User Guide

RotoDV™

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1 Introduction

Welcome to RotoDV

RotoDV is a video painting and special-effects program for Power Macintosh. RotoDV provides an outstanding collection of painting tools in a real-time, motion-video environment.

RotoDV has many uses—from realistic touch-up to special effects to animation. You can paint over video, either one frame at a time or live while it plays. RotoDV's organic brushes and filters give you the power to create effects not possible elsewhere.

In RotoDV, your painting and effects go into separate layers above the video. It's easy to experiment and swap layers in and out. The source material is never altered, so you're free to explore the possibilities. You can add any number of Video and Paint layers to your project. RotoDV's Timeline window lists the layers in the project and lets you control them over time.

As you paint and make changes, you can view the results in real time. The document window immediately displays the results of all painting tools and effects.

When you're finished working in RotoDV, you can save any combination of layers to a QuickTime movie. You can then use an editing or compositing program to combine your RotoDV work with other material.

Into the Workflow

RotoDV is just one component in a desktop video production suite. Most systems will include a non-linear video editor and, perhaps, a compositing program. Some will also have a 3D program for generating animation. Because RotoDV uses QuickTime for file I/O, it integrates perfectly with many other applications.

The following steps describe how we suggest you use RotoDV:

First, generate source material. Video footage may come from a rendered 3D animation, stock video "clip art", or be captured from video with Digital Origin's EditDV, Adobe Premiere, or other software. Many systems will use dedicated hardware for video capture.

Second, use your non-linear video editor to trim the clip to just the frames that need work in RotoDV. Avoid the overhead of bringing in frames that you'll leave untouched. Since RotoDV manipulates the realtime playback in RAM, you'll find it more efficient to work on shorter segments.

Third, open the source material in RotoDV and perform your special-effects magic.

When finished in RotoDV, save the file to a standard format, appropriate for the next application in your workflow.

At this point, the flow diverges—you might import the clip to your editing application for assembly with other material. Or you might take the finished RotoDV clip into a compositing application such as Adobe After Effects.

About this User Guide

Conventions

Menu commands are given as follows: **Menu> Item** or in the case of a sub-menu, **Menu> Sub-Menu> Item**.

On screen buttons or controls are shown as: The **New** button.

Keyboard commands and shortcuts are shown as: Press the **Return** key.

Primary palettes that have sub-palettes are listed as follows: Palette: Sub-Palette.

Note: The Command key on your keyboard is labeled with a cloverleaf symbol.

Using This Guide

This user guide is designed to help you get productive with RotoDV as quickly as possible.

- After this introduction, a "Getting Started" chapter covers program installation and setting preferences.
- Three tutorials build on each other to cover the range of features and project goals.
- The body chapters are organized categorically. The information progresses from basic functions in the early chapters to more advanced techniques later on.

If you're looking for information in this guide, try the Table of Contents. Locate the general category and heading that describes what you're looking for. If there's no exact match, check out a related section. You might find it there or find a cross-reference to the right section.

You can also search the Index for the term or feature you want to find.

2 Getting Ready

Before Installing

This chapter provides information on installing RotoDV, launching the program for the first time, setting preferences, getting help and contacting Digital Origin.

System Requirements

Before installing RotoDV on your computer, please review these system requirements:

Minimum System Requirements

- Macintosh with a PowerPC G3 or 604 processor
- Display system capable of 832x624 resolution at Millions of colors (24-bit) (high performance accelerated video recommended)
- 128 MB RAM minimum[1]
- CD-ROM drive
- Sufficient hard drive free space for projects[2]
- Mac OS version 8.5 or later
- QuickTime 3.0 or later

Additional Recommended Hardware

The following hardware will greatly improve RotoDV performance:

- 256MB to 1GB RAM for extended realtime playback
- Accelerated, high resolution graphics capability
- Large, fast hard drive with plenty of free space for video clips and scratch files

Optional Accessories

Many systems will include the following:

- Pressure-sensitive drawing tablet (Wacom or compatible)
- QuickTime-based editing software, such as Digital Origin EditDV

Notes on the System Requirements:

1. RotoDV requires significant RAM for real-time playback. Many artists will want at least 256 MB to 1 GB of RAM.
2. The RotoDV installation occupies approximately 25 MB.

Installing RotoDV

Note: RotoDV requires QuickTime. If you don't already have QuickTime installed on your system, use the installer provided on the RotoDV CD, or visit: www.apple.com.

1. Insert the RotoDV CD-ROM into your computer's CD drive.
   When the disc is mounted, the disc contents window opens.
2. Double-click the RotoDV Installer icon and follow the on-screen instructions.

Allocating Memory to RotoDV

Layered video projects require significant memory—especially at larger frame sizes. To provide real-time playback, live painting and other functions, RotoDV will take advantage of as much RAM as you can give it.

For maximum capabilities in RotoDV, you'll want to run the program by itself and disable all unnecessary system extensions.

To allocate memory to RotoDV:

1. Quit all applications.
2. Choose **Apple Menu> About This Computer** and check the memory used by your system software and note the "Largest Unused Block". Close the window.
3. Select the RotoDV application icon.
4. Choose **File> Get Info** to open the application Info window.
5. If necessary, Choose "Memory" from the Show pop-up.
6. In the "Preferred Size" box, enter a value about 10 MB less than the Largest Unused Block you noted earlier. Do not enter a number smaller than the Minimum Size.
7. Close the Info window. You're now ready to launch RotoDV.

Getting Help and More Information

Browsing to Digital Origin's web site

Digital Origin maintains a web site that may include additional helpful information.

The **Digital Origin logo** button on the Button Bar will launch your browser and link to our web site, provided that your system is networked.

You may also visit directly from your browser—

http://www.digitalorigin.com

Once you're connected, you can navigate to the RotoDV support section.

Registering

Please take time to complete and mail the RotoDV registration card. Registering makes you eligible for technical support and allows Digital Origin to contact you with product update information.

Technical Support

If you've searched this user guide and the RotoDV support web site and you still have a problem or question, you can contact Digital Origin technical support.

The preferred method for contacting technical support is by e-mail. For most questions, you should include details on your particular system:

- Processor type and speed
- Installed RAM
- Model, size and speed of disk storage
- Display system specifics
- Video compression/acceleration hardware
- Format of the video source you are using (including: frame size in pixels, frame rate in frames per second, QuickTime codec, and project length)
- Model of input device (drawing tablet)
- Version of RotoDV are you are running

Send the details along with a description of the problem or question you have to:

support@digitalorigin.com

You may also contact technical support using fax, voice or mail.

Fax: (650) 404-6060

Voice: (650) 404-6400

(Monday-Thursday: 7 am to 4 pm Pacific Time, Fridays 7 am to 3 pm Pacific Time)

Technical Support
Digital Origin Inc.
460 East Middlefield Rd.
Mountain View, CA 94043 USA

3 Tutorials

About the Tutorials

This chapter includes three tutorials, designed to introduce you to RotoDV. These tutorial projects begin with the basics and progress into advanced features and uses.

- Tutorial One covers starting a project, choosing tools, painting and playing through your work.
- Tutorial Two shows you how to use Clone Paint with video.
- Tutorial Three introduces the major features of the Timeline—Media Stack layers and the Blend Stack.

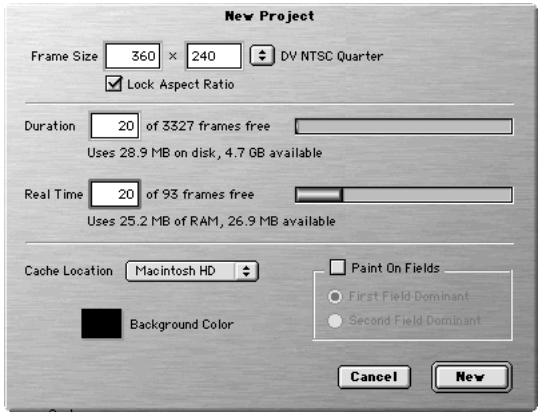
Tutorial One

This tutorial teaches you to add an effect to a digital video clip. Along the way, you'll learn to use the main features of the Transport palette, the Tools palette, the Brush tool and how to choose colors.

Open a new Project

1. Launch RotoDV.
2. From the **File** menu, choose **New.** (Hereafter, menu command notation will be **File> New.**).

3. For frame size, choose DV NTSC Quarter from the pop-up or type in 360 x 240.
4. Set Duration and Real Time to 20 frames each.



The New Project dialog with the settings for this tutorial.

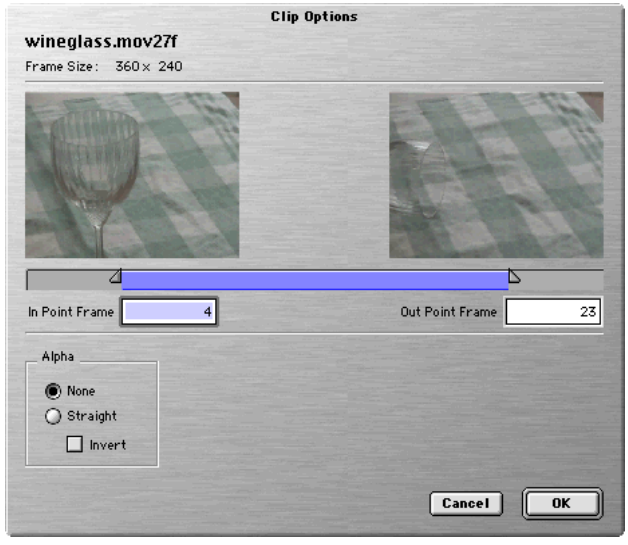
5. Click the **New** button, or press the **Return** key to create the new project file.

Import the Movie Clip

1. Use the Import Clip dialog to locate and open the file RotoDV Application Folder/Tutorial Files/wineglass.mov27f.

   This is a simple 360x240, 30fps video clip.

   When you click **Open**, the Clip Options dialog box appears.



The Clip Options dialog box displays the first and last frames in the selection.

2. Move the selection bar so that the In Point Frame box reads “4”, and the Out Point Frame box reads “23”.

   This selects the twenty frames in the middle of the clip to import into the project. You can also type a frame range in the In Point and Out Point boxes.

3. Verify that the Alpha setting is “None”.
4. Click **OK** or press **Return** to import the selected frames.

Preview the Video

1. Display the Transport palette.

   All palettes and windows may be displayed/hidden using commands on the Windows menu. The Button Bar is a special palette that gives you one-click access to all of the palettes and windows.

The Transport palette provides the movie play controls and miscellaneous related functions.

   The Transport palette provides the movie play controls and miscellaneous related functions.

2. Click **Play** and preview the video. Try out the several transport features—Play-mode, Jog, Shuttle, and Scrub.

3. When you're ready to continue, click the **Rewind** button to return to frame #0.

Note: The first frame of a movie or project is identified as frame #0. This means that a project that has 30 frames will end on frame #29. This follows the SMPTE convention.

Choose a Brush Tool and a Color

In this phase of the project, you'll use the Brush tool to paint in some red wine. You'll work across time so that the wine will spill when the glass tips over. This kind of effect is easy to accomplish in RotoDV, but would be impossible in all but the most sophisticated 3D programs.

1. If necessary, display the Tools palette. You may use the Windows menu, Button Bar or press **F2** to open it.

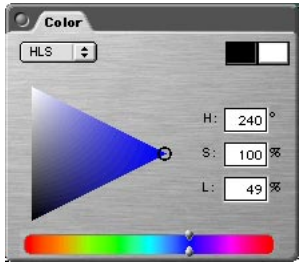
   The Tools palette holds an icon for each tool. The Brush tool has several versions to choose from, and you can create new, custom versions to add to your tool set. Customizing brushes is a major feature of RotoDV. You'll learn all about it in **Chapter 6**.

2. Hold down on the Brush tool icon.... All available brush tools in the current set pop-up in a string of icons.... select the Airbrush, as shown below.

Select the airbrush from the brushes pop-up.

3. If necessary, display the Color palette. Choose **Windows> Show Color**, or press **F5**.

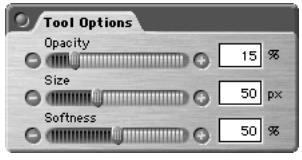
4. Select a color for the wine. In the Color palette, use the slider at the bottom to choose the color range, then refine your selection by moving the circle in the triangular color area above. Notice that the primary color indicator in the Tools palette reflects your color choice.



Use the color palette to choose a color.

