.

4 Under **Display Time Code As**, select the format that you want for displaying time codes in A/V Tools (applicable only if you're using a video format that has a frame rate of 29.97 or 59.94). The format used is indicated by the separator between the seconds and frames digits in the time code fields as follows:

– A colon (:) indicates non-drop frame.

– A semicolon (;) indicates drop frame.

5 Click the **Playback Settings** button to specify your playback settings (see "Defining your playback settings" on page 98).

6 Click the **Capture Settings** button to specify your capture settings (see "Defining your capture settings" on page 100). If capture is not supported for your selected editing video format, a message will be displayed to indicate that it is not supported.

7 Click **OK** to save your settings.

Selecting your capture folder

You can select the folder where you want A/V Tools to store your captured clips by typing the drive and folder name directly into the **Capture Folder** box, or by using the **Browse** button.

```
┌─ Capture Folder ──────────────────────────────────────┐
│                                                        │
│  D:\Matrox AV Tools Capture              Browse...     │
│                                                        │
└────────────────────────────────────────────────────────┘
```

To ensure the best capture and playback performance of your clips, save them on one of your A/V drives.

A/V Tools will save your video and audio clips in a subfolder with the same name as the **Tape ID**. For example, if you selected *D:\Matrox AV Tools Capture* as your capture folder, all video and audio clips from tape "MyTape" will be saved in *D:\Matrox AV Tools Capture\MyTape*.

Defining your playback settings

The **Matrox Playback Settings** dialog box has several pages that you can use to specify various settings for working with A/V Tools. When you select your editing video format in the **Options** dialog box, many settings are optimized for you.

Specifying your general settings

To specify your general settings for playback in A/V Tools:

1   Click the **Options** button in the **Matrox A/V Tools** dialog box.

2   Click the **Playback Settings** button. This displays the **Matrox Playback Settings** dialog box.

✎   **Note**   You can also access the **Matrox Playback Settings** dialog box by right-clicking the clip list and selecting **Playback Settings**.

3   Click the **General** tab.

```
┌─ General ─┬─ Video Output ─┐
│                             │
│  ┌─ Scrubbing Mode ─┐  ┌─ Video Luma Level ─┐
│  │ Frame         ▼ │  │ Broadcast       ▼ │
│  └──────────────────┘  └────────────────────┘
│  ┌─ A/V Sync Adjustment ────────────────┐
│  │ ▌────────────────────    D │ 0 │     │
│  └───────────────────────────────────────┘
```
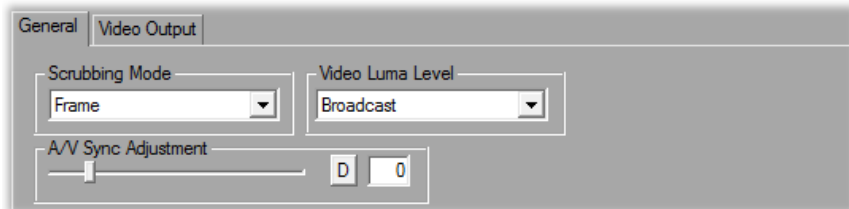
4   Under **Scrubbing Mode**, select **Frame**, **1st Field**, or **2nd Field** to indicate whether you want to display frames or only one field when you scrub your clips in the clip list using the transport controls. For example, you may want to scrub the first or second field to eliminate the flickering that can be seen in

your picture when you pause while scrubbing interlaced video. Scrubbing fields can also be used to check for any dropped fields that may have occurred in your video during a telecine process.

Note When using a progressive editing video format, the scrubbing mode is set to **Frame**.

5 Under **Video Luma Level**, select the type of processing that you want to be applied to video luminance levels when playing back clips in the clip list:

– **Broadcast** Processes video using the standard legal range of luminance levels for broadcast video. Any super black or super white luminance levels (that is, levels that fall below the standard black level or exceed the standard white level) are clipped.

– **Post Production** Processes video for post production. Any super black or super white luminance levels in your video are retained.

6 Under **A/V Sync Adjustment**, drag the slider to adjust the A/V synchronization of clips played back in the clip list. If your audio starts later than the associated video, increase the A/V sync value. Alternately, if your audio starts before the associated video, decrease the A/V sync value. Be aware that if you decrease the value too much, you may experience audio crackling.

Note To return the slider to it's default setting, click its **D** button. This button is available for all sliders in the Matrox dialog boxes.

7 Click **OK** to save your settings.

Specifying your video output settings

You can specify various settings to configure the video output from Matrox RT.X2. Some of the settings are predetermined for you based on your editing video format.

⟹ **To specify your video output settings:**

1 Click the **Options** button in the **Matrox A/V Tools** dialog box.

2 Click the **Playback Settings** button. This displays the **Playback Settings** dialog box.

3 Click the **Video Output** tab. The video output settings are the same as those provided when using Adobe Premiere Pro as explained in "Specifying your video output settings" on page 16.

4 Click **OK** to save your settings.

Defining your capture settings

The **Matrox Capture Settings** dialog box has pages that you can use to specify your settings for capturing video and audio in A/V Tools. The settings available are based on your editing video format and your input source.

📝 **Note**   When you specify your capture settings in A/V Tools, VU meters can be displayed to let you monitor your audio input levels.

Specifying your video capture settings

You can capture video to various formats, depending on your selected editing video format and source video format. For example, you can choose to capture NTSC clips to Matrox MPEG-2 I-frame *.avi* files.

⟹ **To specify your settings for capturing video in A/V Tools:**

1 Click the **Options** button in the **Matrox A/V Tools** dialog box.

2 Click the **Capture Settings** button. This displays the **Matrox Capture Settings** dialog box.

📝 **Note**   You can also access the **Matrox Capture Settings** dialog box by right-clicking the clip list and selecting **Capture Settings**.

3 Click the **Video Capture Settings** tab.

| Video Capture Settings | Audio Capture Settings |

Editing Video Format
NTSC 4:3

Input Device
RT.X2

Input Source
Composite   Disconnected

Input Format
NTSC

Input Aspect Ratio
4:3

Capture Format
Matrox MPEG-2 I-frame   Configure...

☐ Use Automatic Gain Control (AGC)

Input Type
Broadcast-quality Source
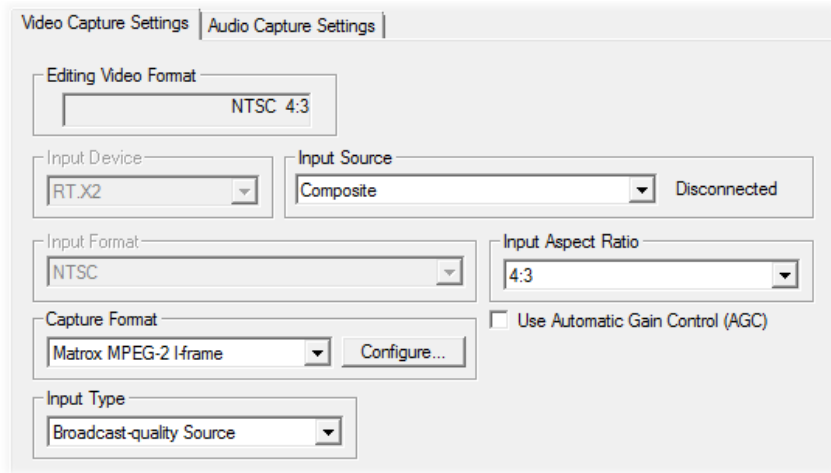
4 From the **Input Source** list, select the type of input you want to capture (**Component**, **Composite**, or **S-Video**). This will be set to **Component** when capturing HD video (not supported on RT.X2 SD).

📝 **Note**   If Matrox RT.X2 can't detect your source device when you start a capture, you'll receive an error message. Either black video will be captured or the capture won't be able to start until a valid input signal is present. In either case, you must make sure that your source device is switched on and properly connected to your system to properly capture the video.

5 From the **Input Format** list, select the video format that matches your source video. Depending on your editing video format, you may not be able to change the input format. If needed, Matrox RT.X2 will apply an appropriate pulldown method to convert the incoming video to your editing video format. For example, if your editing video format is 1080p @ 23.98 fps and you set the **Input Format** to **1080i@29.97fps**, a standard reverse pulldown (2:3 cadence) will be applied to capture the video to 1080p @ 23.98 fps.

6 From the **Input Aspect Ratio** list, select the aspect ratio of your SD source video (4:3 or 16:9). For example, to capture video that was recorded using the standard TV screen format, select **4:3**. To capture video that was recorded using the widescreen 16:9 format, select **16:9**. If you're capturing HD video, the **Input Aspect Ratio** will be set to **16:9**.

7 Under **Capture Format**, select your desired capture format from the list. The formats available in the list depend on your editing video format.

  – **Matrox DV/DVCAM**   Captures video to DV or DVCAM format.
  – **Matrox DVCPRO**   Captures video to DVCPRO format.

Defining your A/V Tools options

- **Matrox MPEG-2 I-frame**   Captures video to MPEG-2 intra-frame format using the 4:2:2 Profile @ Main Level at a selected data rate (SD resolution only). For the best results when capturing video clips on which you'll be applying chroma key effects, you should use this codec instead of a DV codec.

- **Matrox MPEG-2 I-frame HD**   Captures video to MPEG-2 intra-frame format using the 4:2:2 Profile @ High Level at a selected data rate (HD resolution only). This is the only capture format available when using a 1440×1080i or 1080i editing format.

8 If you're capturing to a Matrox MPEG-2 I-frame format, click the **Configure** button to configure your settings. The MPEG-2 I-frame settings for capture in Matrox A/V Tools are the same as when you capture using Adobe Premiere Pro. For more details, see "Selecting your MPEG-2 I-frame settings" on page 29.

9 Select **Use Automatic Gain Control (AGC)** if you want the gain of your composite or S-Video input signal to be adjusted automatically to compensate for very bright or dark images. This improves the brightness or contrast of your picture.

10 From the **Input Type** list, select the type of equipment you're using for capture:

- **Broadcast-quality Source**   Select this if your source device is broadcast-quality. This setting provides the best capture results for most devices.

- **Consumer-quality Source**   Select this if you're having problems capturing video because your source device doesn't meet broadcast-quality standards. For example, the capture may be interrupted when you try to capture from certain composite and S-Video devices, especially from low-quality VCRs. If this happens, selecting **Consumer-quality Source** will allow the video to be captured, but you may experience dropped frames during the capture.

✎ **Note**   For any change to the input type to take effect, you must restart Matrox A/V Tools.

11 Click **OK** to save your settings.

Specifying your audio capture settings

You can specify various audio capture settings, such as to specify the type of audio files (either stereo *.wav* or mono *.wav*) that you want to create when capturing audio in A/V Tools.

Remarks

- When you capture to an *.avi* file using A/V Tools, the clip's video and audio are saved to the *.avi* file, and the clip's audio is also saved to one or more separate *.wav* files. You could choose to edit the separate *.wav* files using audio post-processing software, such as Adobe Soundbooth.

- The separate *.wav* files are not supported in the A/V Tools clip list, but you can import them into Adobe Premiere Pro.

To specify your settings for capturing audio in A/V Tools:

1 Click the **Options** button in the **Matrox A/V Tools** dialog box.

2 Click the **Capture Settings** button. This displays the **Matrox Capture Settings** dialog box.

3 Click the **Audio Capture Settings** tab.
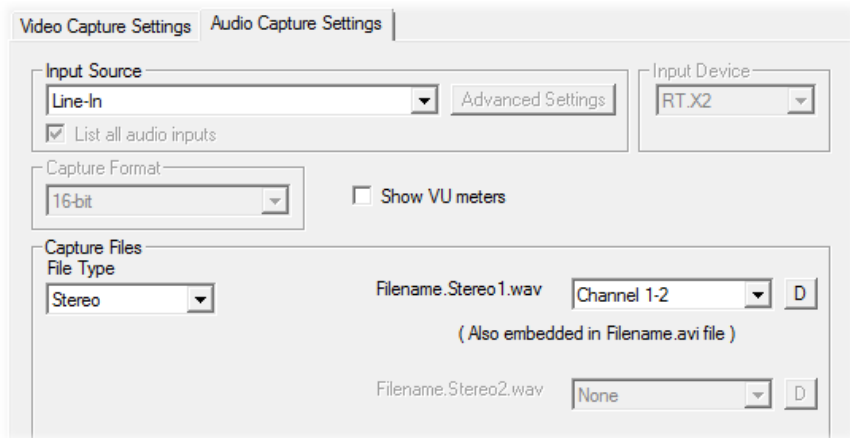
4 Under **Input Source**, select the audio input source you want to capture. Your audio source **must** match the audio input where you connected the cable labeled TO AUDIO CARD IN from your RT.X2 breakout box as explained in your *Matrox RT.X2 Installation Manual*. For example, if you plugged the TO AUDIO CARD IN connector into the Line-In jack (or corresponding jack) on your sound card, select **Line-In** from the **Input Source** list.

Remarks

- If all available audio inputs don't appear in the **Input Source** list, select **List all audio inputs**. If your audio input connection does not appear in

the list, you must unplug the TO AUDIO CARD IN connector and connect it to an audio input on your sound card that appears in the list.

– If your analog audio source appears with an * beside it in the list, your sound card does not have matching audio inputs and outputs. In this case, choose the audio source with an * that matches your audio input, make sure that your source is playing back audio, and click **Advanced Settings**. In the provided dialog box, select an analog audio passthrough. If you can hear audio, then you've selected the correct analog audio source and passthrough. If you can't hear audio, try selecting a different analog audio source and/or passthrough.

– The **Capture Format** (bit-depth) for your captured audio files is set to **16-bit**.

5 If you want the VU meters to be displayed each time you configure your capture settings or start a capture in A/V Tools, select **Show VU meters**. The VU meters are the same as displayed when you capture audio using Adobe Premiere Pro (see "Monitoring audio levels for capture" on page 27).