Adjust the Brush and the View

1. f necessary, display the Tool Options palette. Choose **Windows> Show Tool Options**, or press **Shift-F2**.
2. Adjust the **Opacity** slider to about 15%.



Less opacity makes the paint more transparent, like wine.

3. Click the Zoom tool (magnifying glass icon) on the Tools Palette. Click once with the zoom tool in the document window to enlarge the wineglass.
4. Drag the size box at the lower right corner of the window to enlarge the document window so you can see the whole top part of the wineglass.

Enlarge the window to see the top of the wineglass.

5. Click the Hand tool in the Tools palette. Drag the image in the document window to reposition the wine glass in the center.

Select a Mask

1. Click once on the Lasso tool in the Tools palette.
2. Select an area slightly smaller than the inside of the wine glass that you want to fill with wine. If you don't get the selection exactly right, don't worry.
   - Use the Shift key with the lasso to add to the selected area.
   - Use the Option key with the lasso to subtract from the selected area.

Use the Lasso tool to select an area to mask.

3. Choose **Select> Feather**, or press **Command-Option-D** to open the Feather dialog box. Enter a value of 2.

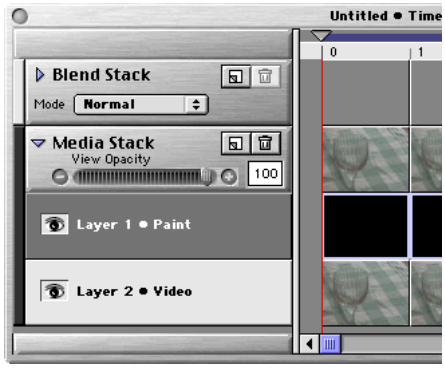
   Feathering the selected area blends the edged into the surrounding imagery.

Feathering the edges of the selection makes the wine blend smoothly into the glass.

You've created the mask, now you can fill it with paint.

Apply Some Paint

1. Verify that the Paint Layer is selected in the Timeline. Click the paint layer in the Timeline to select it, or use the **up** and **down arrow** keys to select a layer.



Use the up and down arrow keys to select a layer in the timeline.

2. Click the Airbrush icon on the Tools palette to select your brush again.

   You're ready to paint.

Note: If you need to erase, you can click the Erase Mode icon in the Tools palette (see page 78). Click the Paint mode icon to return to paint mode.

3. In the document, drag brush strokes into the selected area to paint in the wine. You don't need to be too careful, you can return to this frame later and clean up your work. This is one of the advantages of working in layers.

   Notice that the paint is confined to the selected area, except for a small amount of color around the edges. This is because of the Feather command and why you made the selected area slightly smaller than the wineglass.

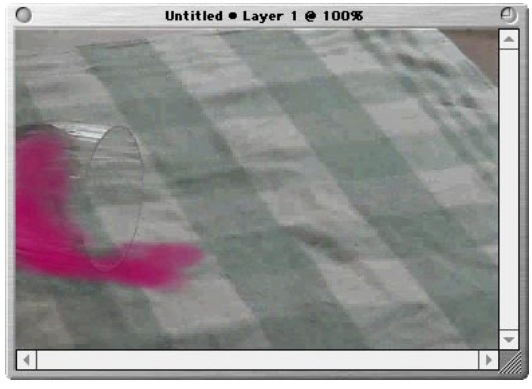
   TIP: To produce a more realistic effect of the wine in the glass, set the **Blend Mode** to **Hard Light** in the Brush Options palette

4. Use the **right arrow** key to advance to the next frame and paint the wine in again.
5. Continue painting and advancing until you see the wineglass tipped over on the table.
6. Return the window to normal size by double clicking the Zoom tool on the Tools palette. Click the zoom box at the upper right of the document window to shrink the window to the frame.
7. Choose **Select>None** or press **Command-D** to remove the selection.

Use Auto Paint

Before painting the frame where the wine glass is tipped over, we're going to engage a special option—Auto Paint. This feature automatically copies anything you paint in this frame to the next one (when you advance). Using the Auto Paint feature ensures that the shape of the wine stain on the table cloth won't change unexpectedly.

1. Turn on **Auto Paint** by clicking its icon in the Transport palette, or choose **Edit> Auto Paint**, or press **Command-B**.
2. Paint the wine spilling out of the glass and onto the table cloth.
3. Press the **right arrow** key to advance to the next frame. Notice that the work you did in the last frame appears also in this one. This is the power of the Auto Paint feature.



The stain trails out from the lip of the wineglass. You'll probably want to use a different shaped brush for this part.

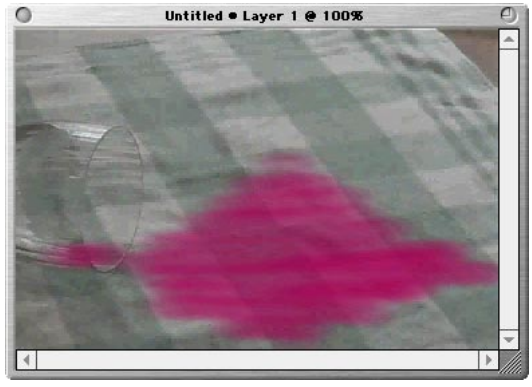
To change the brush shape:

- Display the Dab Options palette (**shift-F4**).
- Adjust the **Ratio** slider to about 45% to make the brush shape more horizontal.

Empty the Glass

1. Click on the Erase mode icon on the Tools palette, or press the **E** key.
2. Use the airbrush in erase mode to remove paint from the glass as you advance.

3. Switch back to paint mode to paint the expanding wine stain, then advance to the next frame.
4. Repeat this process until all the wine is out of the glass.
5. Continue painting the wine stain and advancing until you reach the last frame of the clip.



The final frame should look something like this.

6. Turn off the **Auto Paint** feature by clicking its icon again (**command-B**).

Finish the Project

1. Save your work by choosing **File> Save**.

   Now is a good time to preview the spilling wine.
2. Click the **Play Mode** button in the Transport palette to select the play back and forth mode. (See "Play Mode" on page 64.)
3. Choose **10fps** from the frame rate pop-up on the Transport palette.
4. Click the Transport **Play** button to review your work.
5. You'll probably notice several places where the wine doesn't flow as it should. You can stop the preview, move to any frame, and correct problem:
   - Use the Brush to apply more wine.

- Switch to Erase Paint mode (press **E**) and use the same brush tool to remove wine.

Because the wine is in a layer floating above the wine glass, you can make any number of changes to the wine without touching the glass.

Tutorial Two

This second tutorial builds on the information covered in the first. In this project, you'll work with two video layers, the clone paint feature and effects brushes. The end result will produce the effect of a man breathing fire.

Create the Project

1. Close any document you may have open.
2. Choose **File> New** to start a new project.
3. In the New Project dialog, set frame size to DV NTSC quarter (360 x 240)
4. Set project duration to 37 frames, and Set Real Time range to 37 frames as well.
5. Click **New.** RotoDV opens a new project.

Import the Clips

Now you can import the two video clips.

1. Choose **File> Import Clip...** from the File menu.

   Use the dialog to locate and open the file RotoDV Application Folder/Tutorial Files/Fire Clip™37f.
2. The Clip Options dialog appears. Go ahead and click **OK** to use the default settings to import the clip.

3. Once the clip has been imported, double click the layer title (Layer 2• Video) in the Timeline. This opens the Set Layer Name dialog box.

Name the layers in the Set Layer Name dialog box.

4. Enter "Fire" for the name of the first layer, then click **OK**.
5. Repeat steps 1 through 4 to import a second file, Ric Clip™37f.

Note: The paint layer is on top of all video layers, but it is transparent, so the top video layer shows through.

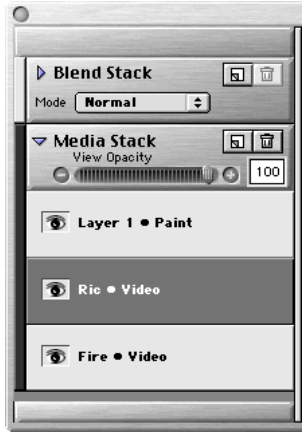
Notice that although the video clip of Ric is not visible in the document window, it is present in the Timeline. This is because the fire video layer is on top of Ric's video layer in the media stack.

To rearrange the Media Stack:

You need to bring Ric's video layer forward in the media stack so that it appears in the document window.

- Resize the Timeline window with the size box at the lower right of the window so that all layers in the media stack are visible.
- Press the **down arrow** key twice, until Ric's video layer is selected. You can also click on the video layer in the timeline to select it.

- Choose **Layer> Move Forward**, or press (**command**-]).



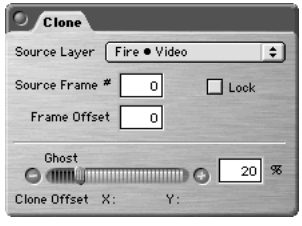
Once you swap the layers you should see Ric in the document window.

Setup Clone Paint

Now you'll use RotoDV's Clone Paint feature to combine the fire video with Ric's head. Clone Paint copies the images from one layer into another using the Brush tool. You need to select the source for the clone paint, in this case the fire video.

Note: You can turn on Clone Paint mode by pressing the "S" key on the keyboard.

1. Click the Clone mode icon (Sheep) in the Tools palette to select clone mode.
2. If necessary, Display the Clone palette (**F7**).



The Clone palette allows you to set up clone paint.

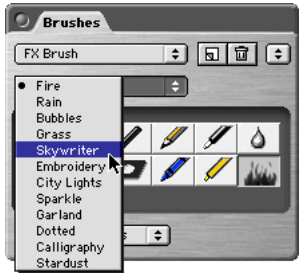
3. From the Source Layer pop-up in the clone palette, choose "Fire • Video". This selects the fire video as the source for the clone paint.

4. If necessary, adjust the Ghost slider in the Clone palette so that you can see a trace of the fire in the document window. This gives you a guide for painting.

Select and Modify the Effects Brush

To clone in the fireball, you will use one of RotoDV's effects brushes: the skywriter brush. This paints a effect like the texture of lettering from a skywriter, which works well for the fireball.

1. Choose the Fire icon from the **Brush** pop-up on the Tools palette (see "The Tools Palette" on page 72).
2. Press **F3** to show the **Brushes** palette (see **Chapter 7**).
3. From the second pop-up choose **Skywriter.**



Use the Skywriter brush to clone in the fireball.

4. Press the up arrow key to select the paint layer in the timeline (You can't paint directly onto video layers).

5. Now try out the Skywriter brush on the document window. Brush in the fire next to the Ric's mouth. Start with a small ball of fire in the first frame and make it grow larger over time.

The skywriter brush clones the fire from the video layer into the paint layer.

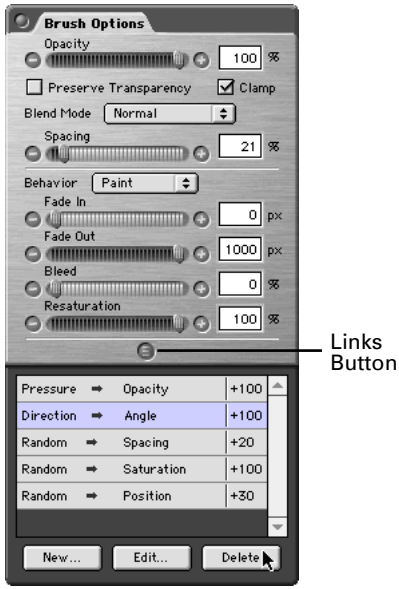
That looks pretty good, but lets adjust the brush a bit for more precise painting.

1. Display the Dab Options palette (**shift-F4**).
2. Use the Size slider to adjust the dab size to about 20 pix.
3. Set the Angle slider to 0° so that the dab is horizontal.
4. Adjust the Ratio slider to about 30%.

The skywriter brush is designed to angle the dab in the direction of your stroke. You need to change that to paint in the fireball.

1. Press Shift-F3 to display the Brush Options palette.

2. Click the Links button at the bottom of the palette. The Links drawer opens.



Delete the Angle link from the skywriter brush.

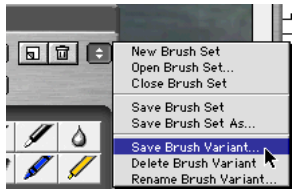
3. Click once on the **Direction > Angle** link, then click **Delete**.

You've finished modifications to the skywriter brush, try it out on the document window.

You have just created your own personalized skywriter brush. You may want to use it again in the future, so here's how to save your custom brush:

1. Display the Brushes palette (**F3**).

2. Choose Save Brush Variant from the pop-up at the top right of the Brushes palette.



Save your new fire brush for later use.