6 Under **Capture Files**, indicate whether you want to capture to stereo or mono audio files, and select which channels you want to save to separate *.wav* files.

– From the **File Type** list, select **Stereo** to save your captured audio to stereo *.wav* files, or **Mono** to save your captured audio to mono *.wav* files.

– From the **Filename** lists, select which stereo pairs or mono channels you want to save to your *.wav* files. Select **None** if you don't want a particular *.wav* file to be created.When A/V Tools saves each *.wav* file, it assigns a *.Stereo.wav* or *.Mono.wav* suffix to the base name you gave for the associated video file. For example, if you've named your video file *MyFile.avi*, the associated stereo audio files would be named *MyFile.Stereo1.wav, MyFile.Stereo2.wav*, etc.

Note   The channels that you choose to save to the first stereo *.wav* file or first two mono *.wav* files will be embedded in the associated *.avi* file.

7 Click **OK** to save your settings.

How A/V Tools assigns clip names

When using the **New** tab, **Clip ID** displays the base name for your new clips. For example, if the **Clip ID** is "MyClip," A/V Tools will assign the name *MyClip000.avi* to the first new clip you capture, and continue naming clips sequentially (for example, *MyClip001.avi, MyClip002.avi*, etc.). Before capturing new clips, you can change the **Clip ID** to any base name you like.

When editing clips using the **Edit** tab, **Clip ID** displays the name of the selected clip in the clip list. You can change the name by typing a new name in the **Clip ID** box on the **Edit** tab, then clicking **Update**. You can also change a clip ID directly in the clip list by typing a new name in the clip's **Clip ID** box, then pressing **ENTER**.

Note   Changing the clip ID for a captured clip will **not** change the clip's file name.

Capturing clips

With A/V Tools you can capture live video from your camera, or video on tape. Capturing saves the clips as *.avi* files on your computer's hard drive.

Note   A/V Tools does not support capture from tape with device control.

Capturing live video

1   In the **A/V Tools** dialog box, click the **CAM** button. To capture live video, your device must be set to Camera mode.

2   In the **Clip ID** box, type the base clip name you'd like to be assigned to your clip. For more information, see .

3   Click **Capture**.

4   A/V Tools will start capturing the clip. To stop the capture, click the **Stop** button.

5   Your captured clip is added to the clip list with its duration and an icon representing the first and last frames of the clip.

Capturing from tape without device control

1 In the **A/V Tools** dialog box, click the **CAM** button. To capture video from tape, your device must be set to VTR mode.

2 In the **Tape ID** box, type a name for the tape presently loaded in your VTR.

3 In the **Clip ID** box, type the base clip name you'd like to be assigned to your clip. For more information, see "How A/V Tools assigns clip names" on page 105.

4 Press the Play button on your device. You will see the video play back in the A/V Tools Preview Window and on your video monitor.

5 Click **Capture**.

6 A/V Tools will start capturing the clip. To stop the capture, click the **Stop** button.

7 Your captured clip is added to the clip list with its duration and an icon representing the first and last frames of the clip.

Editing clips

Matrox A/V Tools lets you update the clip ID and comment information for clips in your clip list, as well as change a clip's In and Out icons.

Updating clip information

To update the clip ID and comment information for a clip, select the clip in the clip list and click the **Edit** tab. Type the new text in the text boxes, then click **Update**. For more information on the clip ID, see "How A/V Tools assigns clip names" on page 105.

Changing a clip's In and Out icons

In and **Out** icons are the small icons representing the first and last frames of a clip in the clip list. These icons can be changed to better represent your clip.

To change the In and Out icons of captured clips in the clip list:

1 Use the transport controls to play back your clip in the preview window and on your video monitor.

2 When you see the frame you want for the In icon, click **Grab In Icon**. A/V Tools automatically updates the icon.

3 When you see the frame you want for the Out icon, click **Grab Out Icon**.

Working with the clip list

The following sections explain how to add new clips to the clip list, play back clips, save and load clip lists, copy, move and delete clips, and how to detach and resize the clip list.

Adding clips

You can add a clip or a series of clips (*.avi* files) to the clip list using any of the following methods:

- Drag an *.avi* file from a file management program, such as Windows Explorer, to the clip list. If you're adding clips to an existing clip list, you can drag them to the bottom of the clip list, or place them in a specific position using the methods described in the section "Moving clips" on page 108.

- Right-click the clip list, then choose **Import Clip** from the pop-up menu (or double-click an empty area of the clip list). In the **Open** dialog box, select the *.avi* files you want to import, then click **Open**.

Playing back clips

You can play back your clips one at a time, or in the same sequence as they appear in the clip list. To play back your clips:

- Select a clip in the clip list and click the Play button on the transport controls.

- Right-click a clip on the clip list and choose **Play**.

- To play back multiple clips in sequence, select a range of clips in the clip list using **SHIFT+click** or select individual clips using control click, then use one of the afore-mentioned methods to play them back.

Saving and loading a clip list

To save a clip list, right-click the clip list. Choose **Save As** from the pop-up menu to save your current clip list as a *.dvl* file.

You can load a clip list (*.dvl*) using any of the following methods:

- Right-click the clip list. Choose **Open Clip List** or **Open Recent** to select a recently opened clip list.

- Drag a *.dvl* file from a file management program, such as Windows Explorer, to the clip list.

- Double-click the *.dvl* file in Windows Explorer to start A/V Tools and load the clip list. Make sure that A/V Tools is **not** running when you do this.

Remarks

– The first time you double-click a *.dvl* file in Windows Explorer, you will need to specify Matrox A/V Tools as the program you want to use to open *.dvl* files.

– If you load a *.dvl* file to a clip list that already contains clips, it will replace the current clip list. If needed, your editing video format in A/V Tools will be changed to match the video format of the clips in the loaded clip list.

Copying clips

You can copy a clip or a series of clips in the clip list using either of the following methods:

- Select the clips you want to copy, right-click the clip list, then choose **Copy** from the pop-up menu. Select a clip in the clip list, then choose **Paste** to paste the copied clips above the currently selected clip.

- Select the clips you want to copy, then **CTRL+drag** the clips and drop them into the sequence you want.

Note   When copying a clip, the clip's *.avi* file is not copied, only the reference to the clip on disk is copied. A/V Tools assigns the *-Copy* extension to the **Clip ID** of the copied clips.

Moving clips

You can change the order of clips in the clip list, such as to arrange clips in the order you want to play them back. To rearrange your clips, do any of the following:

- Select the clips you want to move, then drag and drop them into the sequence you want. If you drag clips up in the clip list, the clips are inserted above the black line. If you drag clips down in the clip list, the clips are inserted below the black line. Releasing the mouse button places the clips in the list and ripples the position of all subsequent clips in the clip list.

- Select the clips you want to move, then right-click the clip list. Choose **Cut** from the pop-up menu to cut the clips. Select a clip in the clip list, then choose **Paste** to paste the clip above the currently selected clip.

Deleting clips

Select the clips you want to delete, right-click the clip list, then choose one of the following from the pop-up menu:

- To delete only the selected clips from the clip list, choose **Delete Clip Only**.

- To delete the selected clips and their corresponding files from your hard drive, choose **Delete Clip + File**.

Detaching and resizing the clip list

You can change the size of your clip list to suit your needs. First, detach the clip list from the **Matrox A/V Tools** dialog box by clicking the **Float/dock clip list** button ( ) above the clip list. Now the clip list can be freely moved and resized. To resize the clip list, drag the sides or corner of the clip list as needed. You can also use the standard Windows **Maximize** and **Restore** buttons in the top right corner of the window.

After resizing, A/V Tools will automatically rearrange the clips in the clip list. To dock the clip list back to the **Matrox A/V Tools** dialog box, click the **Float/dock clip list** button, or click the **Close** button in the top right corner of the **Clip List** window. Once the window is docked again, A/V Tools will remember the previous size and location of the clip list for the next time you detach the clip list.

Grabbing a single-frame image

You can grab single-frame (still) images and save them as *.tga* files to use in your Adobe Premiere Pro projects. Your source video can be a clip on tape, a clip on disk, or live video.

→ **To grab a single-frame image:**

1 Play back your source video. If it is on disk, you can use the transport controls to locate the clip

2 In the **A/V Tools** dialog box, click the **Grab Image** button to open the **Grab Image** dialog box.
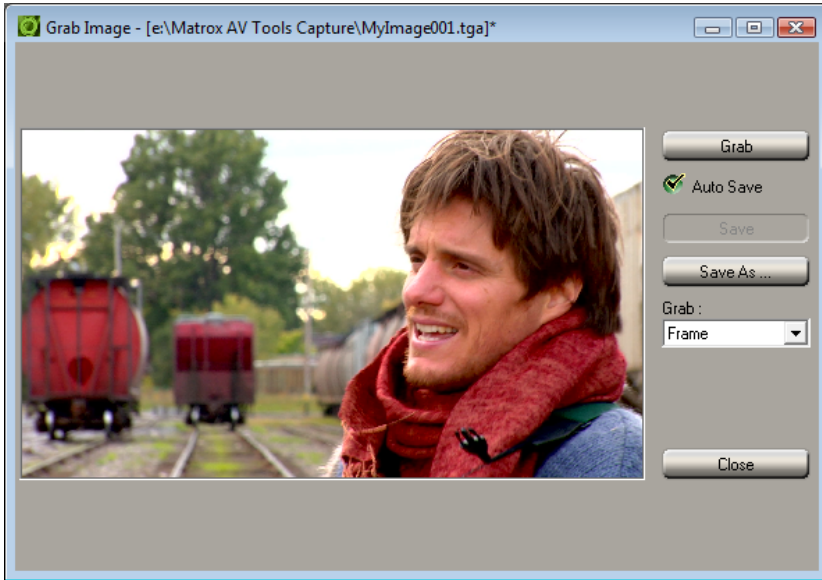
3 When the frame you want is displayed in the Preview Window, click the **Grab** button.

4 If you notice flickering in your image, you can choose to grab only one of the fields. From the **Grab** list, select **Field 1** or **Field 2**. One field contains the odd-numbered scan lines in the frame, and the other field contains the even-numbered lines. Select the field that best displays your image. A/V Tools interpolates between the two consecutive scan lines to create the missing field.

5 Click **Save** or **Save As** to save the image.

6 Click the **Close** button to return to the **Matrox A/V Tools** dialog box.

✎ **Note**   If you do not specify a file name in the **Save As** text box, or if you select **Auto Save**, A/V Tools will assign a default name to the first grabbed image (such as *MyImage01.tga* or a name based on the last name you used) and continue naming images sequentially.

Keyboard shortcuts

The following table provides a complete list of keyboard shortcuts available for using A/V Tools.

Keyboard Shortcuts	
Disk mode	K
CAM mode	B
Play	B
Rewind	Z
Fast Forward	X
Frame Advance	' (apostrophe)
Frame Reverse	; (semicolon)
Stop	V
Loop	A
Delete Clip Only	DELETE
Delete Clip + File	SHIFT+DELETE
Grab	F5
Auto Save	F6
Save	F7
Import Clip	CTRL+I
Select All	CTRL+A
Cut	CTRL+X
Copy	CTRL+C
Paste	CTRL+V
New Clip List	CTRL+N
Open Clip List	CTRL+O
Save Clip List	CTRL+S

Your notes

6

Using the Matrox WYSIWYG Plug-ins

This chapter explains how to use the Matrox WYSIWYG Control Panel and plug-ins available with Matrox RT.X2 so that you can display the contents of your composition or animation on your video monitor.

Overview

Together with your Matrox RT.X2 hardware, the Matrox WYSIWYG Control Panel and Matrox WYSIWYG plug-ins let you display the contents of your composition or animation on your video monitor. This lets you see the exact color temperature, safe-title area, and any interlaced artifacts as you work.

You can preview video played back using the following applications that are supported by the Matrox WYSIWYG plug-ins:

- Adobe After Effects, version 5.0 to CS5.
- Adobe Photoshop, version 7.0 to CS4 (32-bit only), and CS5 (32-bit and 64-bit).
- Autodesk 3ds Max, version 7.0 to 2009 (32-bit only).
- Autodesk Combustion, version 4.0 to 2008 (32-bit only).
- eyeon Fusion, version 4.0 to 5.2 (32-bit only), 6.0 and 6.1 (32-bit and 64-bit).
- NewTek LightWave 3D, version 7.0 to 9.2 (32-bit only), 9.6 and 10 (32-bit and 64-bit).

Configuring the Matrox WYSIWYG Control Panel

The Matrox WYSIWYG Control Panel lets you specify the settings you want for previewing video on your video monitor. To use the Matrox WYSIWYG Control Panel, right-click the 📺 icon on your Windows taskbar. If you don't see the 📺 icon, choose **Start > All Programs > Matrox Mtx.utils > Matrox WYSIWYG Control Panel**.

The Matrox DVI Calibration Utility uses the Matrox WYSIWYG Control Panel to display specially designed graphics for calibrating your DVI monitor for video (not applicable to RT.X2 LE or RT.X2 SD). For details on calibrating your DVI monitor, see Chapter 2, "Calibrating Your DVI Monitor for Video."

📝 **Note** By default, the Matrox WYSIWYG output to your video monitor is enabled. To disable it, clear the **Enable WYSIWYG Output** option in the Control Panel.

1 From the **Project Format** menu, select the format that matches your composition or animation, such as **NTSC 4:3**.

2 Choose **Output Configuration** to specify the video output settings you want for previewing your video. The available settings depend on your selected project format (editing video format), and are the same as those provided when using Adobe Premiere Pro as explained in "Specifying your video output settings" on page 16.

3 If your video output format has a frame rate of 25 or 50 fps, and your DVI video monitor is unable to properly display your preview output, select **Force DVI Output to 60 Hz (Bypass Autodetect)**. Otherwise, make sure this option isn't selected to allow Matrox RT.X2 to automatically detect the frequency rates supported by your DVI video monitor and set the DVI output frequency accordingly.

4 From the **Preview Type** menu, select one of the following options for the preview:

   – **Video**   Select this to view your composition or animation.

   – **Alpha Channel**   Select this to view only your composition's or animation's grayscale alpha-key (matte) information.

5 From the **Scaling** menu, select one of the following options for your preview output:

   – **Scale to fit**   Select this to scale your output to fit your video monitor. The aspect ratio of your project format will be preserved.

   – **Original Size**   Select this to output your video without any scaling. If you are playing back HD clips in an SD project, your output will be centered on your video monitor.

Required steps to use the WYSIWYG plug-ins

The following sections list the steps required to use the Matrox WYSIWYG plug-in for each application in order to preview video on your video monitor.

Note   The following procedures may change with a subsequent release of the program.

Adobe After Effects

1 Start Adobe After Effects and import the footage you want to preview.

2 Drag the footage from the **Project** window to the **Composition** panel.

Note   In order for the preview to be updated on your video monitor when you scrub the timeline, you must disable OpenGL for your previews. To do this, choose **Edit > Preferences > Previews**, and clear the **Enable OpenGL** option.

Adobe Photoshop

1 Start Adobe Photoshop and open the file you want to preview.

2 Choose **File > Export > Matrox WYSIWYG Preview**.

Autodesk 3ds Max

1 Start Autodesk 3ds Max and open the file you want to preview.

2 Open the **Render Scene** dialog box by choosing **Rendering > Render Setup**.

3 Click the **Common** tab.

4 Under **Render Output**, click **Devices**.

5 In the **Select Image Output Device** dialog box, select **Matrox WYSIWYG Preview**, and click **OK**.

6 Click **Render**.

Autodesk Combustion

1 Start Autodesk Combustion and open the file you want to preview.

2 Choose **File > Preferences > Framebuffer**.

3 In the menu beside **Framebuffer Type**, select **Matrox WYSIWYG Preview**, and click **OK**.

eyeon Fusion

1 Start eyeon Fusion and open the file you want to preview.

2 Right-click on the file, and choose **View On > Matrox WYSIWYG Preview**.

NewTek LightWave 3D

1 Start NewTek LightWave 3D and load the file you want to preview by choosing **File > Load > Load Scene**.

2 Click the **Render** tab.

3 Under **Options** on the left hand side of the screen, click **Render Globals**.

4 From the **Render Display** menu, select **Matrox WYSIWYG Preview**.

5 Under **Render** on the left hand side of the screen, click **Render Frame**.

7

Using the Matrox Video for Windows Codecs

This chapter explains how to use the Matrox Video for Windows codecs to render material to Matrox .avi files.

Overview

When using Video for Windows (VFW) programs to render material to an *.avi* file, such as in the case of a completed video production or an animation, you can use a Matrox VFW codec to create a Matrox *.avi* file. For example, you may want to render an animation to a Matrox MPEG-2 I-frame *.avi* file so that you can import the file as a realtime clip into your Adobe Premiere Pro projects on Matrox RT.X2.

When rendering compositions or animations that have an alpha channel, you can select a "+ Alpha" Matrox VFW codec to render to a Matrox uncompressed or MPEG-2 I-frame *.avi* file that contains the alpha-key information. This *.avi* file will be automatically keyed when you place the clip in an Adobe Premiere Pro sequence.

The following sections explain the various settings that you need to make to render material to a Matrox *.avi* file using a VFW program. For details on exporting a Matrox sequence in Adobe Premiere Pro, see "Exporting to a Matrox .avi file" on page 33.

✎ **Note** Although Matrox has tested many VFW programs, there may be certain operational limitations when using the Matrox VFW codecs with some of these programs (as well as with untested programs).

Using VFW programs without the RT.X2 hardware

If you installed the Matrox VFW software codecs for use without the RT.X2 hardware (see "Installing the Matrox VFW software codecs on a system without the RT.X2 hardware" in your *Matrox RT.X2 Installation Manual*), you can render and play back Matrox *.avi* files without having the RT.X2 hardware in your computer. For example, if you captured clips to Matrox MPEG-2 I-frame format using Adobe Premiere Pro, you could edit and play back those clips on a system without the RT.X2 hardware, assuming that you installed the Matrox VFW software codecs on that system.

Before you start rendering

Before you start rendering material to a Matrox *.avi* file, make the following settings in your VFW program:

- Set the frame size (width and height) of your rendered material to full-screen, depending on the codec that you'll be using.
  - DV/DVCAM, DVCPRO, DVCPRO50, or MPEG-2 I-frame SD:
    - 720 × 480 to render to NTSC or 486p format.
    - 720 × 576 to render to PAL or 576p format.
  - Uncompressed SD:
    - 720 × 486 to render to NTSC or 486p format.
    - 720 × 576 to render to PAL or 576p format.
  - MPEG-2 I-frame HD:
    - 1280×720 to render to 720p format.
    - 1440×1080 to render to 1440×1080i/p format.
    - 1920×1080 to render to full-size 1080i/p format.
  - DVCPRO HD or Uncompressed HD:
    - 1280×720 to render to 720p format.
    - 1920×1080 to render to 1080i/p format.
- Set the appropriate frame rate for the video format to which you are rendering. For example, if you are rendering to PAL format, set the frame rate to 25 fps.
- If available, select the "Recompress" option. This allows you to render video using the same compression format, frame size, and frame rate as your source video but using a different data rate, scanning mode (interlaced or progressive), or bit depth (8-bit or 10-bit).
- If you'll be rendering audio, set the audio sample rate to 48 kHz and the sample size to 16-bit (mono or stereo).
- For best results, make sure that there is no data rate limit set in your program for rendered material. This ensures that your *.avi* files will be rendered at the particular data rate you select.

Note Before rendering a lot of material, check that your rendered animations and transitions such as wipes and slides play back smoothly. If they appear jumpy, try adjusting the field dominance or field order for your rendered material.

Selecting color space conversion options

When you render material to an *.avi* file using a Matrox VFW codec, you can determine how you want the luminance levels and chroma information to be processed during the color space conversion that's performed during the render.

Note The default settings for color space conversion provide good results for most applications. We recommend that you change these settings only when needed for special purposes.

To select the color space conversion options you want:

1 Choose **Start > All Programs > Matrox Mtx.utils** (or **Matrox VFW Software Codecs**) **> Matrox VFW Codec Configuration**.

2 In the provided dialog box under **Color Space Conversion**, select the options you want:
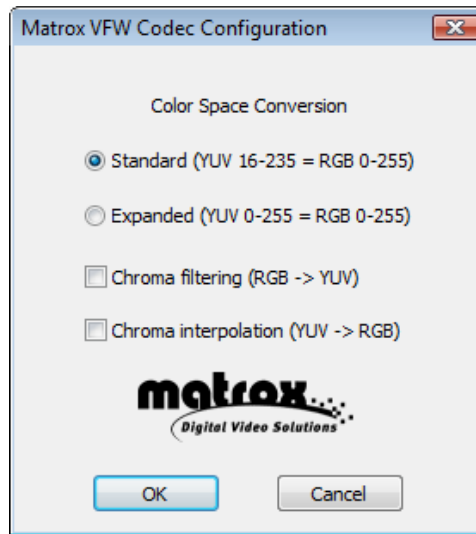
– **Standard** Renders video using standard broadcast luminance levels. Super black and super white luminance levels are clipped.

– **Expanded** Renders video using the full range of luminance levels. Super black and super white luminance levels are retained. You may want to use this setting, for example, to render material on which you'll be applying luminance key effects.

Important When rendering RGB graphics, selecting **Expanded** will create super black and/or white in your rendered images. For example, all black in your RGB graphics will become super black, and white will become super white. To render your RGB graphics with standard black and white levels, set your luminance range to **Standard**.

- **Chroma filtering** and **Chroma interpolation**   Select these options to adjust the chroma bandwidth of RGB graphics. This improves images that have abrupt changes between different colors, such as a blue box on a black or white background. You should select these options for most animation and compositing work (computer-generated material). For most video editing programs, however, it's best that you **not** select these options. If you find that your rendered images appear to be blurred, try clearing one or both of these options.

3 Click **OK** to save your settings. Any change you make to your selected luminance range setting (such as switching from **Standard** to **Expanded**) will only take effect the next time you start your VFW program.

Rendering material to a Matrox VFW .avi file

When you render material to an *.avi* file, such as when you render a finished video production or an animation, you must select the compressor (codec) you want to create the file. The compressor determines the quality of your rendered video. Refer to your program's documentation for instructions on how to select a compressor for your *.avi* file.

For information about exporting using Adobe Premiere Pro, see

To create a Matrox VFW .avi file:

1 Select one of the following codecs from your program's list of available compressors:

- **Matrox DV/DVCAM**   Renders video to DV or DVCAM format.
- **Matrox DVCPRO**   Renders video to DVCPRO format.
- **Matrox DVCPRO50**   Renders video to DVCPRO50 or D-9 format.
- **Matrox DVCPRO HD**   Renders video to DVCPRO HD format (for 1080i and 720p video only).
- **Matrox MPEG-2 I-frame**   Renders video to MPEG-2 intra-frame format using the 4:2:2 Profile @ Main Level at a selected data rate (SD resolution only).
- **Matrox MPEG-2 I-frame + Alpha**   Renders video to MPEG-2 intra-frame format with alpha using the 4:2:2 Profile @ Main Level at a selected data rate (SD resolution only).
- **Matrox MPEG-2 I-frame HD**   Renders video to MPEG-2 intra-frame format using the 4:2:2 Profile @ High Level at a selected data rate.
- **Matrox MPEG-2 I-frame HD + Alpha**   Renders video to MPEG-2 intra-frame format with alpha using the 4:2:2 Profile @ High Level at a selected data rate.

- **Matrox Uncompressed SD**   Renders video to 8-bit or 10-bit uncompressed SD format.
- **Matrox Uncompressed SD + Alpha**   Renders video to 8-bit or 10-bit uncompressed SD format with alpha.
- **Matrox Uncompressed HD**   Renders video to 8-bit or 10-bit uncompressed HD format.
- **Matrox Uncompressed HD + Alpha**   Renders video to 8-bit or 10-bit uncompressed HD format with alpha.

Note   The Matrox Offline HD codec is not supported for rendering clips. This codec is provided only for playback of legacy Matrox Axio offline HD projects.

2 If you've selected a Matrox codec that requires configuration, click the button provided by your program that allows you to configure your codec settings. For more details, see the following sections.

Configuring the Matrox DVCPRO HD codec

When you choose to configure the Matrox DVCPRO HD codec, a dialog box similar to the following appears:
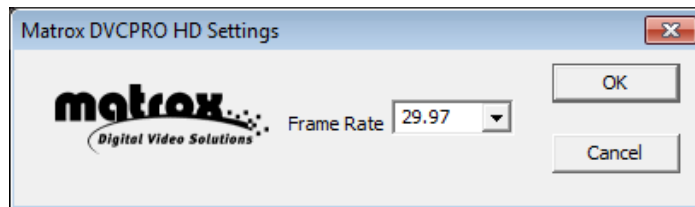
From the **Frame Rate** list, make sure that you select the frame rate that matches the frame rate specified for rendering video in your editing application.

Configuring the Matrox Uncompressed codecs

When you choose to configure a Matrox Uncompressed codec (SD or HD resolution), a dialog box similar to the following appears:
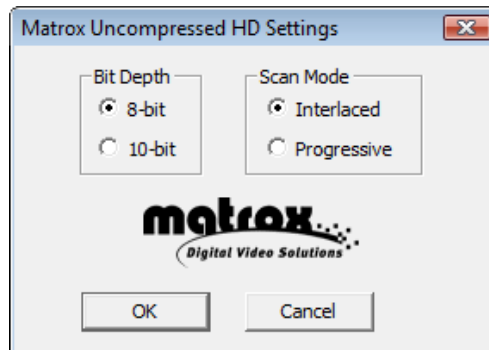
1 Under **Bit Depth**, select the bit depth you want for your video.

📝 **Note**   Matrox RT.X2 does not support 10-bit uncompressed video.

2 Under **Scan Mode**, select the scan mode of your video.

3 Click **OK** to save your selection. The settings you selected will be used each time you render material with your program, until you change the settings again.

Configuring the Matrox MPEG-2 I-frame codecs

When you choose to configure a Matrox MPEG-2 I-frame codec (SD or HD resolution), a dialog box similar to the following appears:
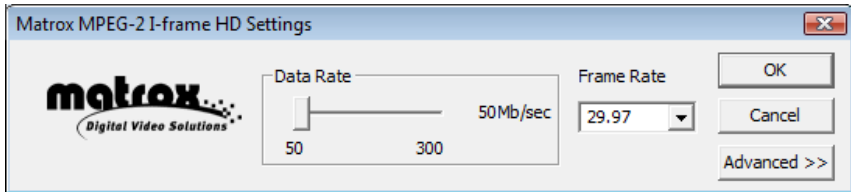
1 Drag the **Data Rate** slider until your desired data rate is displayed. The higher the data rate you select, the better the video quality will be. Depending on the capabilities of your system, however, you may not be able to smoothly play back video at a high quality using your VFW program.

2 Beside **Frame Rate**, select a frame rate from the list. Make sure the frame rate you select is appropriate for the format to which you are rendering.

3 To apply advanced settings to your MPEG-2 I-frame file, click the **Advanced** button.

📝 **Note**   The default advanced settings should provide good results for most applications. It's recommended that you change these settings only when needed for special purposes.
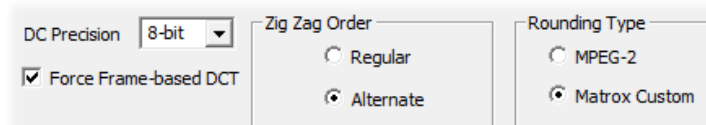
4 Beside **DC Precision**, select the bit-depth precision of the DC intra block. The higher the DC precision value that's used to render your video, the more likely that the DC content will be increased at the expense of the AC content in the encoded stream. This may result in lowering the overall quality of the compressed stream at a specified data rate.