Note: You can also save sets of your own custom brushes. (See "Saving Custom Brushes" on page 83.)

3. Choose an icon and enter a name for your new brush in the Brush Variant dialog box, then click **OK**. Your brush now appears with the other effects brushes in the pop-up at the top of the Brushes palette.

Finishing up

Once you have a skywriter brush you like you can complete the fire breathing effect.

1. Advance to the next frame and continue to paint in the fireball. Remember, the fire expands outward and upward from the Ric's mouth.
2. Choose **File> Save** to save your work.

   When you finish painting in the fireball, use the controls on the transport palette to preview your work. You can stop at any time, go to a specific frame and touch up your work.

To touch up the fireball:

- Click the eraser icon to switch to erase paint mode, or press the "E" key on the keyboard. This removes the cloned fire on the paint layer, and also adds texture to the edges of the fireball.
- Experiment with other settings in the Brush Options palette for variation. (Hint: Use the Opacity setting to dilute the black background to gray at the edges of the fireball.)

When finished, choose **File> Make Movie...** to export the project to a stand-alone movie file. You can choose a frame range and a compression setting in the Make Movie dialog box. Click **Make** to create the movie file.

By cloning the fire video to the paint layer you can experiment with different fire variations without affecting the underlying video files. Exporting the project combines all layers into a single flattened movie file.

Tutorial Three

In tutorial three you'll work with two layers, apply an effect on a paint layer, apply a key to create an alpha channel, and then combine layers using the blend stack.

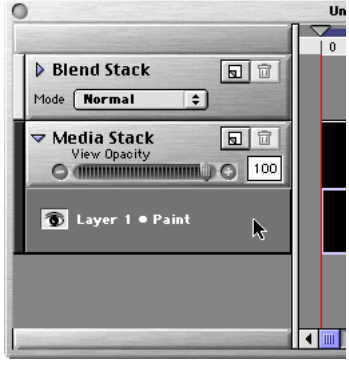
Close any document you may have open.

1. Choose **File> New** to start a new project.
2. In the New Project dialog, set frame size to 360 x 240, and set project duration and real time range to 30 frames.
3. Click **OK.** RotoDV opens a new project.

In the clouds

When you create a new project, RotoDV automatically creates a Paint layer in the Timeline Media Stack.

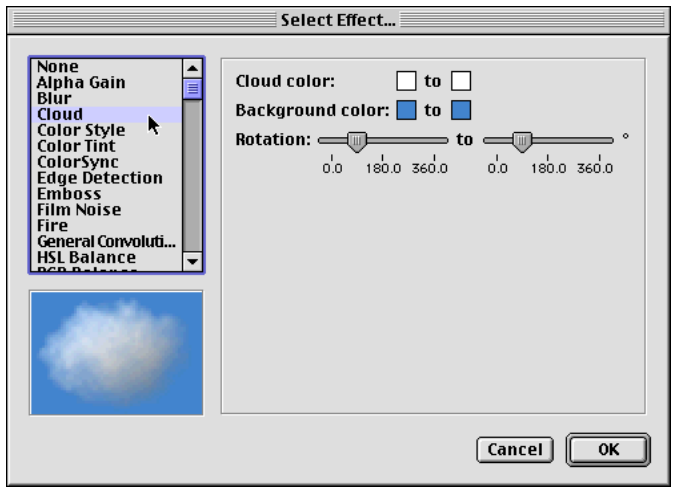
1. Click on the Paint layer to make it active.



Click once on the Paint layer in the Timeline to make it the active layer.

2. Click once on frame 0 in the Paint layer.

3. Scroll to the last frame on the Paint layer and shift-click on it. You have now selected the entire range of frames in the Paint layer.
4. With the frames still selected, choose **Effects> Apply QuickTime Effect**. The QuickTime effects dialog appears.
5. In the scrollable list on the left side of the dialog, choose the Cloud effect. The sliders on the right control the rotation of the cloud through the range of frames—when both sliders match the cloud remains at a stationary angle. Experiment with the sliders to see how they control the cloud's rotation. Return the sliders to the default settings (90°) and, click **OK.**



QuickTime Select Effect... dialog box shows the settings for the cloud effect.

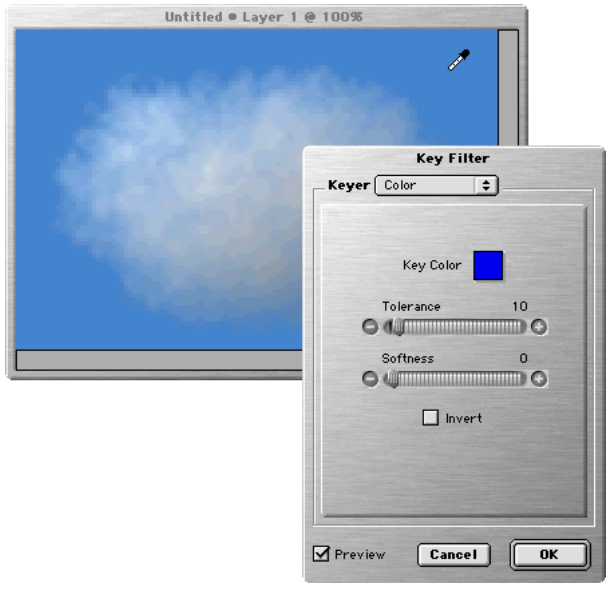
RotoDV goes to work and applies the cloud effect on each of the selected frames.

Apply a Key

The next step is to remove the blue background by applying a color key. All frames in the paint layer stay selected after the cloud effect has been applied, so you don't need to select them again.

1. Choose **Effects> Apply Key**. The Key filter dialog box appears with the color keyer selected.

2. Move the pointer over the document window and use the eyedropper to select the blue background for the key color.



Select the blue color near the corner to get the background color.

If you have the preview box checked, the blue background disappears when you select the color.

3. Adjust the **Tolerance** and **Softness** sliders to soften the edges, but make the cloud as large as possible.
4. Click **OK** to apply the key to all the selected frames.

This removes the blue sky, but leaves the cloud. You can play the project in real-time as soon as RotoDV finishes applying the key.

Import the Clip

Now you can import the video clip.

1. Choose **File> Import Clip...** from the File menu.

   Use the dialog to locate and open the file RotoDV Application Folder/Tutorial Files/fish.mov.

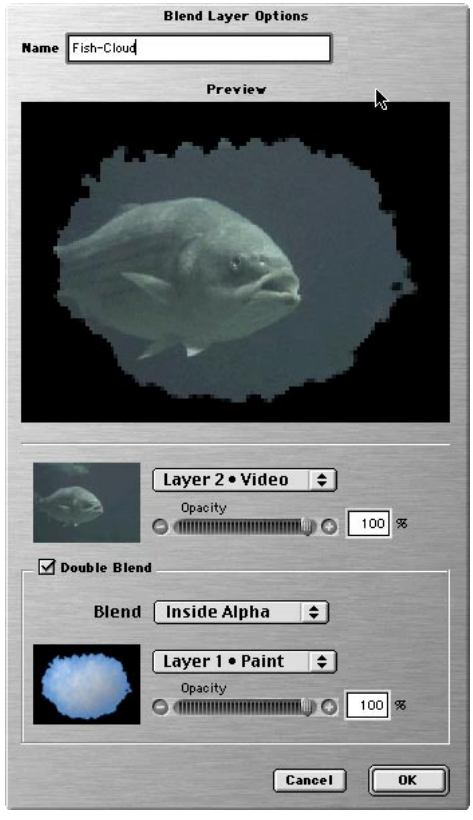
2. The Clip Options dialog appears. Click **OK** to import the clip with the default settings.

RotoDV imports the fish clip into a new video layer.

Blend the Layers

Now you are going to blend the layers to create the effect of a fish in a cloud.

1. In the Timeline palette, click the new layer icon in the Blend Stack area.
2. Enter the name “Fish-Cloud” in the Name box



The double blend layer combines the fish and the cloud.

3. Now click the Double Blend checkbox.
4. From the Blend pop-up select “Inside Alpha”.
5. From the top layer pop-up select “Layer 2 • Video”, from the lower layer pop-up select “Layer 1 • Paint.
6. Click **OK** to create the blend layer.

Now your document window should show the effect of a fish projected onto a cloud.

Use the Transport palette’s controls to see how the combined layers look in motion.

Congratulations! You’ve finished the tutorial section of this manual. Please review the remaining chapters which describe RotoDV’s many features and controls in more detail.

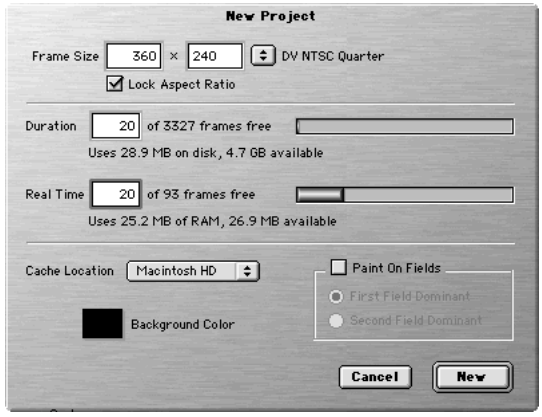
4 Climbing In and Out of a RotoDV Project

This chapter covers the basics of starting and saving a RotoDV project, including how to import video clips and other raw materials. This chapter includes file operations and describes how to deliver output when your project is finished.

Starting a New Project

When you launch the application, RotoDV presents the New Project dialog. (You can change this startup option in the Preferences dialog.) You can also open the New Project dialog by choosing **File menu> New Project,** or by typing **Command-N** on the keyboard.

The specific options are described in the following sections. When you're finished setting project options, click **New** to dismiss the dialog and create the specified project.



The New Project dialog.

Frame Size

The Frame Size describes the number of pixels horizontally (x) by the number of lines vertically (y) in the document window. (The frame size is also called the resolution.)

You may enter values in the text fields, or choose a standard size from the pop-up menu. If you enable **Lock Aspect ratio,** RotoDV maintains the proportions when you edit either the width or height.

In most cases, you'll choose the frame size based on your intended output format. In other cases, your source video might determine the frame size.

Project Length

Your project length is constrained by disk space. The number of the live preview frames is constrained by available RAM. Remember that shorter projects will always be more manageable.

Duration

The total number of frames for your project. Maximum determined by free RAM or disk space. Once you create the project you cannot change this setting.

Real Time Range

Note: The Real-Time Range holds the composited view of all layers. It is this data that you view when playing a movie. For this reason, the Real-Time Range is always in RAM, and is always real-time.

The number of frames which will appear in the live preview range. The number of frames available for the Real Time Range is affected by the total duration of the project.

Cache Location

This pop-up lets you choose the volume to use for scratch files. Choose the fastest disk with the most space available.

Paint On Fields

RotoDV allows you to edit your project one field at a time with interlaced video fields. Video imagery will benefit from working in fields.

To open the new project with Field Mode on:

- Check the **Paint On Fields** box.

RotoDV allows you to switch back and forth between working in the whole frame and in separate fields. You can save time by using Field Mode only where it provides benefit. You can also set the dominant field in this area. See **Appendix B, "Field Rendering,"** for more information on working with fields.

Background Color

The Background Color is the color beneath all other layers. The Background Color will show through at any point where there are no valid pixels in any of the movie, paint or object layers. For most video uses, black is the best choice. For animations, you might want white or a pastel "paper color."

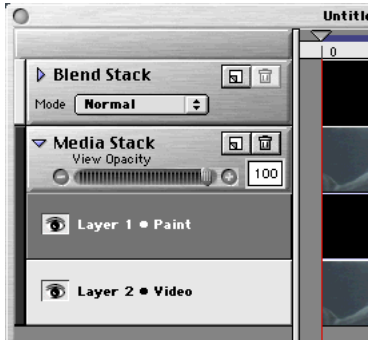
To set the Background Color:

- Click the color chip. RotoDV presents the system's color picker so you can choose a color.

Adding Items to the Project

To import a clip:

1. Choose **File> Import Clip.** You can also press **Command-I** on the keyboard.
2. Use the dialog to locate and open a media item. You can import video clips and still images in any of the formats listed below.
3. The Clip Options dialog will open, where you can control various settings for your clip or still image. The Clip Options dialog is discussed below.
4. RotoDV creates a layer for the clip in the Media Stack and places the clip in the layer. This may take a while, depending on your project options, the length of the clip and other settings. The Media Stack is introduced on page 50. For more information, see "Layers in the Media Stack" on page 105.