5 Under **Zig Zag Order**, select one of the following:

Rendering material to a Matrox VFW .avi file

- **Regular**   Sets the regular (default) zig zag scanning pattern of the AC coefficient of the DCT block as defined in the ISO/IEC 13818-2 (figure 7-2) specification documentation.

- **Alternate**   Sets an alternate zig zag scanning pattern of the AC coefficient of the DCT block as defined in the ISO/IEC 13818-2 (figure 7-3) specification documentation. Use this setting when capturing or rendering video at a high data rate (for example, at a data rate of 100 Mb/sec or higher).

6 Under **Rounding Type**, select one of the following:

- **MPEG-2**   Rounds the AC coefficients up to the nearest whole number when calculating the quantization coefficient.

- **Matrox Custom**   Truncates the AC coefficients to the lowest whole number when calculating the quantization coefficient. In some cases, this setting may yield less artifacts in graphics.

7 Select the **Force Frame-based DCT** setting to render macroblocks as frames rather than as fields. In some cases, graphics will yield less artifacts if this option is selected.

8 Click **OK** to save your settings. The settings you selected will be used each time you render material with your program, until you change the settings again.

8

Monitoring Your Matrox RT.X2 System

This chapter explains how to use the Matrox X.info program to display important details about your Matrox RT.X2 system and installed hardware.

Using X.info to display RT.X2 information

The Matrox X.info program lets you display information about your Matrox RT.X2 system and installed hardware, and provides warnings when certain problems arise, such as when the temperature of your RT.X2 card exceeds the maximum operating temperature.

Matrox X.info runs continuously to monitor your system, whenever your computer is turned on. You can open Matrox X.info to display system and hardware details by double-clicking the icon on your Windows taskbar.

Note If you do not see the icon, right-click the notification area of the taskbar and choose **Properties**, clear the **Hide inactive icons** option, and click **OK**.

Displaying system information

To display information about your Matrox RT.X2 system, select **System** from the **Display Information About** list. On this page, you can see **Install Information**, such as the install path and version of Matrox Mtx.utils.

You can also create an HTML log file of your system information, which can be useful for troubleshooting. To create this log, use the **Browse** button under **System Information Log** to select the path and name of the log, then click

Create. If **Open file after scan** is selected, the HTML system log opens after it is created.
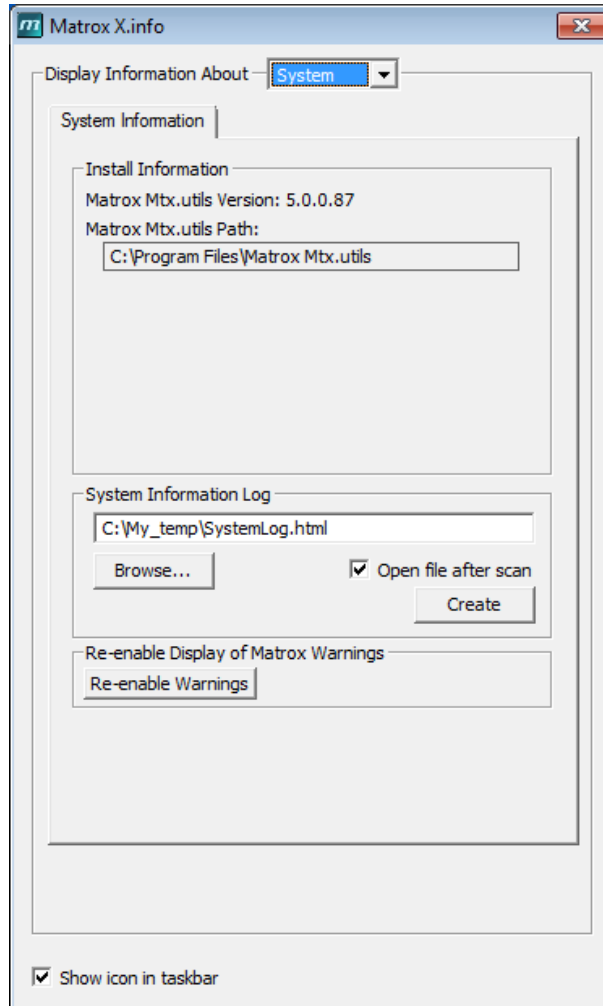
If you had previously turned off certain Matrox warnings and want them to be re-enabled, click **Re-enable Warnings**. For example, some Matrox warnings provide an option to turn off the warning (that is, you can select **Don't display this message again**). Clicking **Re-enable Warnings** allows these warnings to be displayed again.

Displaying hardware information

To display information about your Matrox RT.X2 hardware, select **Hardware** from the **Display Information About** list. Your RT.X card and display card are each represented by a tab.

Click a card's tab to display a page with hardware information (for example, serial number and production date). You can also monitor the current and maximum operating temperatures for your RT.X2 card.
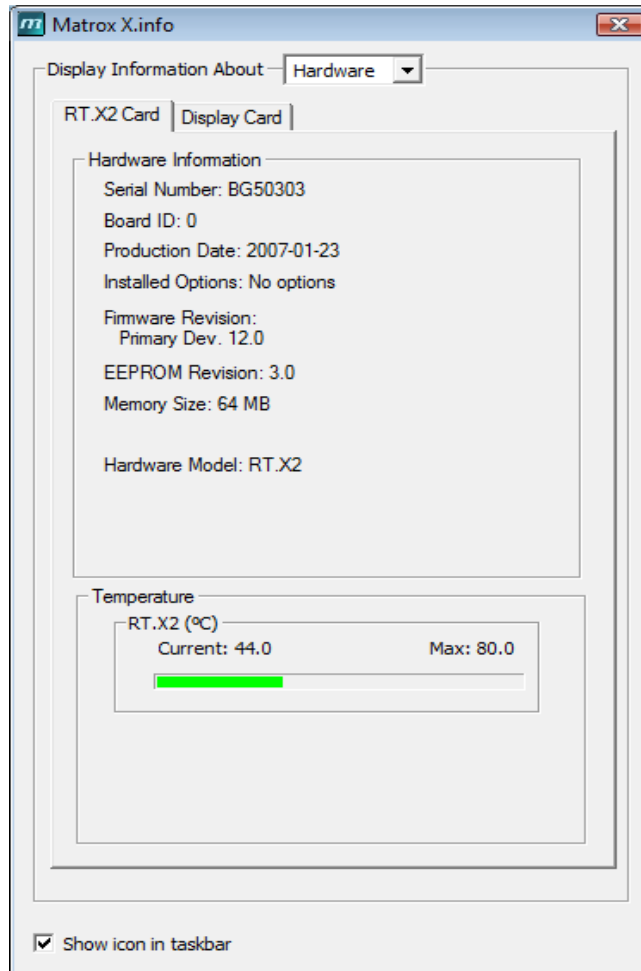
Important   Whether or not you have opened Matrox X.info, if your RT.X2 card exceeds the maximum operating temperature, you'll receive a warning message with further instructions as explained in the section "Error notification" on page 129.

Monitoring your RT.X2 card's operating temperatures

As shown in the X.info **Hardware** section, the **RT.X2 Card** page displays the current and maximum operating temperatures for your Matrox RT.X2 card. To avoid damage to your Matrox RT.X2 system, make sure that you don't operate your RT.X2 card at or near the maximum temperature for a prolonged period of time. You should target your RT.X2 card to operate at least 10°C below the maximum operating temperature.

You should monitor the temperature of your RT.X2 card periodically and take measures as needed to lower the room temperature and/or improve the ventilation in your Matrox RT.X2 system. For details on how to ensure your system is properly ventilated, see your *Matrox RT.X2 Installation Manual*.

Error notification

X.info provides temperature warnings and warnings for other possible RT.X2 hardware problems. Once X.info has detected a hardware problem, the **Matrox X.info Notification** dialog box will be displayed to give you details of the problem and further instructions. You will not be able to close this dialog box until the problem has been resolved.

Your notes

A

Understanding Standard and Advanced Pulldown

This appendix describes the most common pulldown methods, and explains how and when these pulldown methods are employed by Matrox RT.X2.

Overview

Part of your project's workflow may involve the application of a pulldown technique to convert your input video to the video format of your sequence. Pulldown can also be applied to your output video to meet certain requirements. When a pulldown is required, Matrox RT.X2 performs either a standard 2:3 pulldown or an advanced 2:3:3:2 pulldown.

Standard 2:3 pulldown

Standard 2:3 pulldown is often used as part of the telecine process to transfer 24 fps film footage to 29.97 fps interlaced video. This pulldown method is also used to convert any 23.98 fps progressive video to 29.97 fps interlaced video, such as for converting 486p @ 23.98 fps video to NTSC.

In order to convert 24 fps film or 23.98 progressive video to 29.97 fps interlaced video, additional video frames, and more specifically video fields, must be created and added to the video sequence. For example, to convert a sequence of four film or progressive frames, five frames of video are needed for a total of 10 video fields. Therefore, one additional video frame or two video fields must be created. To accomplish this, the first and third frames of a four-frame film or progressive video sequence are each converted to two video fields. The second and fourth frames of the sequence are converted to three video fields to make up a total of five interlaced video frames.

The following diagram demonstrates the process:

Film frames @ 24 fps or progressive frames @ 23.98 fps

A	B	C	D

Video fields @ 29.97 fps

a1	a2	b1	b2	b3	c1	c2	d1	d2	d3

Frame A	Frame B	Frame C	Frame D	Frame E
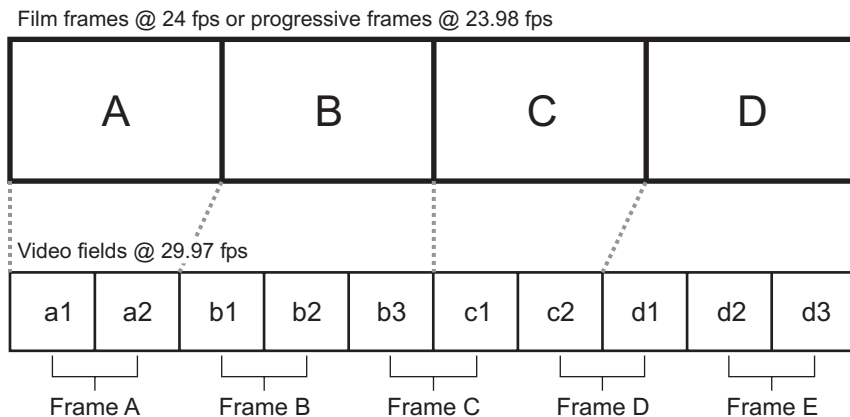
Standard 2:3 pulldown is accomplished by representing the first frame of film or progressive video (frame **A**) as two fields of video (fields **a1** and **a2**), the second frame (frame **B**) as three fields of video (fields **b1**, **b2**, and **b3**), the third frame (frame **C**) as two fields (fields **c1** and **c2**), and the fourth frame (frame **D**) as three fields (fields **d1**, **d2**, and **d3**). This sequence repeats six times each second.

Performing a standard reverse pulldown (2:3 cadence) reverses the process by converting 29.97 fps interlaced video to 23.98 fps progressive video. This is achieved by discarding a video frame (two video fields) from the sequence. From the diagram above, a typical standard reverse pulldown would discard fields **b3** and **d1**. This means that video frames **C** and **D** must be read by the application to remove the additional fields. For standard reverse pulldown that is performed on compressed video, the application must decompress frames in order to remove the additional fields, and then it must recompress frames to complete the conversion.

Matrox RT.X2 implementation of standard reverse pulldown

In order for Matrox RT.X2 to properly perform a standard reverse pulldown, the material that is to be converted from 29.97 fps interlaced video to 23.98 fps progressive video must have been originally acquired at 23.98 fps. When Matrox RT.X2 performs a standard reverse 2:3 pulldown, the process identifies the A frames of a sequence as those frames that have time code ending in 0 or 5. For example, a frame with the time code 00:00:20:20 or 00:00:20:25 would be considered an A frame, and therefore would be used as the first frame in a pulldown sequence.

In the case of batch captures, when the first frame of a clip that is to be captured might not always be an A frame, Matrox RT.X2 advances to the next instance of an A frame in the clip to start the pulldown sequence (if it's required). In order for Matrox RT.X2 to perform standard reverse 2:3 pulldown accurately, the clips must have A frames appearing at time codes 0 and 5. The clips must also be recorded to a tape that has continuous, non-drop frame time code.

Advanced 2:3:3:2 pulldown

Advanced 2:3:3:2 pulldown was developed as an alternative to the standard pulldown method for making frame rate conversions in DV video. It is used to convert 486p @ 23.98 fps video to NTSC (486i @ 29.97 fps) video. This conversion is used when video footage is acquired by a DV camera at 23.98 fps and recorded to DV tape with the recorder set for advanced pulldown (called 24PA or 24P Advanced mode on some devices). Advanced 2:3:3:2 pulldown differs from standard 2:3 pulldown in that the two middle frames of the video sequence are each converted to three video fields.