Imported clips are placed in the media stack.

Supported File Types

RotoDV can open any of the following file types.

Movie

- AVI
- DV
- OpenDML
- QuickTime
- Animated GIF
- FLC/FLI
- PICS

Still Image

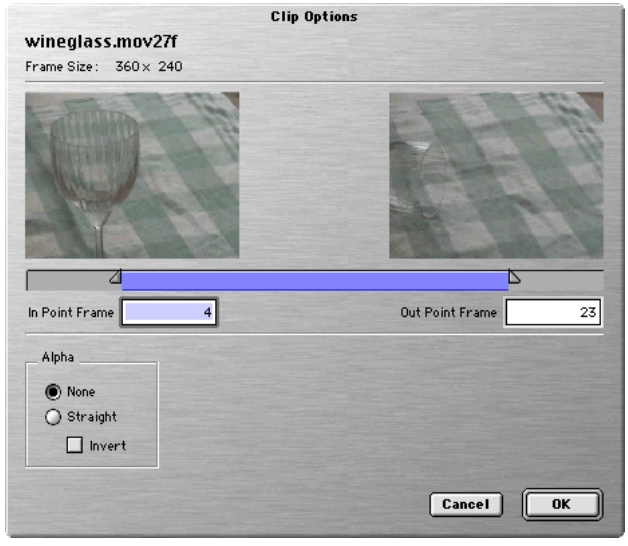
- BMP
- GIF
- JPEG/JFIF
- PICT
- PNG
- QuickTime Image
- SGI
- Targa
- TIFF
- Adobe Photoshop—files are opened “flattened”
- 3DMF—opened as a 2D image

When you save the project, RotoDV includes references to your original source material—not the data itself. This is an efficient use of disk space, but it means that you must maintain the original source files throughout the life of the project. Do not delete, move or rename any clip you are using in a RotoDV project.

Setting Clip Options

Note: For best results, all clips you use in a project should have the same frame rate and field dominance.

The top of the dialog provides the name of the clip and its size and rate details. The remainder of the dialog offers options for interpreting the data for use in the project.



The Clip Options dialog offers options for interpreting the clip data for use in the project.

In Point, Out Point and Duration

The In and Out Point Frames define the duration of the clip. You may not want to use the entire clip in the project. Set the In and Out Points to describe the portion of the clip you want to work on.

Sliding the In and Out markers in the Set Clip Options dialog determines which frames are included in the project. You can also enter values in the text boxes.

Alpha

Enable the **Alpha** checkbox if you want to use the clip's alpha-channel data. The alpha masks the clip (controls visibility).

- **None—**This is the default setting. Leave the Alpha set for "None" unless you know the video clip contains an alpha channel.
- **Straight—**RotoDV uses the alpha data that came with the clip. 3D animations might include alpha data. And you might pre-process video in another application to develop the alpha. If you choose straight, but the clip has no alpha data, the clip will be fully transparent.
- **Invert** checkbox— Sometimes it is easier to isolate a specific element by masking its surroundings with an alpha channel instead of the element itself. Because of this, it's sometimes useful to be able to invert the area that is included in an alpha channel. To invert an alpha upon import, click this checkbox.

Note: If you select Straight alpha, and the clip contains no alpha layer, the clip will not be visible in the project.

Changing Project Settings

During a project, you might need to change some of the basic project settings or preferences.

Project Settings

Several settings can be found in the Project Settings dialog box.

To change project settings:

1. Choose **Edit> Project Settings.** You can also click the Settings button on the Button Bar, or press **Command-K** on the keyboard.

2. Use the Project Settings dialog to change the timeline thumbnail option, field mode options or background color. For more information, see below.

Use the Project Settings dialog to change the settings of an existing project.

Thumbnail Options

This setting determines how thumbnails appear in the Timeline window.

- **None**—Thumbnails do not display in the Timeline.
- **First and Last Frame**—Only the first and last frame of the real time range appear in the Timeline.
- **Every Frame**—Each frame in the real time range is represented by a thumbnail in the Timeline. This option may degrade playback speed.

Field Rendering

Working with fields in a project offers better temporal resolution for moving imagery. Use the Field Rendering option if you want to work with fields, not frames. Choose the field order that's consistent with your video source material and video output system.

- **Paint On Fields unchecked**—Each frame is treated as a full frame image. This is appropriate when your source is not interlaced.
- **First Field Dominant**—The frame is treated as interlaced fields, with the upper field displayed before the lower, as in NTSC video.

- **Second Field Dominant—**The frame is treated as interlaced fields, with the lower field displayed before the upper, as in PAL video.

To take advantage of field rendering, you'll need to work in Field Mode. For complete information on working with fields, see Appendix B: Field Rendering.

Background Color

This setting works just like the Background color option in the New Project dialog box. See "Background Color" on page 43 for complete details.

Changing the background color requires you to use the Render command to update the project. See "Manual Rendering" on page 110 for more information.

Preferences

The Preferences dialog box contains the disk cache location setting and other RotoDV workflow settings.

To change the disk cache location:

1. Choose **Edit> Preferences**.
2. Select a new location for the disk cache from the pop-up at the bottom of the dialog box. Choose the fastest disk with the most free space available.

Select a volume for scratch files in the Preferences dialog box.

3. Quit and restart RotoDV to use the new disk cache location.

Other workflow options available in the Preferences dialog box:

- **Show Tool Tips**—When checked, tool labels appear when the pointer rests on a tool or mode button.
- **Live Window Dragging**—When checked, window contents remain visible while dragging.
- **When Starting Up**—Turn off the "New Project on Start-up" option here. Takes effect after you quit and restart RotoDV.

Opening an Existing File or Project

After you've saved a RotoDV project, you can reopen it and resume working.

Note: RotoDV allows you to have only one project open at a time.

To open a saved RotoDV project:

Choose **File> Open** or press **Command-O** on they keyboard. Use the dialog to locate and open the RotoDV project file you want.

Note: Important: Source clips (movies and stills) are retained only as references in the RotoDV project file. You must not delete, move or rename any source item used in the project.

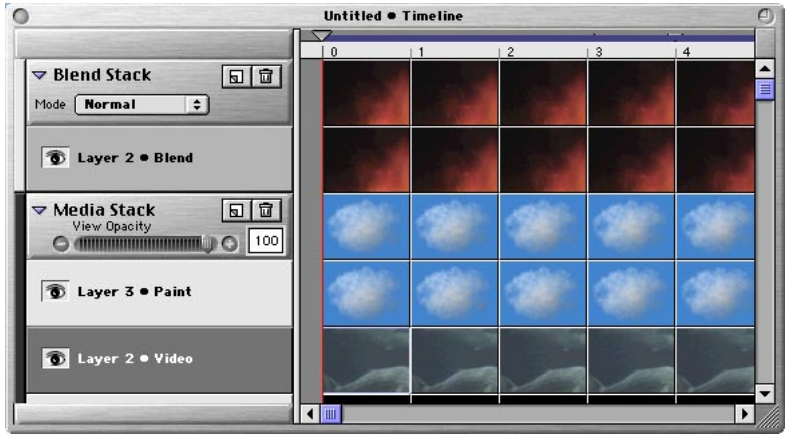
Introduction to the Project Timeline

Every RotoDV project has a Media Stack which contains at least one paint layer and any layers you have created to hold imported video clips. The combined video that appears in the document window depends on the order and contents of the layers. If your project requires that the layers interact in more complex ways, you can add layers to the Blend Stack. A project with Blend layers requires more memory and disk space. Use the controls in the Timeline to switch between viewing the Media Stack and the Blend Stack.

- The Media Stack lists all paint and video layers in the project. These layers are the building blocks of your composition. Use the Media Stack to create imagery and control sources. If the project has no Blend layers, the order of the Media stack determines the output.
- The Blend Stack arranges layers from the Media Stack in logical relationships, like one layer matting the visibility of another. If the project has Blend layers, then the Blend Stack determines your final output.

Note: Remember, if you don't create any layers in the blend stack, then the output is determined by the layer order of the Media stack.

As you work, you can switch the document window between displaying the Media Stack and displaying the Blend Stack. The two views may be quite different. For example, the order of layers in the Media Stack doesn't influence the display order of the Blend. This means you can change the order of layers for output purposes without affecting the result of the blend.



The Timeline displays thumbnails of clips in both the Media and Blend Stacks.

In **Chapter 8, "Layers and Time,"** you'll find complete information on the Timeline window and the Media and Blend Stacks.

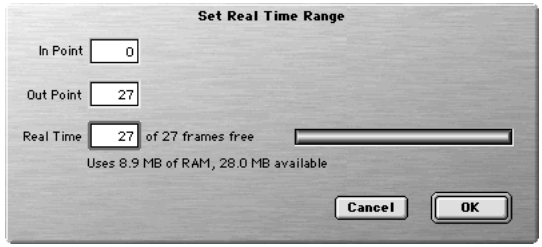
Real-Time Range

The Real-Time Range defines the section of your project that is available for real-time playback. RotoDV accomplishes full-speed playback of your project by loading frames of the composited image into RAM. The number of frames you can load and play will depend on the amount of RAM you have available.

When you start a project, you set the Real-Time Range. You can play through this range and begin developing imagery here. If your project is longer and you want to play through a later section, you can adjust the Real-Time Range.

To adjust the Real-Time Range:

Select **Edit>Set Real-Time Range.** You can also click on the **Range** button on the Button Bar, or type **Command-Option-R** on the keyboard. Type frame numbers into the **In Point** and **Out Point** boxes provided.



The Set Real Time Range dialog box lets you control the live playback range.

When you adjust the Real-Time Range, RotoDV must load this new set of frames into RAM. You'll have to wait a few moments before you can play and continue working.

AutoSpool

If your real time range is shorter than the total project duration, the real time range advances as you step forward with the arrow keys or the step buttons on the Transport palette. This insures that the real time range always contains the current frame as you step forward, frame by frame, to edit your project.

Moving Through Time

The Timeline has a Current Frame Indicator that shows which frame you're on. The current frame is also listed in a SMPTE readout in the Transport palette. The Timeline window automatically updates to show the frame which is currently displayed in the document window.

The primary tools for moving through time are on the Transport palette. The Timeline also provides some methods for moving to other frames:

- You can drag the **triangular top** of the current frame indicator.
- You can click on the **thumbnail** image of the frame you want.

- You can drag the slider at the bottom of the Timeline window and scrub back and forth for a real-time flip book effect. This is a handy way to preview video at thumbnail size.

The Document Window

The document window displays the image content of your project. It's where you paint and do all your editing. At any moment, the document window displays either the Media Stack or the Blend Stack. You can toggle between the stacks as needed.

To set the document window view:

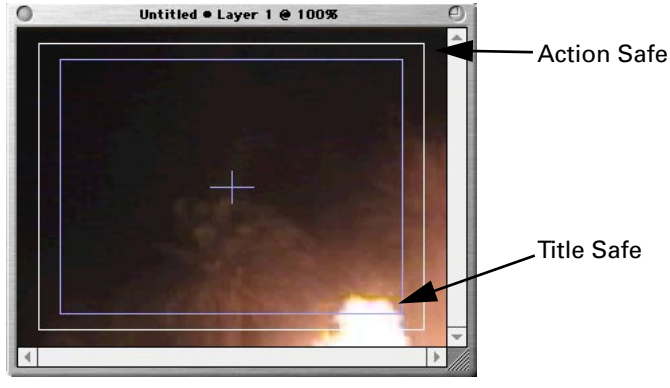
Click the stack label in the timeline window to activate a particular stack.

Media View displays the combined layers in the Media Stack. See "Layers in the Media Stack" on page 105.

Blend View displays the results of combining layers in the Blend stack. See "Creating a Blend Stack" on page 111 for details.

Safe Regions

The Safe Regions option displays two margin rectangles to indicate the outer portions of the frame. Imagery outside this rectangle may not display correctly on some TVs or video monitors. Using the Safe Regions reference can help you avoid putting important detail where it may be distorted or cut off.



The Safe Regions option displays a margin rectangle.

- The inner rectangle is the **title safe** area where text will display accurately, while the outer rectangle defines the **action safe** area.

To control Safe Regions reference display, click the **Safe Regions** button in the Transport palette to toggle the display.

Zooming in on the Document Window

Sometimes you'll want to magnify an area to make painting or selecting easier.

Changing the view with the Zoom Tool

1. Choose the **Zoom tool** from the Tools palette (see "The Tools Palette" on page 72). You can also select the Zoom tool by pressing the **Z key.**
2. Click on the spot you want to magnify.
   - Hold down the **Option** key and click to zoom out.
   - Double-click the Zoom tool in the Tools Palette to return the view to 100%.