The following diagram demonstrates the process:

Progressive frames @ 23.98 fps
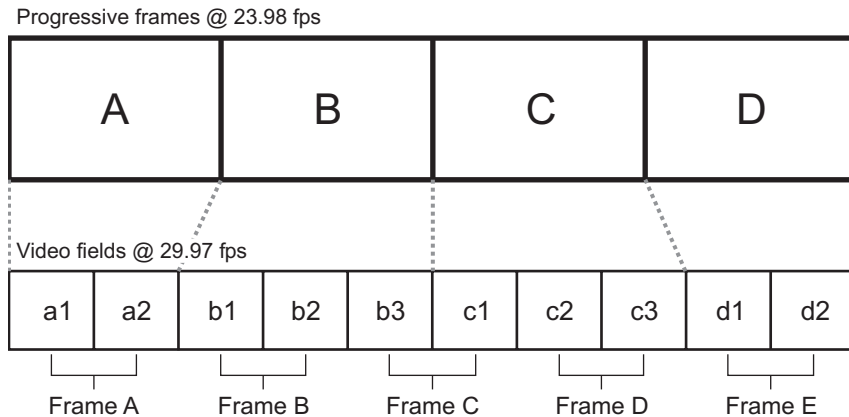
Advanced 2:3:3:2 pulldown is accomplished by representing the first frame of progressive video (frame **A**) as two fields of video (fields **a1** and **a2**), the second frame (frame **B**) as three fields of video (fields **b1**, **b2**, and **b3**), the third frame (frame **C**) as three fields (fields **c1**, **c2**, and **c3**), and the fourth frame (frame **D**) as two fields (fields **d1** and **d2**).

Performing an advanced reverse pulldown (2:3:3:2 cadence) reverses the process by converting 29.97 fps interlaced video to 23.98 fps progressive video. This is achieved by discarding a video frame (two video fields) from the sequence. From the diagram above, a typical advanced reverse pulldown would discard video fields **b3** and **c1**. This means that the application can remove video frame **C** from the sequence without reading the other frames.

When compared to standard reverse pulldown, advanced reverse pulldown results in less degradation in the converted video because removing an entire frame from the sequence leaves the remaining frames in the sequence intact, and therefore preserves the native generation of the video.

Matrox RT.X2 implementation of advanced reverse pulldown

The advanced reverse pulldown process is simpler than a standard reverse 2:3 pulldown because the additional frame, video frame **C** in the diagram above, is tagged when the 23.98 fps progressive footage is recorded to tape. This information is present in the DV stream and when Matrox RT.X2 performs an advanced reverse pulldown, it reads this information to identify the additional frame that is then removed from the sequence. Matrox RT.X2 can perform advanced reverse pulldown on clips that have been recorded to a DV tape that has continuous drop-frame or non-drop frame time code.

B

Matrox RT.X2 Workflows

This appendix provides information about working with different types of sequences in Adobe Premiere Pro on Matrox RT.X2.

Overview

This appendix provides general information about using various Matrox RT.X2 sequence presets and codecs for working with different types of sequences in Adobe Premiere Pro. Workflow diagrams and descriptions are used to help explain the specific workflow details.

Working with SD "24P" material

Matrox RT.X2 allows you to choose a Premiere Pro preset to work with SD material originally acquired at 23.98 fps. When you select the Matrox 486p @ 23.98 fps sequence preset, you can edit SD material as 23.98 fps progressive video as long as the source video was originally acquired at 23.98 fps. This includes video that was captured to tape by a DV camera capable of shooting 486p @ 23.98 fps video. You cannot use the 486p @ 23.98 fps preset to capture or edit video that was originally acquired as NTSC or PAL.

Regardless of it's origin, SD material that is acquired at 23.98 fps must undergo a format conversion to NTSC (486i @ 29.97 fps) when it is recorded to tape. This means that the output from your source device and input to Matrox RT.X2 is always NTSC. Your source device outputs the 23.98 fps material as NTSC by applying a pulldown method when it records the material.

Some DV cameras that are capable of shooting 23.98 fps progressive video have the option of performing either a standard or advanced pulldown for recording material to tape. Matrox RT.X2 allows you to capture 486p @ 23.98 fps DV material natively over the 1394 interface to a Matrox *.m2v* file so that you can import the file to Adobe Encore for DVD authoring. During capture, Matrox RT.X2 detects the original pulldown method in the DV stream, and then performs either a standard or advanced reverse pulldown.

The analog output from your 486p @ 23.98 fps sequence on Matrox RT.X2 is always NTSC. Matrox RT.X2 provides the option to apply either an advanced or standard pulldown. In most cases, you would want to perform a standard 2:3 pulldown when you export analog video from your 486p @ 23.98 fps sequence to tape. For more information about pulldown, see Appendix A, "Understanding Standard and Advanced Pulldown."

486p @ 23.98 fps workflow example

The following diagram illustrates a typical 486p @ 23.98 fps workflow using
Matrox RT.X2:

**DV-1394 input (capture to
Matrox .m2v file)**

SD video footage acquired
at 23.98 fps progressive
scan

DV camera performs either standard or
advanced pulldown (depending on mode
selection) when the acquired footage is
recorded to tape.

NTSC video on tape

Matrox RT.X2 detects original pulldown
method, then performs either a standard
or advanced reverse pulldown during
capture.

Matrox RT.X2
486p @ 23.98 fps
sequence

Depending on the user's selection of
pulldown method, Matrox RT.X2 performs
either a standard or advanced pulldown.

Matrox .m2v file imported to
Adobe Encore for DVD
authoring

Analog export to tape
as NTSC video

Note   You can also capture DV clips natively over the 1394 interface using the
Adobe Premiere Pro DV capture format as explained in your Adobe Premiere Pro
documentation. If you want to export your 486p @ 23.98 fps sequence to a
DV-1394 device, you must copy or import your sequence to a native Adobe
Premiere Pro DV-24p sequence.

Working with SD "24P" material

Working with HD sequences

Matrox RT.X2 lets you capture HD analog component input to MPEG-2 I-frame HD format, and capture HDV and DVCPRO HD material natively over the 1394 interface (for HDV capture, however, you must use the Adobe Premiere Pro HDV capture format). You can mix the native HDV, DVCPRO HD, and MPEG-2 I-frame HD clips in real time in the same HD sequence. You can also import file-based clips supported by Adobe Premiere Pro, such as XDCAM EX and AVCHD clips.

When your edits are complete, you can export your sequence to a DVCPRO HD device over the 1394 interface (depending on your sequence's video format), or export to tape using your Matrox RT.X2's HD analog component output. You can also choose to downconvert the video to NTSC or PAL to record to SD tape. The format in which you can export analog video depends on your sequence's video format as explained in "Supported master output formats" on page 148.

Note To export your sequence to an HDV device over the 1394 interface, you must copy or import your Matrox sequence into a native Adobe Premiere Pro HDV sequence.

720p workflow example

Matrox RT.X2 supports creating 720p sequences at 23.98 fps, 25 fps, 29.97 fps, 50 fps, and 59.94 fps. If you're working with a 720p @ 23.98 fps or 25 fps sequence, Matrox RT.X2 supports capturing Panasonic VariCam material (you must select **Enable VariCam capture** when you perform the capture). In this case, RT.X2 will remove the redundant frames from the VariCam input during capture and create a clip in the same format as your sequence for editing.

Depending on your sequence's video format, you can export your sequence to tape as 720p @ 50 fps or 59.94 fps video, or downconvert the video to NTSC or PAL. You can also export over the 1394 interface to DVCPRO HD for a 720p @ 59.94 fps sequence.

Remarks

- Analog component input is not supported for 720p sequences, and DVCPRO HD capture over the 1394 interface is not supported for 720p @ 50 fps sequences.

- You can capture HDV clips natively over the 1394 interface using the Adobe Premiere Pro HDV capture format as explained in your Adobe Premiere Pro documentation.

The following diagram illustrates a typical workflow for working with a 720p sequence on Matrox RT.X2:
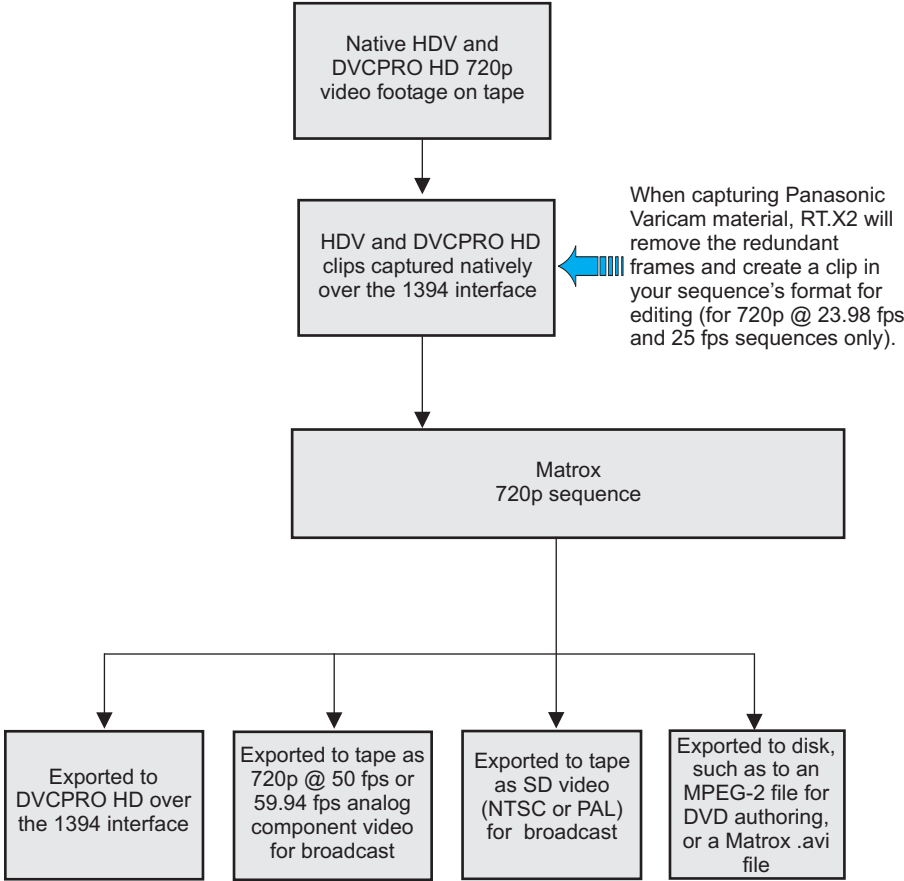
1440×1080i/p workflow example

The following diagram illustrates a typical workflow for working with a 1440×1080i/p sequence on Matrox RT.X2:

```
┌─────────────────────────────┐
│   Native HDV (1080i/p), or  │
│  analog component video     │
│     footage (1080i only)    │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Clips captured natively over│
│    the 1394 interface, or    │
│  Matrox MPEG-2 I-frame HD    │
│  codec used to capture HD    │
│   analog component video     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│          Matrox             │
│       1440x1080i/p          │
│         sequence            │
└─────────────────────────────┘
```

┌────────────────────────┐ ┌────────────────────────┐ ┌────────────────────────┐
│ Exported to tape as HD │ │ Exported to tape as SD │ │ Exported to disk, such │
│ analog component video │ │ video (NTSC or PAL)   │ │ as to an MPEG-2 file   │
│ for broadcast   │ │ for broadcast   │ │ for DVD authoring, or a│
│   │ │   │ │ Matrox .avi file   │
└────────────────────────┘ └────────────────────────┘ └────────────────────────┘

Remarks

- HDV clips are captured natively over the 1394 interface using the Adobe Premiere Pro HDV capture format as explained in your Adobe Premiere Pro documentation.
- To output a 1440×1080p @ 23.98 fps sequence as 1080i @ 29.97 fps or NTSC, Matrox RT.X2 will perform a standard 2:3 pulldown.

1080i workflow example

When working in a 1080i @ 25 fps or 29.97 fps sequence, you can capture analog component video using the Matrox MPEG-2 I-frame HD codec, as well as capture DVCPRO HD video natively over the 1394 interface. You can export your sequence to tape in the same format as your sequence, or you can choose to downconvert the video to NTSC or PAL (NTSC for a 1080i @ 29.97 fps sequence, or PAL for a 1080i @ 25 fps sequence). You can also export your sequence natively over the 1394 interface to a DVCPRO HD device.

Note If you want to capture and edit only HDV clips, you should create a 1440×1080i/p @ 25 fps or 29.97 fps sequence. A 1440×1080i/p sequence provides better editing performance than a full-size 1080i/p (1920×1080) sequence, and supports capturing HDV material natively over the 1394 interface using the Adobe Premiere Pro HDV capture format. A 1440×1080i @ 25 fps or 29.97 fps sequence also supports capturing analog component input to Matrox MPEG-2 I-frame HD format.

The following diagram provides a typical workflow for working with a 1080i @ 25 fps or 29.97 fps sequence on Matrox RT.X2:

Film footage telecined and transferred to HD tape. Standard 2:3 pulldown performed (for converting to 1080i @ 29.97 fps video only).

```
┌──────────────────┐          ┌──────────────────┐
│ Film footage shot│────────▶ │ 1080i video on   │
│    at 24 fps     │          │      tape        │
└──────────────────┘          └──────────────────┘
                                       │
                                       ▼
                              ┌──────────────────┐
                              │ Matrox MPEG-2 I- │
                              │ frame HD codec   │
                              │ used to capture  │
                              │ clips, or DVCPRO │
                              │ HD clips         │
                              │ captured natively│
                              │ over the 1394    │
                              │ interface        │
                              └──────────────────┘
                                       │
                                       ▼
                              ┌──────────────────┐
                              │ Matrox 1080i     │
                              │ sequence         │
                              └──────────────────┘
```

| Exported to DVCPRO HD over the 1394 interface | Exported to tape as 1080i analog component video for broadcast | Exported to tape as SD video (NTSC or PAL) for broadcast | Exported to disk, such as to an MPEG-2 file for DVD authoring, or a Matrox .avi file |

Appendix B, Matrox RT.X2 Workflows

Using the Matrox MPEG-2 I-frame HD codec for online editing

The Matrox MPEG-2 I-frame HD codec allows you to control the data rate of the video that you are capturing or exporting. At high data rates (100 Mb/sec or higher), the codec can be used to capture high-quality video for online editing. The Matrox VFW MPEG-2 I-frame HD codec allows you to render and play back MPEG-2 I-frame HD clips in VFW applications, such as Adobe After Effects.

MPEG-2 I-frame HD codec workflow example for online editing

In this workflow example, the Matrox MPEG-2 I-frame HD codec is used to capture video clips for online editing. The clips are captured with Matrox RT.X2 at a data rate of 100 Mb/sec or higher and then used to complete an online editing sequence in Adobe Premiere Pro. A VFW application is also used to render the clips in a compositing project using the Matrox VFW MPEG-2 I-frame HD codec. When the edit is complete, it is exported to tape for broadcast.

This workflow scenario is represented in the following diagram:
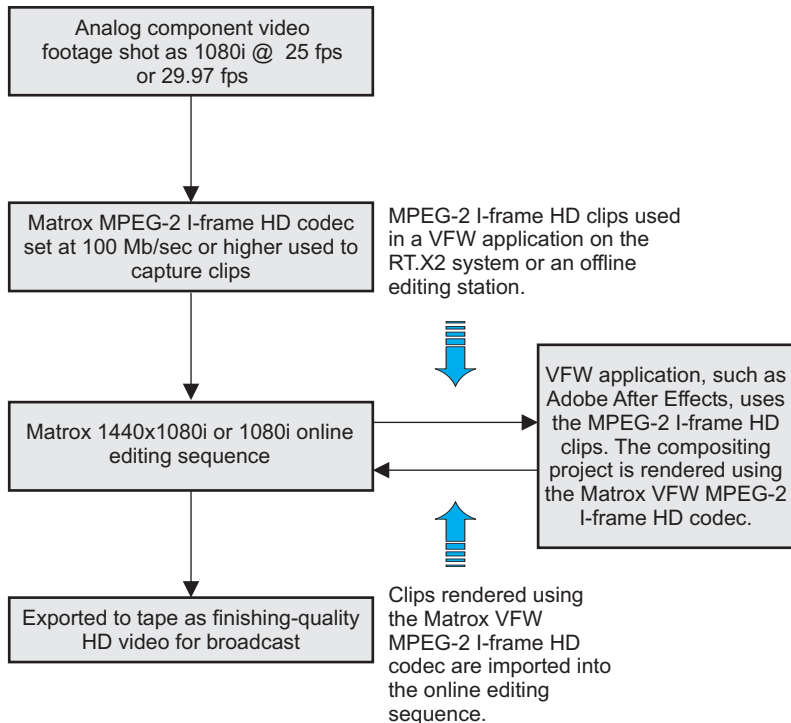
Using the Matrox MPEG-2 I-frame HD codec for offline editing

You can use the Matrox MPEG-2 I-frame HD codec to capture clips at a low data rate of 50 Mb/sec for offline editing. You can then edit the offline sequence on your RT.X2 system, and later recapture the clips at a high quality to complete your sequence as finishing-quality HD video for broadcast. This workflow is described below in the section, "MPEG-2 I-frame HD codec workflow example for offline editing on an RT.X2 system."

As an alternative, you can transfer your project and the offline-quality clips you've captured to a remote editing workstation, such as a laptop, to complete your offline edit using Adobe Premiere Pro with the Matrox VFW MPEG-2 I-frame HD codec (see "Installing the Matrox VFW software codecs on a system without the RT.X2 hardware" in your *Matrox RT.X2 Installation Manual*). Once your edit is complete, you transfer the project back to your RT.X2 system so that you can recapture your clips at a high quality and create a finishing-quality project for broadcast. This workflow is described in "MPEG-2 I-frame HD workflow example for offline editing on a remote system" on page 146.

MPEG-2 I-frame HD codec workflow example for offline editing on an RT.X2 system

In this workflow example, the Matrox MPEG-2 I-frame HD codec is used to capture video clips for offline editing. The clips are captured with Matrox RT.X2 at a data rate of 50 Mb/sec and then used to complete an offline editing sequence. When the offline edit is complete, the project is trimmed (using the Adobe Premiere Pro Project Manager), and the offline-quality clips are unlinked and then recaptured using the Matrox MPEG-2 I-frame HD codec at a data rate of 100 Mb/sec or higher. The online editing sequence is then exported to tape for broadcast.

This workflow scenario is represented in the following diagram:

```
┌─────────────────────────┐          ┌─────────────────────────┐
│ Analog component video  │          │ Matrox MPEG-2 I-frame HD│
│ footage shot as 1080i @ │ ───────▶ │ codec set at 50 Mb/sec  │
│ 25 fps or 29.97 fps     │          │ used to capture clips   │
└─────────────────────────┘          └─────────────────────────┘
            │                                     │
            │                                     ▼
            │                        ┌─────────────────────────┐
            │                        │ Matrox 1440x1080i or    │
            │                        │ 1080i offline editing   │
            │                        │ sequence                │
            │                        └─────────────────────────┘
            │                                     │
            │                                     ▼
            │                        ┌─────────────────────────┐
            │                        │ Project is trimmed,      │
            │                        │ offline-quality clips are│
            └──────────────────────▶ │ unlinked and recaptured  │
                                     │ usng the MPEG-2 I-frame  │
                                     │ HD codec at 100 Mb/sec   │
                                     │ or higher                │
                                     └─────────────────────────┘
                                                  │
                                                  ▼
                                     ┌─────────────────────────┐
                                     │ Exported to tape as      │
                                     │ finishing-quality HD     │
                                     │ video for broadcast      │
                                     └─────────────────────────┘
```
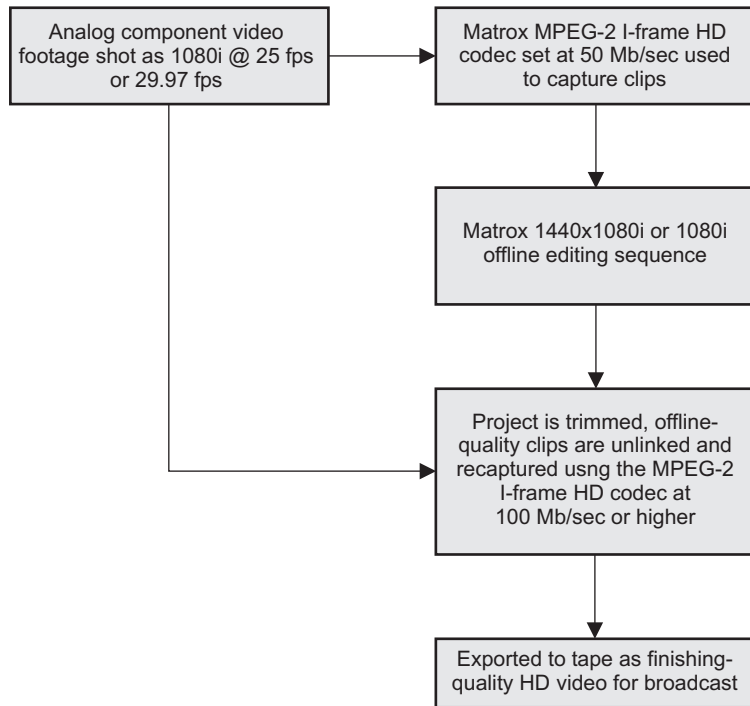
MPEG-2 I-frame HD workflow example for offline editing on a remote system

In this workflow example, the Matrox MPEG-2 I-frame HD codec is used to capture video clips for use in an offline editing project that is to be completed on a remote editing system. Because the remote system has the Matrox VFW software codecs installed, the system can be used with Adobe Premiere Pro to produce the offline edit (the project will open in Desktop mode). When the offline edit is complete and trimmed, the Premiere Pro project (*.prproj*) file is transferred back to the Matrox RT.X2 system. The offline-quality clips are then unlinked and recaptured as high-quality clips using the Matrox MPEG-2 I-frame HD codec at a high data rate. The final online editing sequence is then exported to tape for broadcast.

This workflow scenario is represented in the following diagram:
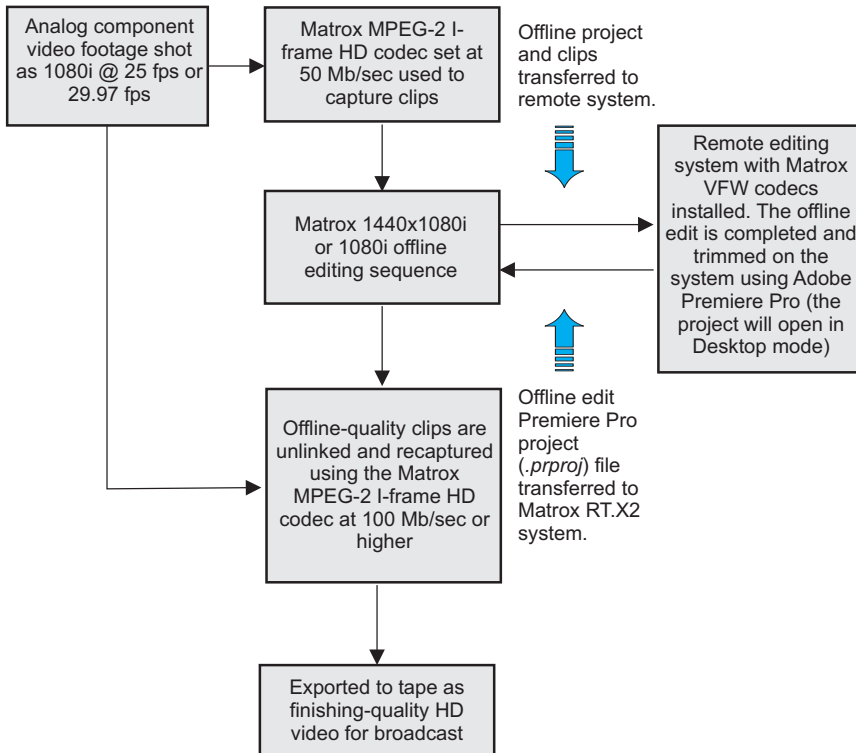
Supported video compression formats

The following table lists the supported video compression formats for performing various operations on Matrox RT.X2 depending on your sequence's video format.

	SD sequence	HD sequence (not supported on RT.X2 SD)
Capture[1]	DV/DVCAM DVCPRO MPEG-2 I-frame MPEG-2 IBP (for capture to *.m2v* files only)	**DV-1394 input**: DVCPRO HD[2] **Analog component input**: MPEG-2 I-frame HD (for 1440×1080i and 1080i sequences only)
Playback[3]	DV/DVCAM, DVCPRO, and DVCPRO50 8-bit Uncompressed MPEG-2 I-frame	DVCPRO HD[2] 8-bit Uncompressed MPEG-2 I-frame HD Offline HD (for playback of legacy Matrox Axio offline HD projects)
Export to disk	All Matrox codecs are available for VFW export	All Matrox codecs are available for VFW export
Render previews	8-bit Uncompressed MPEG-2 I-frame	DVCPRO HD (1080i only) 8-bit Uncompressed MPEG-2 I-frame HD
DV-1394 export to tape[4]	Not supported in a Matrox sequence	DVCPRO HD[2]

[1] If you want to capture DV material other than DVCPRO HD natively over the 1394 interface, you must use a native Adobe Premiere Pro DV or HDV capture format as explained in your Adobe Premiere Pro documentation.

[2] DVCPRO HD is supported only for 1080i, 1080p @ 29.97 fps, and 720p sequences (DV-1394 capture is not supported for 720p @ 50 fps sequences). DV-1394 export to DVCPRO HD is supported only for 1080i and 720p @ 59.94 fps sequences.

[3] Realtime playback also includes formats supported by Adobe Premiere Pro, such as XDCAM EX, P2, and AVCHD. For more information, see "A note about realtime playback capabilities" on page 12.

[4] If you want to export your sequence to a DV-1394 device other than DVCPRO HD, you need to copy or import your Matrox sequence into a native Adobe Premiere Pro sequence. For more details on exporting to tape, see "Exporting your sequence to tape" on page 39.

Supported master output formats

The following table lists the supported master output formats for Matrox RT.X2 depending on your sequence's video format.

Note   Matrox RT.X2 SD supports SD sequences only.

Sequence video format	Supported master output formats
NTSC	NTSC
PAL	PAL
486p @ 23.98 fps	NTSC
486p @ 29.97 fps	NTSC
576p @ 25 fps	PAL
720p @ 23.98 fps	720p @ 59.94 fps or NTSC
720p @ 25 fps	720p @ 50 fps or PAL
720p @ 29.97 fps	720p @ 59.94 fps or NTSC
720p @ 50 fps	720p @ 50 fps or PAL
720p @ 59.94 fps	720p @ 59.94 fps or NTSC
1440×1080i @ 25 fps	1080i @ 25 fps or PAL
1440×1080i @ 29.97 fps	1080i @ 29.97 fps or NTSC
1440×1080p @ 23.98 fps	1080PsF @ 23.98 fps, 1080i @ 29.97 fps, or NTSC
1440×1080p @ 25 fps	1080PsF @ 25 fps or PAL
1440×1080p @ 29.97 fps	1080PsF @ 29.97 fps or NTSC
1080i @25 fps	1080i @ 25 fps or PAL
1080i @ 29.97 fps	1080i @ 29.97 fps or NTSC
1080p @ 23.98 fps	1080PsF @ 23.98 fps , 1080i @ 29.97 fps, or NTSC
1080p @ 25 fps	1080PsF @ 25 or PAL
1080p @ 29.97 fps	1080PsF @ 29.97 fps or NTSC

C
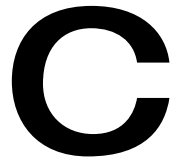
Matrox Customer Support

This appendix explains how you can register your Matrox product and obtain customer support.

How to get Matrox customer support

If you have a problem that you're unable to solve by referring to the documentation for your Matrox product, please contact your Matrox representative. He or she should be able to help you quickly correct any installation or system configuration problem.

If your representative is unable to solve your problem, contact Matrox for further information and assistance.

Registration

You can register your Matrox product in the Matrox Support section of our website at www.matrox.com/video/support.

Only registered users are entitled to customer support, software updates, special promotional offers, and access to our user forum.