Panning with the Hand Tool

After you've zoomed in, you may need to move around the frame, a process called "panning." To do this, you'll use the Hand tool or the scroll bars in the document window.

1. Choose the **Hand tool** from the Tools palette (see "The Tools Palette" on page 72). You can temporarily select the Hand tool by holding down the **H key.**
2. In the project window, drag the image to bring the area of interest into view.

Saving the Project

Saving a RotoDV project preserves the contents of all your layers and Timeline information. However, keep in mind that source media (movies and stills) are retained only as references in the RotoDV project file. **You must not delete, move or rename any source item used in the project.**

Note: See "Making a Movie" on page 55 for information on exporting a movie file of the project that will be suitable for other programs.

Save

Choose **File> Save** to write the current project to disk, or press **Command-S** on the keyboard. If this project has never been saved, this command triggers Save As.

When you save the project, RotoDV includes references to your original source movies—not the movie data itself. This is an efficient use of disk space, but it means that you must maintain the original source files throughout the project. Again, do not delete, move or rename any movie clip you are using in a RotoDV project.

Save As...

Choose **File>Save As...** when you want to save the project under a different name. You can also choose Save As.. by pressing **Shift-Command-S** on the keyboard.

Close

File>Close closes the current project. You can also press **Command-W** on the keyboard to close the project. If the document has unsaved changes, you are asked to save it, discard changes, or cancel the command.

Exporting the Project

When it's time for your creations to leave RotoDV, you'll use the Make Movie command.

Making a Movie

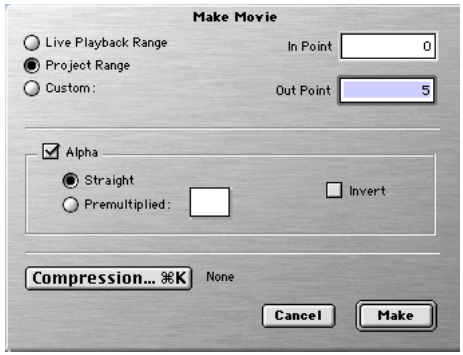
The Make Movie command is useful for delivering your RotoDV project to other QuickTime applications. You can use it to export a fully flattened version of the project.

To export a QuickTime movie:

Note: If you have created Blend layers, but the Media stack is selected in the Timeline window, only the media stack is exported to the movie file.

1. Set up either the Media Stack or the Blend Stack to create your desired output. If you don't have a Blend Stack, RotoDV will export the Media Stack.
   - Only layers that are visible will be included in the exported file.
   - If you want the exported movie to include an alpha channel, you'll need to set this up in the Blend Stack (see "Alpha" on page 57).
2. Make sure the correct stack is selected in the Timeline.
3. Click the **Make Movie** button on the Button Bar. You can also select **Make Movie** from the **File** menu, or type **Command-M** on the keyboard.

   RotoDV displays the Make Movie dialog, described below, where you can set your options for the output.
4. When you're finished setting options, click the **Make** button to create the movie.



Use File> Make Movie to export a project.

In Point and Out Point

The three radio buttons at the left offer three options for setting the range of frames to include in the output movie—Live Playback Range, Project Range and Custom. The first two options depend on the settings in the Timeline window. Selecting either option displays the In Point and Out Point fields at the right.

If you choose Custom, use the In Point and Out Point text fields to specify the range of frames you want.

Alpha

Note: You must export to a file format that retains alpha data. Only the "None" and "Animation" compression options support Alpha layers.

Enable the **Alpha** option if you want the output clip to include alpha data. The alpha mask will be significant only if the composite of all visible Blend layers leaves some portion of the background color visible.

- **Straight—**RotoDV creates the output alpha from the Blend Stack.
- **Premultiplied—**RotoDV creates the output alpha from the Blend Stack. RotoDV also shifts the colors of any pixels whose alpha is not 100% toward the "premultiply color." You can set the premultiply color here using the color chip. Black is typically used. This technique can be useful for avoiding artifacts along the perimeter.

Enable the **Invert** option if you want to invert the alpha data. You might need to do this if the next application you'll use with the movie considers the alpha differently.

Compression

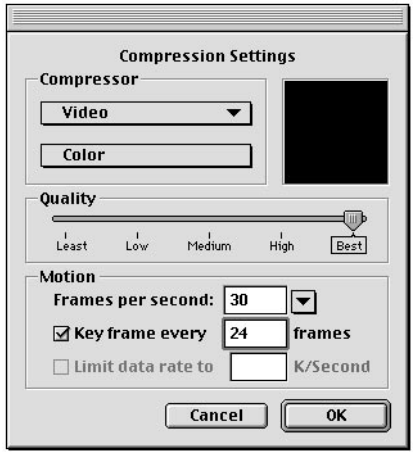
The current file format settings are listed beside the Compression button. Compression helps you achieve an optimum relationship between image quality and file size/data rate.

To set the file format:

In the Make Movie dialog, click the **Compression** button.

Use the Compression Settings dialog, described below, to set the format, quality level, and other options.

When you're done setting compression options, click **OK** to dismiss the dialog.



The Compression Settings dialog.

Compression Settings

Note: It's important to note that only a few compression formats support 32-bit pixels — color and an alpha channel.

The **Compressor** pop-up lets you choose a compression format. Most of the available formats are part of QuickTime. You may have additional formats to support other software or hardware you have installed.

Of the formats, the most useful are as follows:

- **None**—Frames are stored without compression, maintaining pristine image quality. This is the preferred format when transferring the output to another program for further compositing or editing work. Resulting file sizes can be quite large.
- **Cinepak**—Designed for CD-ROM delivery, this format offers decent quality at relatively high frame rates. This is an asymmetric format—it takes far longer to compress than to play back. It's not recommended for large frame sizes.
- **Animation**—Animation is a useful choice for painted or object imagery, not video. It won't maintain high rates at large frame sizes, but it might be useful for smaller sizes or for transferring material to other programs.

You can find detailed descriptions of the other software compression formats at the Apple Computer's QuickTime web site. Many of these formats compromise

image quality for disk playback speed and, as such, aren't appropriate for most of the work you'll do in RotoDV.

Color Level and Alpha Channel

The **Color Level** pop-up lets you choose how much color information is saved for each pixel. Some compression formats support only one color level, and you don't have a choice. For other formats, you can choose from limited colors, Grayscale, Thousands, or Millions of colors.

If you want the output file to include alpha data, you must choose the "Millions of colors+" color level. "Millions of colors" means the pixels have 24 bits of color, and the appended "+" means the pixels *also* have an alpha channel, yielding 32-bit pixels in the output file.

Quality

The **Quality** slider lets you adjust the amount of compression. The higher the compression ratio, the smaller the file, but the lower image quality. Some formats don't allow adjustment. For example, "None" uses no compression, so the Quality slider has no effect.

Frames per Second

Choose a frame rate that is appropriate to the material and the delivery platform. Material that will be played only on a computer can be effective at lower rates. Material destined for video output should be in the frame rate of the video standard (NTSC, PAL, HDTV, etc.) you are using.

Key frame Every ___ Frames

This setting adjusts the amount of temporal (time-based) compression. It is only relevant for compression formats that use temporal compression, such as Sorenson Video or Cinepak. If you want to use temporal compression, enable this option and set a value for the rate of producing keyframes.

Keyframes are frames that are stored in their entirety. Between keyframes, a temporal compression format stores *only the changes* since the last key. Frequent keyframes keep quality high, while keys set far apart may let quality slip on fast-moving material.

Limit Data Rate to __ K/Second

Limiting the data rate is an alternative to the Quality slider, described above. This feature is supported by only a few compression formats.

By enabling and setting a data rate limit, a compression format adjusts the compression level dynamically (frame to frame) to maintain a steady data rate. This is advantageous when the accelerated video system can maintain real-time playback up to a certain data rate. For example, if your hard disk can sustain a transfer rate of 4.5 MB/second, you can set the data rate limit just below this level. This ensures you'll get the best compression ratio (Quality setting) possible within that data rate. Compression acceleration hardware performs better when the data rate is constant.

When the Quality slider is used instead of limiting the data rate, the amount of data used to store the frames may vary, depending on the image content. When the data rate jumps up, the system might "stumble" and drop frames. In most cases, you'd want to avoid this.

Saving the Movie

Clicking the **Make** button opens a dialog that asks you to provide a disk location and name for the file to be created.

To set the file name and disk location:

1. Click the **Make** button.

   RotoDV opens a standard Save dialog.
2. Use the file system controls to choose a disk location.
3. Type in the file name you want.

These settings persist, so that each time you use Make Movie, RotoDV will replace the previous version of the file. This helps use disk space efficiently. RotoDV will alert you before overwriting a file, in case you'd like to cancel and preserve the old file by changing the name of the output file.

When you're done with the Save dialog, click **Save** to begin the file rendering.

5 Navigating Time and the Frame

The Transport Palette

The Transport palette provides the controls for moving through time and changing your view within the frame. It also provides controls for working in the document window and other related features.

The Transport palette.

About the Real-Time Range

RotoDV accomplishes full-speed playback of your project by loading frames into RAM. The number of frames you can load and play will depend on the amount of RAM you have available. This set of frames that RotoDV loads and can play at full speed is called the Real-Time Range.

Playing, looping, rewinding and the other transport controls operate within the domain of the Real-Time Range.

Optimizing Playback Capabilities

A number of factors influence your playback speed. The following suggestions will help you get the most out of RotoDV's real-time playback:

- **Keep palettes off the document window.** Any palette that overlaps the document window increases processing overhead. The system must mask out that region of video and replace it with the palette image. This results in delay that can impact your playback rate.
- **Disable unnecessary system extensions.** Some background programs poll the system occasionally to see if they're needed. This can put a hitch in the playback and cause you to miss a frame. Networking (like AppleTalk) and screen-saver programs fall into this category.
- **Use a fast processor.** Faster computers can pass the data from memory to display more quickly. Refer to "System Requirements" on page 15 for suggestions.
- **Use a high-performance display system.** The video graphics card that drives your monitor can make a huge difference in performance.

The Transport Palette

The Transport palette provides control over movie play functions, including speed control and basics like frame-forward, rewind and jog/shuttle. The Transport palette also has features that let you record your painting actions and set options for how your work is carried forward in time.

The Transport palette.

Current Frame and Field

Note: The Field mode button (page 66) activates Paint on Field mode and adds a field indicator to the Timecode display.

The current frame is shown in the SMPTE Timecode field.

To the right of the timecode display, you'll find an indicator of the current field:

- **1**—The first field is displayed.
- **2**—The second field is displayed.
- **No Indicator**–Field mode is off – the whole frame is displayed.

The field display is only present when working in Field Mode. In this case, two Frame Advances are necessary (one for each field) to move to the next frame. See Appendix B for more on field rendering.

Play Mode

The **Play Mode** button has three states:

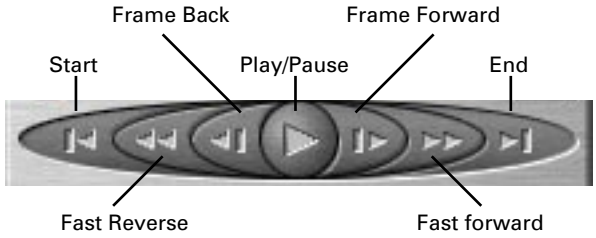
Forward—Play to the end of the range and stop.

Loop—Play forward through the range, repeated continually.

Back and Forth—Play forward, then reverse continually.

The Transport Controls

The Transport buttons provide the basic controls for moving through the frames.



The Transport controls.

Record (round button to left of timecode)—Record your painting as the movie plays. For more information, see "Painting While the Movie Plays" on page 118.

(Working in from the ends)

Start/End—Go to the first/last frame of the range. On the keyboard, press **Option-left arrow/Option-right arrow** keys.

Fast Reverse/Fast Forward—Play in reverse/forward quickly. Stop at the beginning/end of range.

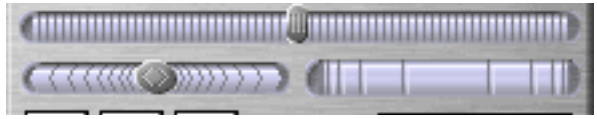
Note: You can also move to a particular frame by clicking its thumbnail in the Timeline window.

Frame Back/Frame Forward—Step back/forward one frame. Pressing the **left/right arrow** keys on the keyboard will yield the same result.

Play/Pause—Play through the range using the current setting of the Play Cycle. During play, the icon turns into a Pause button. Pressing the **Spacebar** will toggle between **Play** and **Pause**.

Shuttle, Jog and Scrub

The Shuttle, Jog and Scrub controls let you move through the frames of your project in various ways.



The Shuttle, Jog, and Scrub controls.

Shuttle— This control functions as an indicator while the project is playing. You can drag the slider to go to any location in the Real-Time Range. Shuttling is bi-directional—you control the direction and speed of play by dragging the slider.

Jog— Move backward or forward through the Real-Time Range. Accelerate playback by dragging farther toward either end.

Scrub— The Scrub control directly links mouse movement to frame movement. Small motions advance a few frames forward or backward, large motions advance many frames.

Frame Controls

Use the buttons in the frame control area to access RotoDV's frame editing features.

Transport frame controls.

Safe Regions

The Safe Regions button toggles display of the Safe Regions overlay. The overlay displays the center point and pair of margin rectangles to indicate the outer portions of the frame, which may not be safe for putting text or important imagery. Using the Safe Regions reference can help you avoid putting important details where they may be warped or cut off. For more on safe regions, see page 53.

Field Mode

The **Field Mode** button toggles between frames and fields. When you want your painting and editing to apply to fields, enable Field Mode by clicking the **Field Mode** button. In Field Mode, each "Frame Advance" moves forward one field. The current field is indicated to the right of the SMPTE readout.

Frame Mode—The document window displays both fields in the same frame.

Field Mode—The document window displays one field of the current frame. The field number appears at the right of the timecode display.

Auto Paint

Note: Auto Paint options apply to work you do with the Brush tools in Paint, or Clone mode.

This option lets you carry paint you apply forward through the next frames. Copying paint forward is useful in many circumstances, particularly when you want paint you apply to persist through subsequent frames.

Auto paint copies forward paint applied by:

- Painting with a brush
- Pasting onto the frame
- Dropping a selection by **Option**-clicking

Using Auto Paint

In the Transport palette, click the Auto Paint button to turn on Auto Paint. You can also activate Auto Paint by pressing **Command-B** on the keyboard.

- **Auto Paint On —**Paint you apply *in this pass* is carried forward to subsequent frames. Paint applied earlier is not included.

Note: The Auto Paint function will copy paint from one frame to the next when you advance frames with the Right Arrow key, with the Frame Forward button on the Transport palette, or by clicking the Record button and pressing Play.

1. Paint, paste, or drop paint onto the frame.
2. Click the Transport Palette: **Frame Forward** button. Your applied paint is automatically copied to the next frame.
3. Apply more paint and continue stepping forward to "grow" the painted region.
4. When you're finished carrying the paint forward, click the Auto Paint button to turn Auto Paint off.

Frame Rate

The frame rate sets the movie's playing speed. Choose the rate you want from the pop-up. You can choose a lower rate to slow the movie down, which can make painting easier.

Info Palette

The Info palette provides a technical readout of useful information.

The Info palette.

RGB: These values describe the Red, Green and Blue components of the color that is beneath the Eyedropper cursor.

A: This value describes the alpha component of the color that is beneath the Eyedropper tool.

HSL: These values describe the Hue, Saturation and Lightness of the color that is currently beneath the eyedropper cursor.

X, Y: These values describe the coordinate location of the cursor. The origin (0, 0) is at the top left corner.

W, H: These values describe the width and height of any rectangular selection you make.

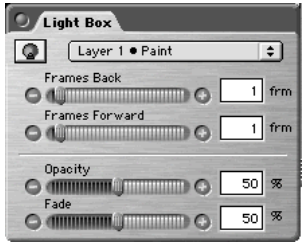
Actual FPS: This value reports the actual frame rate (frames per second) achieved during playback. When working with a large frame size on some systems, this rate might be lower than the movie's actual rate.

Lightbox Palette

RotoDV's Lightbox feature lets you work using the onion-skinning technique of a traditional cel animator. When the Lightbox is turned on, the document window displays the current frame, with subsequent and previous frames appearing in a ghosted overlay.

This ghosted overlay lets you paint the current frame using the preceding and following frames as a reference. This is more useful when creating animations from scratch than when painting over video.

You'll use the Lightbox palette to turn the feature on and off and to set the number of adjacent frames to include in the overlay.



The Lightbox palette controls the onion skinning feature.

Click the light icon to enable/disable the Lightbox.

Frames Back determines how many preceding frames should be included in the Lightbox overlay.

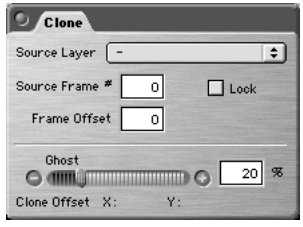
Frames Forward determines how many subsequent frames should be included in the Lightbox overlay.

Opacity sets the opacity dropoff for the first of the overlaid frames.

Fade sets the opacity dropoff (from the first) of each subsequent overlay image.

Clone Palette

The Clone palette provides some special controls for using a cloning brush. Cloning lets you sample imagery from one layer and location and paint with it in another. The Clone palette is described in “Cloning” on page 121.



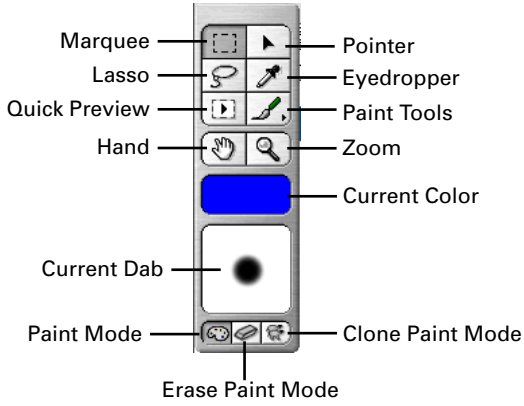
The Clone palette

6 Reaching into the Toolbox

About RotoDV's Tools

RotoDV has a full set of paint, selection, manipulation and navigation tools. These tools are similar to those found in other programs, and most artists will recognize them immediately.

The Tools Palette

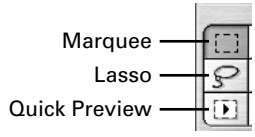


The Tools palette provides access to the tools.

This section provides an overview of RotoDV's tools. Follow the cross references for detailed information on tool options or usage.

The behavior of a tool may depend on the type of layer currently selected. For example, paint tools only work in paint layers. Selection tools can select and copy in video layers, but can cut and paste only in paint layers.

Selection Tools



The Selection tools allow you to select an area for manipulation.

Selection tools help you isolate areas of imagery for editing and to control effects. Selection tools work in paint and video layers.

To select a selection tool from the keyboard:

- Press **M** for the Marquee tool
- Press **L** for the Lasso tool
- Press **Q** for the Quick Preview tool

For information on setting options for selection tools, see page 79.

For information on taking advantage of selections, see “Selecting and Editing Paint” on page 124.

Marquee

Drag in the document to create a rectangular selection.

Lasso

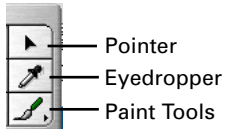
Draw a freehand path around the area you want to select. When you let go, RotoDV closes the path and creates the selection.

Quick Preview

The Quick Preview tool allows you to restrict the full motion preview to a selected area in the preview window. This is helpful when your system is unable to display full-sized frames at full speed.

In the document window, use the Quick Preview tool to drag a selection rectangle over the area of interest. You can now play and preview the "boxed region" at better frame rates. When you've finished, click in the document window to remove the preview region.

Manipulation Tools



The manipulation tools help you apply and manipulate paint.

Use the manipulation tools for painting and working with images in paint layers.

To select a manipulation tool from the keyboard:

- Press **V** for the Move tool
- Press **I** for the Eyedropper tool
- Press **B** for the Paint (**b**rush) tool

Move

The Move tool, is used to move, and manipulate paint selections.

- Click and drag in a selection with the Move tool to move the selected imagery.
- Option-click in a selection with the Move tool to stamp the selection onto the active paint layer without de-selecting.

Eyedropper Tool

The Eyedropper samples color from the preview window, making it the selected color for painting.

Click on the color you want to sample. The new color appears in the current color box on the Tools palette.

Paint Tools and Brush Types

The paint tool icon that appears on the Tools palette depends on which brush was most recently selected.

To select a Brush from the Tools palette:

- Click and hold the Paint tool icon.
- Select the desired Brush icon from the brush pop-up.

Painting tools work only with pixels in paint layers. They apply and remove color, or cloned images in the selected layer. RotoDV has several different types of brushes, each with its own characteristics. Each Brush Type can have several variants, and you can save custom variants as well. See **Chapter 7** for more information on customizing Brushes. A table describing the standard paint tools appears on the next page.

Note: All of the factory standard tools listed here are simply pre-set variants of RotoDV's multi-purpose brush tool. You can modify these tool in countless ways and save custom brushes and brush sets. See **Chapter 7** for more information.

Tool	Description
	**Paintbrush:** Lets you stroke in the document window to apply or remove color or cloned material.
	**Airbrush:** Simulates a traditional airbrush by spraying color gradually onto a frame. The edges of an airbrush stroke are more diffuse than those drawn with the paintbrush tool. When used with a pressure-sensitive tablet, additional pressure generally yields more paint.
	**Chalk:** Modeled after traditional artists chalks, draws a slightly thicker line than the pencil, with slightly rough edges.
	**Pencil:** Works like a pencil, draws thin lines in the selected color.
	**Ink Pen:** Behaves like a pen. Draws somewhat thicker lines than the pencil tool, with feathered edges.
	**Watercolor:** Has the effect of using a brush dipped in water on wet paint, makes paint run and distort.
	**Smudge:** Works like dragging a finger through wet paint—picks up the color of the first pixel you click on and pushes it in the direction you drag.
	**Dodge:** Lightens the area to which you apply it.
	**Burn:** Darkens the area to which you apply it.
	**Colorize:** Changes the color of paint that's already been applied to the currently selected color.
	**Hilite:** Tints applied paint a color that is the difference between the applied paint and the currently selected color. Try it out to see for yourself.
	**Effects Brush:** A collection of special brushes that simulate effects like fire, rain, bubbles and several others. Select the desired effects brush from the Brushes Palette. See "Effects Brushes" on page 83 for more information.

Frame View Tools

Use the frame view tools to zoom and pan in the preview window.

The two frame view tools, Zoom and Hand, allow you to zoom in and pan across the document. Pan control is also available with the scroll bars on the document window.

To select a frame view tool from the keyboard:

- Press **H** for the Hand tool
- Press **Z** for the Zoom tool

Hand

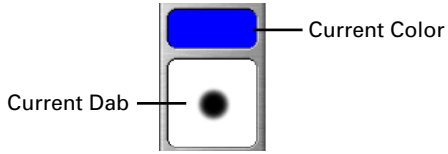
Drag in the document to bring other regions into view (panning). The hand is valid when the document window shows a subset of the frame—for example, when zoomed in.

Zoom

Click on the area you want to zoom in on to increase magnification by a factor of two. You can also press the **Z** key on the keyboard to select the zoom tool.

- Option-click with the Zoom tool in the document window to zoom out (decrease magnification).
- Double-click the Zoom tool icon in the Tools palette to return the magnification to 100%.

Color and Dab



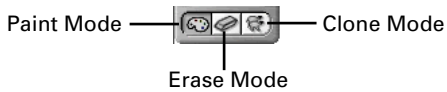
The color and dab areas show current settings.

The Tools palette includes two indicator areas which show the currently selected color and dab.

- Click the color or dab box to select a color or dab from the current color set or dab set.

These sets are selected with the Swatches and Dabs palettes. See “Swatches Palette” on page 96 for more information on color sets and “The Dabs Palette” on page 91 for more information on Dabs.

Paint Modes



Select a paint mode with the bottom buttons on the Tools palette.

You can switch between RotoDV’s three different paint modes with the paint mode buttons. The buttons also act as an indicator to show which paint mode is currently active.

To select a paint mode from the keyboard:

- Press **C** for Paint (color) mode
- Press **E** for Erase mode
- Press **S** for Clone mode (for **S**heep)

Paint

This is the standard paint mode. The currently selected color is applied with the chosen brush.