Keep up to date with our website

In addition to registering your Matrox product, our website offers you up-to-the-minute information about Matrox products and software updates. Be sure to place our site in your favorites or bookmarks: www.matrox.com/video/support.

Contacting us

Matrox is proud to offer worldwide customer support. Please use the contact information for your Matrox product and area as provided on our website at www.matrox.com/video/support.

D

Matrox RT.X2 Glossary

This glossary defines many of the terms used in this manual and related documentation.

Glossary of terms

Use this glossary as a reference for many of the basic terms used in this manual and related documentation.

Numerics

1394   *See* IEEE-1394.

2:3 pulldown   A method used to create additional video frames when 24 fps film footage or 23.98 fps progressive video is converted to 29.97 fps interlaced video, such as NTSC. To convert a four-frame sequence of film or progressive video, five frames of video are required. The 2:3 pulldown sequence accomplishes this by representing the first frame of film or progressive video as two fields (1 frame), the second frame as three fields (1.5 frames), the third frame as two fields (1 frame), and the fourth frame as three fields (1.5 frames). *See also* advanced 2:3:3:2 pulldown.

2D   Short for two-dimensional. An image that has height and width only.

3D   Short for three-dimensional. An object in three dimensions has height, width, and depth. Various techniques are used to show 3D images on 2D surfaces like your computer screen.

4:2:2P@ML   4:2:2 Profile@Main Level. An international standard video compression profile introduced by MPEG-2. It supports 4:2:2 luminance/chrominance sampling at up to 720×608 pixel resolution, and data transfer rates up to 50 Mb/sec (5.96 MB/sec). This profile is used for high-quality distribution and for archiving. *See also* MP@ML.

A

A/B roll   Typically, A/B roll is an editing technique where scenes or sounds on two source reels (called roll A and roll B) are played simultaneously to create dissolves, wipes, and other effects. On nonlinear editing systems, A/B roll refers to using two source streams (*.avi*, *.wav*, *.tga*, and so on) to create an effect.

advanced 2:3:3:2 pulldown   A method that is often used to convert 23.98 fps progressive video to NTSC when the video is acquired by a camera shooting at 23.98 fps and recorded to DV tape. Advanced 2:3:3:2 pulldown differs from standard 2:3 pulldown in that the two middle frames of a four-frame sequence are each converted to three video fields. This results in less image degradation when a reverse pulldown is performed to convert the video back to 23.98 fps progressive video.

AGP slot   Connection slot to a type of expansion bus found in many computers. The AGP slot is used to house the AGP display card.

alpha key   An effect that makes parts of a foreground image fully or partially transparent based on alpha (transparency) values stored within the image's file, so that an underlying image can show through. *See also* chroma key and luma key.

analog component video   *See* component video.

analog signal   A video or audio signal that varies continuously, as opposed to a digital signal which varies only by fixed steps.

anti-aliasing   A technique that smooths jagged edges in computer-generated text or graphics.

aspect ratio   A width-to-height ratio. For example, a 12-by-9-inch image has an aspect ratio of 4:3 (four-to-three). Most TV screens have a 4:3 aspect ratio. HDTV screens have a 16:9 aspect ratio.

assemble editing   Recording new video and audio material sequentially onto tape. Because all the signals are recorded (video, audio, and control track), the new material completely replaces any previously recorded material on the tape. *See also* insert editing.

AVI   Audio Video Interleaved. A video file format designed for the Microsoft Windows environment. *See also* codec.

A/V drive   A hard drive capable of storing high-bandwidth audio/video data.

B

B-frame (Bi-directional frame)   A frame created during the MPEG or MPEG-2 IBP compression process. A B-frame is generated by forwards and backwards referencing of the P-frames and I-frames respectively, which allows it to have the highest compression ratio of the three frame types. B-frames contain only predictive data (that is, not enough data to make up an entire picture), and therefore cannot be edited independently.

BIOS   Basic Input/Output System settings for system components, peripherals, etc. This information is stored in a special battery-powered memory and is usually accessible for changes at computer start-up.

bitmap   A graphics image in which a set of values defines each pixel's relative brightness and color.

black level   The level of brightness at which no light is emitted from the screen (reference black). The standard black level is 7.5 IRE for NTSC video, or 0 IRE for NTSC-EIAJ (Japan) and PAL video. *Also called* setup (NTSC video only). *See also* white level, super black, and super white.

Blue Book standard   *See* DV.

bus   A shared set of hardware lines that lets different parts of your computer transfer information between one another. A card inserted into an expansion slot of your computer makes an electrical connection to the bus and effectively becomes part of your computer system.

C

capture   The process of digitizing video or audio material, usually from a VTR or camera, and storing it in a file on a hard disk.

chroma key   An effect that makes portions of a foreground image fully or partially transparent based on the color of that image, so that an underlying image can show through. *See also* alpha key and luma key.

chrominance   The color portion of a video signal that carries the hue and saturation information. *See also* luminance.

codec   Compressor/decompressor. A processor that compresses video to reduce its file size by eliminating redundancies in information. It also decompresses files to play them back.

color bars   A standard test signal that appears as a series of vertical rows of color by which the chrominance and video levels of a camera's output or a recorded signal can be checked.

color correction effect   A Matrox effect that allows various color properties of an image to be adjusted. There are controls for adjusting the intensity level for hue, saturation, contrast, and brightness. The color correction effect can correct improper color levels of an image that are due to varying lighting conditions or incorrect camera settings. *See also* white balancing.

component video   A video signal having separate channels for the video information, as opposed to a combined (composite) signal. Y, R-Y, B-Y video is a component video signal.

composite video   A video signal containing luminance and chrominance information that has been combined using a video standard such as NTSC or PAL. Composite video often uses a single RCA or BNC cable connection. *See also* component video.

contrast   The difference in brightness between the lightest and darkest areas of an image on the screen.

CPU   Central processing unit. The central processor of a computer that performs calculations and interprets and executes commands.

CPU-based effect   An effect that takes advantage of your computer's CPU to play back in real time. Matrox Flex CPU effects, such as the Matrox color correction effects, are CPU-based effects. *Compare with* GPU-based effect.

crawl   Sideways movement of text across a screen. *See also* roll (1).

crossfade   *See* dissolve.

cut   A direct switch from one video and/or audio source to another.

D

D-9   Originally known as Digital-S. A variant of the DV format developed by JVC that uses a data rate of 50 Mb/sec (5.96 MB/sec), which is double the data rate of most other DV formats. Video is sampled at 4:2:2 for both NTSC and PAL sources to give enhanced chroma resolution. It uses a 1/2" metal particle tape.

D10   *See* IMX.

Digital8   A camcorder video format developed by Sony. Digital8 camcorders use the DV format to record digital video and audio onto 8mm and Hi-8 tapes via any device that has an IEEE-1394 interface.

Digital-S   *See* D-9.

digital signal   A signal representing video or audio information as binary digits that can be easily regenerated with no noise or distortion. *See also* analog signal.

Digital Video   *See* DV.

digitize   To convert analog information, such as a video signal from a VTR or camera, into digital information that can be processed and stored by a computer.

Direct memory access (DMA)   A technique used to rapidly transfer data between an attached device, such as a disk drive, and the computer's main memory without needing to pass the data through the CPU.

DirectX   A Microsoft-developed program that enables interfaces to support advanced hardware features without being written specifically for each hardware model. DirectShow (formerly called ActiveMovie) is part of DirectX.

display card   A card that has its own memory and processor to handle graphics and enhance display capabilities. *Also called* graphics card. *See also* GPU.

dissolve   A transition in which one image smoothly fades to another image. It is characterized by the gradual ending of one image occurring simultaneously with the gradual beginning of another. *Also called* crossfade.

driver   Software that controls a device, such as a display card, and enables it to work with other software.

drop-frame time code   For NTSC video, time code is normally produced by a generator that counts at 30 frames per second. NTSC color signals, however, actually have a display frequency rate close to 29.97 frames per second. Drop-frame time code compensates for this time difference by dropping two frames from the count every minute except for every tenth minute so that the time code matches clock time.

DV   Digital Video. A standard digital bit stream and compression format (known as the Blue Book standard) used to record video and audio onto a digital tape. DV is intra-frame based, saving each frame separately, and uses a fixed 5:1 compression ratio to reduce the size of video files. DV's data rate is fixed at 25 Mb/sec (2.98 MB/sec). Video is sampled at 4:1:1 for NTSC sources or 4:2:0 for PAL sources. *See also* DVCAM, DVCPRO, DVCPRO50, and D-9.

DVCAM   A variant of the DV format developed by Sony that records a 15 micron track on a metal evaporated (ME) tape at a data rate of 25 Mb/sec (2.98 MB/sec). Video is sampled at 4:1:1 for NTSC sources or 4:2:0 for PAL sources.

DVCPRO   A variant of the DV format developed by Panasonic that records an 18 micron track on metal particle tape at a data rate of 25 Mb/sec (2.98 MB/sec). Video is sampled at 4:1:1 for both NTSC and PAL sources. *See also* DVCPRO HD.

DVCPRO HD   A high-definition variant of the DVCPRO format developed by Panasonic that uses a data rate of 100 Mb/sec. Matrox RT.X2 supports DVCPRO HD for 1080i and 720p sequences.

DVCPRO50   A variant of the DV format developed by Panasonic that uses a data rate of 50 Mb/sec (5.96 MB/sec), which is double the data rate of most other DV formats. Video is sampled at 4:2:2 for both NTSC and PAL sources to give enhanced chroma resolution. It uses the same type of tape as DVCPRO.

DVD   Digital Versatile Disc or Digital Video Disc. A type of compact disc that can hold from 4.7 gigabytes (GB) to 17 GB of information. The greatest advantage that DVD has over CD is that it can store video as well as audio and computer data. For video storage, DVD uses MPEG-2 compression, to provide better quality than standard VHS.

DVE   Digital Video Effect. Generally, an effect that resizes and repositions a picture on the screen.

DVI   Digital Video Interface. A video interface technology that maximizes the quality of flat-panel LCD monitors and modern display cards.

E

Edit Decision List (EDL)   A file containing a list of edit decision statements used to create a video production.

edit master   The first generation (original) of a final edited tape.

expansion slot   Electrical connection slot mounted on a computer's motherboard (main circuit board). It allows several peripheral devices to be connected inside a computer. *See also* AGP slot, PCI slot, PCI Express slot, and PCI-X slot.

F

fade to black   A transition commonly used to signify the end of a scene, in which an image or sound smoothly fades to a black screen or silence (*also called* a fade-out

transition). Similarly, you could start a new scene with a fade up from black (or fade-in) transition.

field   One-half of the horizontal lines needed to make a complete scan of an interlaced video frame. In the NTSC system, two consecutive fields of 262.5 lines each create a frame of 525 scan lines. In the PAL system, two consecutive fields of 312.5 lines each create a frame of 625 scan lines.

FireWire   Apple Computer's original implementation of the technology that would be standardized as IEEE-1394 in 1995.

Flex CPU effect   *See* CPU-based effect.

frame   A single video image. An interlaced video frame is comprised of two consecutive fields (the odd and even fields).

G

garbage matte effect   An effect often used to crop unwanted objects from a foreground image in a chroma or luminance key effect. You define the shape of the garbage matte, and only the underlying image is shown outside the matte.

GOP   Group of Pictures. The sequence of I, B and/or P-frames produced during MPEG or MPEG-2 compression. This sequence of frames contains all of the information required to reproduce a complete video segment. The longer the GOP, the less editable it is.

GPU   Graphics processing unit. A processor that is used primarily for computing 3D functions, such as processing 3D DVEs and lighting effects. Because the calculations required to process these effects are CPU-intensive, the GPU lifts this burden from the CPU to allow it to perform more

efficiently. A high-performance display card is sometimes referred to as a GPU.

graphics card   *See* display card.

graphics overlay   Text or a graphics image that's superimposed on video. *Also called* super.

H

hardware-accelerated effect   An effect that requires the assistance of dedicated hardware to play back in real time. *Compare with* CPU-based effect.

HD   Short for HDTV.

HDTV   High Definition Television. A digital television format with image resolutions up to 1080 vertical scan lines. HDTV has a 16:9 aspect ratio. *Also called* HD. *See also* SDTV.

HDV   A high-definition video format that uses MPEG-2 video compression at a data rate of about 19 Mb/sec for HDV-1 or 25 Mb/sec for HDV-2, and records to standard DV format digital video cassettes.

hue   The tint or tone of a color. For example, the difference between the color green and red is its hue.

I

IBP compression   *See* MPEG-2 IBP.

IEEE-1394   An international standard data transfer protocol created by Apple Computer under the FireWire trademark and standardized by the Institute of Electrical and Electronics Engineers (IEEE). It enables simple, low-cost, realtime data transfer between computers and consumer and prosumer electronics products, such as DV camcorders and DV decks. Commonly referred to as 1394.

I-frame compression   *See* MPEG-2 I-frame.

I-frame (Intra-frame)   A frame created during the MPEG or MPEG-2 compression process that contains all the information required to reproduce a complete image. It allows random access points within a video stream, and acts as a reference point for B-frames and P-frames to be built. I-frames are editable because they contain enough data to construct an entire video frame, unlike B-frames or P-frames.