Erase

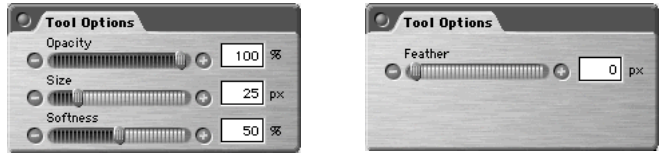
Use Erase mode when you want to remove pixels rather than apply them. Erase mode uses the currently selected brush to remove paint instead of applying it. Erasing "wears down" the paint in the currently selected paint layer, so that underlying layers begin to show through. Use the Tool Options palette's **Opacity** slider to control how much paint is removed by the selected brush.

Clone

Select Clone mode when you want to "paint" imagery from one source layer to the current layer. To use Clone mode you must first select a Clone source layer from the Clone palette. Once you set up the source, use the selected brush to paint the source imagery into the current layer. You can find more information on Clone mode in "Cloning" on page 121.

See **Chapter 9** for complete information on using RotoDV's paint modes.

The Tool Options Palette



Paint tool selected

Marquee or Lasso selected

The Tool Options palette as it appears with different tools selected.

Use the Tool options palette to quickly access frequently used tool options from one location. Options only appear in this palette for the Brush, Marquee and Lasso tools.

Option for Marquee and Lasso Tools:

- Feather

Feathering describes the width of the transition at the selection border. The setting is the number of pixels across which the selection fades from 100% selected to zero.

As feathering increases, edges on the selection become softer.

Options for Paint tools:

- Opacity

  The **Opacity** slider controls the density of the media applied in each stroke. This control also appears on the Brush Options palette, see "The Brush Options Palette" on page 84 for more information.

- Size

  The **Size** slider scales the dab. Use it to change the size of a brush.

- Softness

  The **Softness** slider controls how the dab edge blends with the background. More softness produces a more blended edge.

The Size and Softness controls also appear on the Dab Options palette; see "The Dab Options Palette" on page 92 for more information.

7 Brushes, Dabs, and Colors

About Brushes, Dabs, Colors and Sets

RotoDV is designed to allow you to work using your own custom brushes. When you've adjusted a brush the way you like it, you can save it as a new brush. That custom brush is always at hand, so you can easily retrieve and use it.

Brushes consist of a dab which describes shape, and a brush which defines behavior. Both the brush and the dab have a set of options which you can adjust to create a tool that paints exactly the way you want.

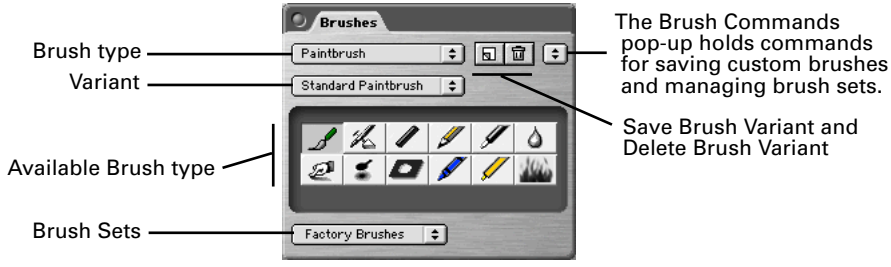
Once you have the right brush you'll want the right paint. RotoDV lets you define colors with RGB values or with the HLS color picker.

And to help manage all of the tools and colors you'll create, RotoDV offers sets—collections of saved brushes, dabs and colors. Most artists will build sets based on production tasks or on a per-project basis. You can easily switch between several sets, so your favorite tool is never far.

The Brushes Palette

Custom brushes streamline the workflow, saving time and ensuring consistency throughout the project. To keep your custom brushes organized, RotoDV lets you organize them in sets. You can load multiple sets and switch between them as needed, so it's easy to have a lot of tools readily available.

Each brush set consists of several brush types represented by tool icons. Each brush type can have several variants. The pop-up menus on the Brushes palette let you choose the brush type, the variant (if more than one exists for that brush type) and the set.



The Brushes palette is the hub for selecting brushes and saving them in sets.

Some brushes have several variants associated with them, such as the effects brush included in the Factory Brushes set.

To choose a brush variant:

1. On the Brushes palette, click on the brush icon that contains the desired variant, or choose the type from the Brush Type pop-up.
2. Choose the desired brush variant from the Variant pop-up.

Selecting a variant for a brush type in the Brushes palette associates the variant with the tool type icon. For example, if you select the Rain variant of the Effects brush type, then change to the Paintbrush, selecting the Effects Brush icon from the Tools palette loads the Rain brush again.

Effects Brushes

The Factory Brushes set comes with a special set of variants to the FX Brush. The FX Brush variants are all created with Links (see “Brush Links” on page 87). These brushes let you paint special effects in your project. The effects include things like fire, grass, rain, bubbles and more. Check out these brush variants and their links, they’re one of RotoDV’s most fun features!

Saving Custom Brushes

After you’ve adjusted a brush the way you want it, you can save the changes to a custom brush. The features for customizing brush behavior are described starting on page 84.

To save a custom brush:

Note: Remember that you first set up the tool the way you want, then save it. You can’t change it later, but you can make a new tool based on a previously saved one.

1. First, make any adjustments to the brush options and dab.
2. On the Brushes palette, choose **Save Brush Variant…**from the Brush Commands pop-up.
3. Name the tool and choose an icon in the Brush Variant window that appears. Remember, the icon determines which brush type your new brush is associated with (your new brush will show up in that tool’s Variant pop-up).
4. Click **OK** to create your new Brush.

RotoDV uses the current settings to build a new brush and add it to the current brush set.

Switching between brush sets

To better manage the tools you create, you’ll want to keep them in sets. You can have several brush sets open and switch between them using the pop-up on the Brushes palette.

Note: If you want particular Brush Sets loaded automatically when RotoDV launches, place these Brush Set files in the Brushes folder inside the RotoDV application folder. Everything in the Brushes, Dabs, and Colors folders is loaded automatically on launch, so you can change the default Brush, Dab, and Color Sets by managing the contents of these folders.

Brush sets are stored in files. You can save, open and close sets as needed. The commands for these operations and other management tasks are on the Brush Commands pop-up, described below.

Brush Commands

The Brush Commands pop-up has the commands for saving custom brushes and managing brush sets. Management tasks include deleting brushes from a set, changing tool icons, and grouping tools.

New Brush Set creates a new, empty brush set.

Open Brush Set... loads a saved tool set into the Brush Set pop-up. Brush Sets that are located in the Brushes folder inside the RotoDV application folder will be loaded into the pop-up automatically.

Close Brush Set removes the current tool set.

Save Brush Set opens a dialog so you can save the current tool set.

Save Brush Set As... opens a dialog so you can save the current tool set under a different name.

Save Brush Variant… opens the Brush Variant dialog box so you can name your new brush and choose an icon.

Delete Brush Variant removes a tool from the current set.

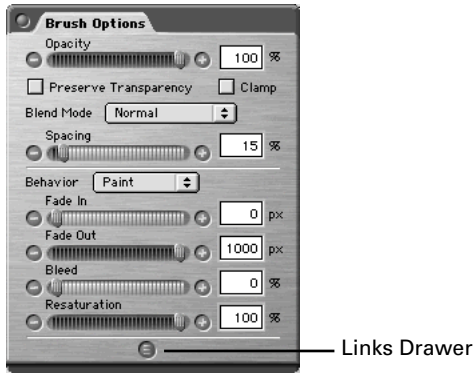
Rename Brush Variant… opens the Brush Variant dialog box so you can rename the selected brush.

The Brush Options Palette

You can adjust the brush options to change the behavior of the brush. These changes are temporary unless you use the commands on the Brushes palette to save a new brush, as discussed in the last section.

Note: The Brush Tool options are distinct from the dab options, set in the Dab Options palette; however, all of these settings are included when you save a new Brush Tool.

The Brush Options palette contains controls that describe how the dab is pulled along the stroke path.



The Brush Options palette provides control over brush stroke characteristics.

Brush Controls

Opacity

Opacity controls the density of the media applied in each stroke.

Preserve Transparency

The Preserve Transparency option causes the brush to operate only on pixels with non-zero alpha values. Enable Preserve Transparency to create a brush that alters existing color, rather than laying down new color.

Clamp

The Clamp option limits the opacity applied in the stroke. When Clamp is enabled, a single stroke, doubled back over the same area, will not increase opacity beyond the Opacity slider setting.

Blend Mode

The Blending Mode controls how the media reacts with underlying colors. Different blending modes lead to diverse results when you paint, such as the difference between felt pens and spray paint.

Blend modes are available for several RotoDV features. See Appendix **"A"** for descriptions.

Spacing

Spacing describes how closely the dab shape is repeated along the stroke path. At 100%, the spacing is equal to the diameter of the dab. With a lower Spacing value, the repeated dabs begin to overlap. Most brushes are designed to have significant overlap.

Behavior

The Behavior controls the brush at its most basic level. The pop-up has two options:

- **Paint**—applies color or other material.
- **Distort**—Picks up pixels and lays them down in a new location. Distort affects paint that has already been laid down on a layer.

Fade In

Fade In controls the rate that the medium enters the stroke.

Fade Out

Fade Out controls the rate that the medium leaves the stroke. As a brush runs out of paint, the stroke "fades out."

Bleed

Bleed controls the paint medium's interaction with existing color. Higher Bleed values correlate to paint that behaves as if it were more "wet." The brush picks up color from the layer and carries it along in the stroke.

Resaturation

Resaturation controls the supply of the paint medium. At 100% the brush will never run low on paint. If you want the brush to dry out toward the end of the stroke, set a low resaturation value.

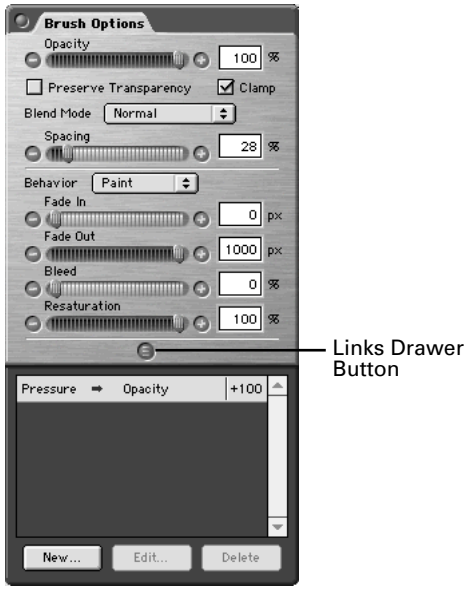
Brush Links

Clicking the small, round button at the bottom of the Brush Options palette opens the Links drawer (see picture below). Links provide a way to set up dynamic modulation of brush attributes. While you paint, you can use various data sources to change brush and media attributes.

RotoDV supports multiple links. You can have three, four, or more brush attributes linked to the same or different data sources. In most cases, two or three linkages will be enough for any brush. Further linkages may be difficult to control and may not contribute to the effect.

The most important data source is provided by a drawing tablet and stylus. Typical usage links stylus pressure to brush size and paint density, so pressing harder creates wider, more opaque strokes.

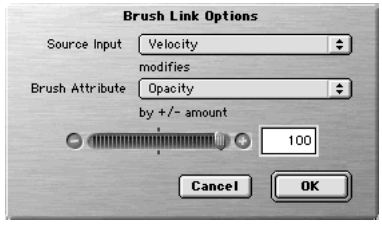
As with all tool options, the links are included when you save a custom brush tool.



The Links drawer in the Brush Options palette lets you set up dynamic modulation of the Brush Tool.

To create a link:

1. Click the **New** button. RotoDV opens a dialog that lets you specify link characteristics.



Use the Brush Link Options dialog box to set up link behavior.

2. Use the Source Input pop-up to select the data source to control that attribute. Descriptions of the data sources are listed in a table on the next page.

3. Use the Brush Attribute pop-up to select the brush feature you want to control with a link. The attributes are listed in a table on the following page.
4. Adjust the **Amount** slider to set the range of modulation. Regardless of the source data extremes, the resulting change to the attribute is maintained within this range.

   For example—if Hue is the selected attribute, you might set the amount slider to 10%. As you paint—regardless of extreme source data—the hue will remain within 10% of the current color.

   The significance of these limitations depends on the selected attribute, source, and the actual data presented. You'll probably set up the link, experiment with the brush, then return to the Links drawer to adjust the Amount setting.

To edit an existing link:

Double-click its listing in the Links drawer. Use the dialog as described above to set the modulation source, destination and amount.