IMX   A video recording format developed by Sony, and standardized by SMPTE as D10, that is used to record video and audio onto a hard disk or tape. The IMX data format is fully MPEG-2 compliant and supports video data rates of 30, 40, and 50 Mb/sec. Video is sampled at 4:2:2 for both NTSC and PAL sources.

insert editing   Recording new video and/or audio material onto a prerecorded (or striped) tape. Insert edits can be made in any order, unlike assemble edits, which must be made sequentially.

inter-frame compression   A video compression method that compares a series of frames in a video sequence and removes the redundant data. Inter-frame compression treats all the frames in the sequence as an interdependent group. As a result, most of the frames can't be edited independently. *Also called* temporal redundancy reduction. *Contrast with* intra-frame compression. *See also* GOP.

interlaced scanning   A method of creating a video image by drawing only the odd numbered lines on the screen in one pass, then the even numbered lines in the next pass. Two passes are therefore required to create a complete frame of video. NTSC and PAL displays are interlaced. *See also* progressive scanning.

interleave   A technique used to incorporate the video and audio portions of a video clip into one file. *See also* AVI.

intra-frame compression   A video compression method that removes redundant information from within a frame. Intra-frame compression treats each frame of a video segment independently. Several video compression formats use the intra-frame method. These include Motion-JPEG, DV, and MPEG-2 I-frame. *Also called* spatial redundancy reduction. *Contrast with* inter-frame compression. *See also* I-frame (Intra-frame).

IRE unit   An arbitrary unit designated by the Institute of Radio Engineers to define the amplitude of a video signal. 1 IRE is equal to approximately 7 mV.

J

JPEG (pronounced "jay-peg")   Joint Photographic Experts Group. A compression and storage standard used for still, digital images. *See also* Motion-JPEG.

K

key effect   *See* alpha key, chroma key, and luma key.

L

LTC   Longitudinal Time Code. Time code that is generally encoded as an audio signal onto a linear audio track of a tape. This type of time code can be read only while the tape is moving. *See also* VITC.

luma key   An effect that makes portions of a foreground image fully or partially transparent based on the luminance of that image, so that an underlying image can show through. *See also* alpha key and chroma key.

Appendix D, Matrox RT.X2 Glossary

luminance   The brightness portion of a video signal. The luminance of a pixel determines its brightness on a scale from black to white. *See also* chrominance.

luminance key   *See* luma key.

M

mark in   To select the first frame of a clip.

mark out   To select the last frame of a clip.

M-JPEG   *See* Motion-JPEG.

Motion-JPEG   A compression and storage standard used for motion video. The JPEG compression process is applied to each video field, in succession. *Also called* M-JPEG.

MP@ML   Main Profile@Main Level. An MPEG-2 video compression profile that supports 4:2:0 luminance/chrominance sampling at up to 720×576 pixel resolution, and data transfer rates up to 15 Mb/sec (1.79 MB/sec). This profile is used for broadcast transmission and distribution on DVD. *See also* 4:2:2P@ML.

MPEG   A video compression standard that specifies a series of compression profiles and image resolution levels, introduced in 1990 by the Motion Picture Experts Group. MPEG takes advantage of the redundancy inherent in video data through a combination of inter-frame and intra-frame redundancy reduction. The MPEG standard supports data transfer rates of up to 1.5 Mb/sec (0.2 MB/sec). *Also called* MPEG-1. *See also* MPEG-2, inter-frame (IBP) compression, and intra-frame (I-frame) compression.

MPEG-1   *See* MPEG.

MPEG-2   A video compression standard that improves upon the MPEG standard by supporting data rates of up to 100 Mb/sec (12 MB/sec), scalable modes, field or frame searching, and much larger screen sizes. *See also* intra-frame (I-frame) compression, inter-frame (IBP) compression, 4:2:2P@ML, and MP@ML.

MPEG-2 IBP   An MPEG-2 compression type that uses inter-frame compression to create a group of I, B, and P-frames. Used for broadcast transmissions and distribution on DVD. *See also* GOP.

MPEG-2 I-frame   An MPEG-2 compression type that uses only intra-frame compression (that is, only I-frames are created). Used for high-quality distribution and for archiving.

MPEG HD   An HD video recording format developed by Sony that uses industry-standard MPEG-2 IBP compression and supports data rates of 17.5, 25, and 35 Mb/sec. Sony XDCAM HD devices use MPEG HD compression for video recording.

mV   Abbreviation for millivolt (one-thousandth of a volt). Unit of measurement sometimes used to define the amplitude of a video signal. *See also* IRE unit.

MXF   Material eXchange Format. A file exchange format standardized by SMPTE that assures interoperability among devices and systems. Panasonic P2 (Professional Plug-in) as well as Sony XDCAM and XDCAM HD use *.mxf* files rather than *.mov*, *.avi*, or *.mpg* files, for example. MXF is designed for today's file-based workflows and provides a common way of packaging video and audio along with metadata so that information about the content is maintained as it flows through the production process.

N

nonlinear editing   Random access editing that generally uses video and audio clips

stored on disks. Nonlinear editing programs let you rearrange and edit clips without having to redo the entire production, and provide instant cueing to any frame in a clip without waiting for tapes to rewind.

NTSC   National Television Systems Committee. The NTSC RS-170A standard defines a method of broadcasting a color signal that can be received by both monochrome and color TVs. It uses a composite interlaced display comprised of 525 scan lines per frame, refreshed at a rate of approximately 30 frames per second. Broadcast systems in North America and Japan use the NTSC standard.

O

OP1a   An Operational Pattern (OP) for the MXF file format that interleaves the video and audio into a single *.mxf* file. Sony XDCAM *.mxf* files use the OP1a Operational Pattern. *See also* OP-Atom.

OP-Atom   An Operational Pattern (OP) for the MXF file format that separates the video and audio into separate *.mxf* files, but retains the common metadata among related files. Panasonic P2 *.mxf* files use the OP-Atom Operational Pattern. *See also* OP1a.

organic wipe   A wipe effect that uses a grayscale gradient pattern to switch from one image to another by gradually revealing the second image according to the pattern.

P

PAL   Phase Alternate Line. A video standard that uses a composite interlaced display comprised of 625 scan lines per frame, refreshed at a rate of 25 frames per second. This is the broadcast video standard for most of Europe.

PCI slot   Connection slot to a type of expansion bus found in many computers. It is smaller in size than older ISA slots and provides connections to the PCI host bus at speeds up to 66 MHz.

PCIe slot   *See* PCI Express slot.

PCI Express slot   A type of PCI slot that uses a different and much faster communications protocol than a 32-bit PCI slot. PCI Express can accommodate the higher speeds required for high-performance peripherals such as display cards and network controllers. PCI Express slots are available in different sizes (x1, x4, x8, and x16). The Matrox RT.X2 card is installed in a PCI Express slot. *Also called* PCIe slot.

PCI-X slot   A type of PCI slot that increases the speed at which data can move within the computer from 66 MHz to up to 133 MHz.

P-frame (Predicted frame)   A frame created during the MPEG or MPEG-2 IBP compression process. A P-frame is created by using motion vectors to predict the differences between it and the closest previous I-frame or P-frame. This forward prediction allows for higher compression than with I-frames, but not as high as with B-frames. P-frames, like B-frames, contain only predictive data and therefore cannot be edited independently.

pixel   Picture element. The smallest portion of an image that can be written to a display. Each pixel in an image represents a single dot on the computer screen. A picture's resolution depends on the number of pixels on the screen.

Plug and Play   A hardware standard for auto-configuration. It refers to the ability of computer hardware to detect and configure expansion devices such as your Matrox hardware. Windows supports Plug and Play.

plug-in   Software that adds functionality and/or features to an application. For example, the Matrox realtime plug-in for Adobe Premiere Pro adds realtime Matrox effects and transitions to Adobe Premiere Pro.

proc amp   An electronic device that adjusts the different aspects of a video signal, such as its hue, saturation, and contrast.

progressive scanning   A method of creating a video image by drawing all the lines of a screen sequentially so that the complete image is displayed in one pass. VGA displays and some HDTV formats use progressive scanning. Progressive scanning produces smoother pictures than interlaced scanning, but uses more bandwidth.

pulldown detection   A method of identifying the extra video frames that are added when 24 fps film footage or 23.98 fps progressive video is converted to 29.97 fps interlaced video. *See also* 2:3 pulldown and advanced 2:3:3:2 pulldown.

R

realtime effect   An effect that is played back instantly, without having to be rendered by an editing program.

render   To compute an image or effect using a nonlinear editing, compositing, or animation program. The result is generally saved in a file on the computer.

RGB parade   A specialized scope that displays the red, green, and blue components of a video signal.

RGB video   A component video signal that uses three signals to carry the separate Red, Green, and Blue channels of colored images.

roll   1. Vertical movement of text across the screen. *Also called* scroll. *See also* crawl.

2. Unwanted vertical roll of a video image, indicating unstable sync.

RS-232   A non-differential serial data transmission standard used for computer connections. *See also* serial control.

RS-422   A differential serial data transmission standard that is often used for linking video production equipment (VTRs, mixers, etc.). Because this standard is differential, RS-422 connections are less subject to interference and noise than RS-232 connections. *See also* serial control.

S

saturation   A measure of the depth of a color. Fully saturated colors are vivid, while colors that lack saturation look washed out or faded.

scroll   *See* roll (1).

SD   Short for SDTV.

SDTV   Standard Definition Television. A television format with image resolutions up to 525 vertical scan lines for NTSC video and 625 vertical scan lines for PAL video. SDTV can have a 4:3 or 16:9 aspect ratio. *See also* HDTV.

SECAM   Séquentiel Couleur Avec Mémoire (sequential color with memory). A color television system developed in France and the former USSR. It uses a composite interlaced display comprised of 625 scan lines per frame, refreshed at a rate of 25 frames per second. The color difference signals are transmitted sequentially on alternate lines.

serial control   A method of remotely controlling a device via a data line. The control data is transmitted in serial form (that is, one bit after another), such as for RS-232 and RS-422 connections.

setup   *See* black level.

SMPTE   Society of Motion Picture and Television Engineers. A professional society of motion picture and television engineers that prepares standards and documentation for television production.

spatial redundancy reduction   *See* intra-frame compression.

striping a tape   Preparing a tape for editing by recording continuous control track, time code, and a video signal (such as black or color bars).

super   *See* graphics overlay.

super black   Video that is darker than the standard black level. *See also* super white.

super white   Video that is brighter than the standard white level. *See also* super black.

SVCD   Super Video CD. A standard for storing video and audio on a CD that provides better video quality than VCD and standard VHS. Video is compressed using MPEG-2 at 2500 Kbps, and audio is compressed as MPEG-1, layer II, at 224 Kbps. An SVCD can hold about 30 minutes of material. Super Video CDs will play back on some DVD set-top players.

S-Video   A component video signal in which the luminance (Y) and chrominance (C) information are separate. S-VHS videocassette recorders use the S-Video format. *Also called* Y/C video.

sync   A circuit or signal that directs the electron gun in a camera or TV picture tube to hold a picture steady on the screen. It also synchronizes the electronics of other video equipment.

sync generator   An electrical device that generates sync (timing) signals used to synchronize video equipment and keep pictures stable on the screen.

T

TBC   *See* time base corrector.

telecine process   A process that transfers film (negative or positive) to SD or HD video tape. The telecine process shines a light source through each frame, converting the optical images to an electronic signal that is then recorded to video tape.

temporal redundancy reduction   *See* inter-frame compression.

time base corrector (TBC)   An electronic device that, when connected to the output of a VTR, corrects the stability and timing of the VTR's playback video. This is achieved by stripping the unstable horizontal and vertical sync pulses from the video signal, and replacing them with new, clean sync pulses.

time code   A sequential code number assigned to successive video frames on tape. Each frame has its own time code, which is electronically encoded on the tape in the form hours:minutes:seconds:frames. *See also* drop-frame time code, LTC, and VITC.

timeline   The graphical representation (normally a horizontal line) of a video sequence. It is usually divided into hours:minutes:seconds:frames, and is used to position video, audio, graphics, and video effects that make up the sequence.

tonal range   The range of light and dark areas in an image. Tonal range can be divided into three different areas: shadows, midtones, and highlights. Shadows are the darkest areas of an image, highlights are the lightest areas, and midtones are the areas with tones between the lightest and darkest areas.

V

VCD   Video CD. A standard for storing video and audio on a CD that provides slightly better video quality than standard VHS. Video is compressed using MPEG-1 at 1100 Kbps, and audio is compressed as MPEG-1, layer II, at 224 Kbps. A VCD can hold about 60 minutes of material. Video CDs can play back on most DVD set-top players. *See also* SVCD.

vectorscope   A device that measures the phase and amplitude of the color components of a video signal.

VITC   Vertical Interval Time Code. Time code that is encoded onto the vertical blanking interval of a video signal. VITC can be read by a VTR whenever an image is displayed, but not usually during high-speed operation. *See also* LTC.

voice-over   Narration added to a video segment and mixed in louder than the original background sounds.

W

WAV   An audio data file format developed by Microsoft and IBM. This format is the standard for Windows and can be played by most applications that can support sound.

white balancing   A color correction technique that adjusts the color levels of an image using white or gray as a color reference point. White balancing assumes that when a white object can be made to look white, the other color levels will also be accurate. White balancing is used to correct improper color levels of an image that are due to varying lighting conditions or incorrect camera settings. White balancing can be performed using the Matrox color correction effect, and is also available as a setting on most cameras.

white level   The brightest "legal" level of a video signal (reference white), which is at 100 IRE. *See also* black level, super black, and super white.

wipe   A transition in which one image is gradually replaced by another image that is revealed in a given pattern. For example, the second image could be revealed from the top of the screen downwards until it fills the entire screen. *See also* organic wipe.

X

x-y-z coordinate system   A 3D positioning system that includes a third (z) axis running perpendicular to the horizontal (x) and vertical (y) axes. The x-y-z coordinate system is used in computer graphics for creating models with height, width, and depth, and for moving models in 3D space.

Y

Y waveform   A specialized scope that displays the luminance (Y) values of a video signal.

Y/C video   *See* S-Video.

YC waveform   A specialized scope that displays the combined luminance (Y) and chrominance (C) of a video signal.

Y, Pb, Pr video   *See* Y, R-Y, B-Y video.

Y, R-Y, B-Y video   An analog component video signal comprised of three channels: Y (luminance), R-Y (red minus luminance), and B-Y (blue minus luminance). *Also called* Y, Pb, Pr video.

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Your notes

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