To remove a link:

Click on a link to select it. Then click **Delete.**

Table of Link Modulation Sources

Data Source	Description
Velocity	The speed of the stroke modulates the attribute. This might be linked to size or, perhaps, bleed.
Direction	The direction of the stroke modulates the attribute. This is often used to control angle.
Pressure	Stylus pressure modulates the attribute. It's commonly linked to size, opacity or feathering.
Tilt X Tilt Y	The tilt of the drawing stylus in the X or Y dimension modulates the attribute. Not all drawing tablet models provide tilt data.
Random	RotoDV modulates the attribute at random.

Table of Link Destination Attributes

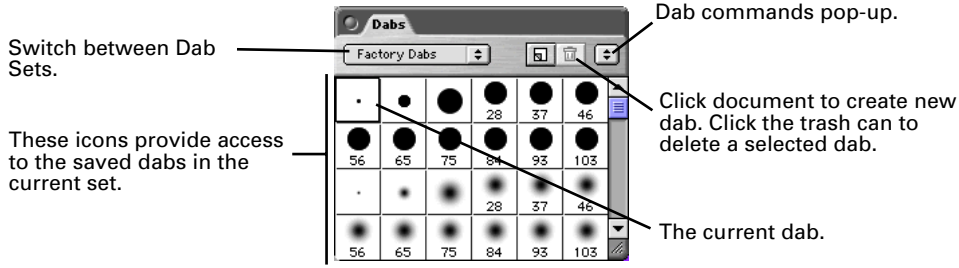
Attribute	Description
Hue	These attributes affect the paint media. You might put a little randomness in the color to give the paint a little variation. Look at the links for the Fire Effects brush to see how randomly varying the Hue just a bit adds to the look of flickering flames.
Saturation	
Luminance	
Size	These attributes refer to the dab options. See “The Dab Options Palette” on page 92 for descriptions. Size is often linked to pressure, so that by pressing harder, you get a larger brush dab.
Angle	
Ratio	
Opacity	These attributes refer to the Brush Tool options. See “Brush Controls” on page 85 for descriptions. Opacity is often linked to pressure, so that by pressing harder, you get denser paint.
Spacing	
Flow	
Fade In	
Fade Out	
Bleed	
Resaturation	
Position	This attribute describes the position of the dab in relation to the stroke path. Without modulation, the dab is always centered on the path.

The Dabs Palette

The Dabs palette holds saved dabs. These dabs attach to the Brush tool; you can use any dab with any brush.

Note: The features for customizing the dab itself are in the next palette, the Dab Options palette.

The Dabs palette also holds the features for saving dabs, switching between sets of dabs, and managing those sets.



The Dabs palette stores saved dabs and lets you switch between them.

To keep your custom dabs organized, RotoDV lets you organize them in sets. You can load multiple sets and switch between them as needed.

Note: If you want particular Dab Sets loaded automatically when RotoDV launches, place the Dab Set files in the Dabs folder inside the RotoDV application folder. Everything in this folder is loaded automatically on launch, so you can change the default sets by managing the contents of this folder.

Dab Sets are stored in files. You can save, open and close Dab Sets as needed. The commands for these operations are on the Dab Commands pop-up, described below.

To choose a dab:

1. Use either the Tools palette or Brushes palette to choose the Brush Tool that you want to use.
2. In the Dabs palette, click the image of the dab you want.

   You can use the Dab Options palette to make further adjustments.

To switch between open Dab sets:

The pop-up on the Dabs palette lists all open Dab Sets. Choose the set you want from the pop-up.

Dab Commands

The Dab Commands pop-up has the commands for creating and saving custom dabs and for managing Dab sets.

New Dab Set creates a new, empty Dab set.

Open Dab Set... loads a saved Dab set.

Close Dab Set unloads the current Dab set.

Save Dab Set saves changes to the current dab set.

Save Dab Set As... opens a dialog so you can save the current dab set under a different name.

Note: You create a new dab by modifying an existing dab.

New Dab saves the current dab, including all of its option settings, to the current Dab set.

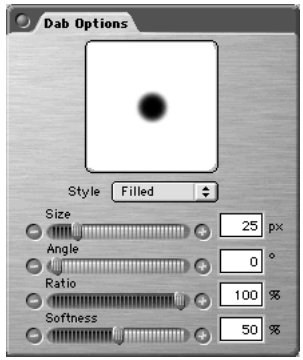
Delete Dab removes the current dab from this set.

The Dab Options Palette

The Dab Options palette holds features for adjusting the brush dab. Changes you make here apply to the current dab, so you can make minor adjustments while you paint.

Note: Remember that when you use the brush, the dab is applied along the stroke. You control the dab here, in the Dab Options palette, and you control stroke behavior in the Brush Options palette.

If you design a dab you want to keep, you can use the commands on the Dabs palette to save it for future use.



The Dab Options palette helps you customize the dab.

Dab Controls

The controls in the Dab Options palette allow you to adjust several aspects of the dab. The preview shows the dab image, so you can see the results of your changes.

Style

The Style pop-up lets you choose between Filled and Framed.

- A Filled dab has a solid center.
- A Framed dab uses only the feathered, outer regions.

Size

The **Size** slider scales the dab. Use it to change the size of a brush.

Angle

Angle controls rotation of the dab shape. (Changing the angle makes more of a difference when the dab is flatter.)

The same dab shown at progressive angles.

Ratio

The Ratio describes the aspect ratio of the dab. A dab that is inherently round can be flattened by reducing the Ratio.

Reducing the Ratio flattens a dab.

Softness

The Softness slider controls the softness or feathering at the dab edge.

Adjusting Your Brush

The brush you paint with is composed of "a dab attached to a tool." Both the tool and the dab have a set of options, and you may be unsure what to adjust when the brush doesn't look quite right. This section provides some suggestions for adjusting brushes to get the effects you want.

All of the brush and dab options apply to the current brush immediately—so you can tweak a slider and continue working. It isn't necessary to save adjustments to a new brush unless you want store them for later use.

RotoDV creates the brush stroke by repeating the dab shape along the stroke path. If you want to change the appearance of the stroke a brush delivers, you'll find the control to make the change you need in one of four places:

1. The Brush Options palette is where you set the rules for the stroke path.

2. The Links drawer on the Brush Options palette is where you set the rules for dynamically modulating Brush tool, dab and media attributes.
3. The Dabs palette holds saved dabs and dab sets.
4. The Dab Options palette is where you adjust dab shapes.

The following table lists common brush-adjustment needs and suggests how to resolve them. The numbers refer to the palette locations listed above.

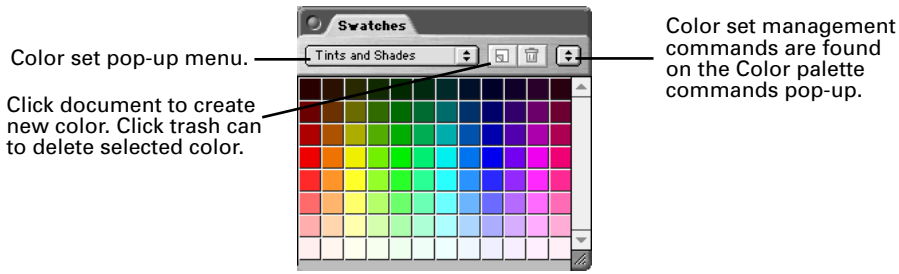
Problem	Solution
Brush is the wrong size	Change the dab size (4). You may also choose a different dab (3).
Media is too weak or too thick	Change the opacity (1).
Stroke appears as series of spots	Adjust the spacing to increase the dab repeat rate (1). When the dabs are close together, they blend into a continuous stroke.
Stroke is too slow	Increase the spacing (1).
Edge feathering or paint distribution is wrong	Choose a different dab (3).
Brush delivers unexpected results	Check the Behavior setting (1). Set the Behavior you want. Check if any links modulate brush attributes (2). Delete unnecessary links.

Swatches Palette

The Swatches palette lets you save collections of colors in sets, where you can easily choose them later. This can help you maintain color consistency throughout a project. As with the other features, you can have several sets loaded and switch between them.

Switching between color sets

To better manage your saved colors, you'll want to keep them in sets. You can have several color sets open and switch between them using the pop-up on the Swatches palette.



Use the Swatches palette to use and manager color sets.

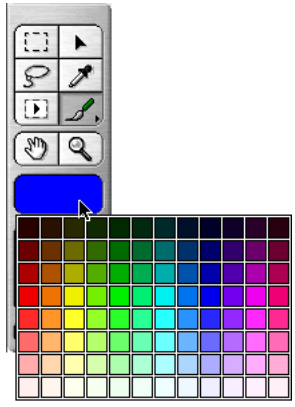
Note: If you want particular Color Sets loaded automatically when RotoDV launches, place these Color Set files in the Colors folder inside the RotoDV application folder.

Color sets are stored in files. You can Save, Open and Close color sets as needed. The commands for these operations and other management tasks are on the Color Set Commands pop-up, described below.

To select a color from the current set:

- In the Swatches palette, click on the color chip of the color you want. The selected color is indicated with an outline.

- You may also use the Paint pop-up on the Tools palette to choose a color from the current set.



Color is chosen by clicking and holding on the current color in the Tools palette

To save a color to the current set:

1. Use either the color picker or the Eyedropper tool to select a color.
2. On the Swatches palette, click the **document** icon. Alternatively, you may use the Commands pop-up to choose **New Color**.

   RotoDV adds the current color to the current color set.

To delete a color from the current set:

1. In the color set, select the color you want to delete.
2. On the Swatches palette, click the **trash can** icon. Alternatively, you may use the Commands pop-up to choose **Delete Color**.

Color Set Commands

The Color Set Commands pop-up holds the commands for saving custom colors and managing tool sets. Management tasks include deleting colors from a set.

New Color Set creates a new, empty color set.

Open Color Set... loads a saved color set.

Close Color Set unloads the current color set.

Save Color Set opens a dialog so you can save the current color set.

Save Color Set As... opens a dialog so you can save the current color set under a different name.

New Color saves the current color as a new item in the current set.

Delete Color removes the currently selected color from this set.

Color Palette

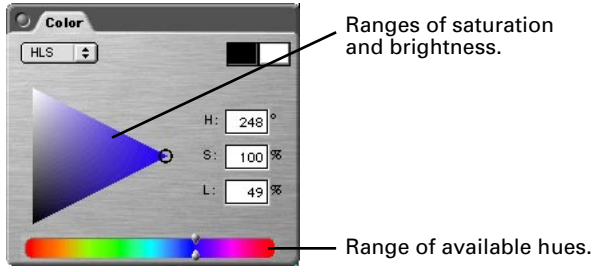
The Color Palette offers two styles of color picker—RGB and HLS. Use the pop-up to select the style you want. The Color palette also contains two quick shortcut buttons for choosing black or white. Of course, you can also choose the Eyedropper from the Tools palette and click on the color you want to sample. Refer to page 74 for information on the Eyedropper tool.

Black and White Shortcut Buttons

The black and white icons are available on the Color palette with either the RGB or HLS color picker showing. These buttons provide quick access to the colors at the extremes of the luminance range—R,G and B equal 0, 0, 0 (black) and R,G and B equal 255, 255, 255 (white).

Using the HSL Color Picker

The vertical bar at the bottom shows the range of available hues. The triangle shows the ranges of both saturation and brightness. Saturation increases left to right, and lightness increases from bottom to top.

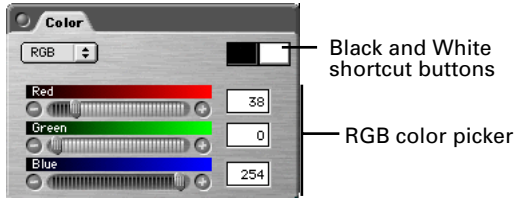


HSL color picker in the Color palette.

- Click in the bar to select the hue you want. You may also set hue values by typing numbers in the text field.
- Click in the triangle to set the saturation/lightness. You may also set saturation and lightness numerically by typing in their respective text fields.

Using the RGB Color Picker

The RGB picker provides sliders that set the relative contributions of Red, Green and Blue to define the color. The range for each is 0 to 255. When all three have the same value, the result is grayscale.



The RGB color picker in the Color palette. Choose between RGB and HSL with the RGB/HSL pop-up.

8 Layers and Time

Understanding Layers and the Blend Stack

Every RotoDV project has a Media Stack which contains at least one paint layer and any layers you have created to hold imported video clips. The combined video that appears in the document window depends on the order and contents of the layers. If your project requires that the layers interact in more complex ways, you can add layers to the Blend Stack. A project with blend layers requires is more memory and disk space. Use the controls in the Timeline to switch between viewing the Media Stack and the Blend Stack.

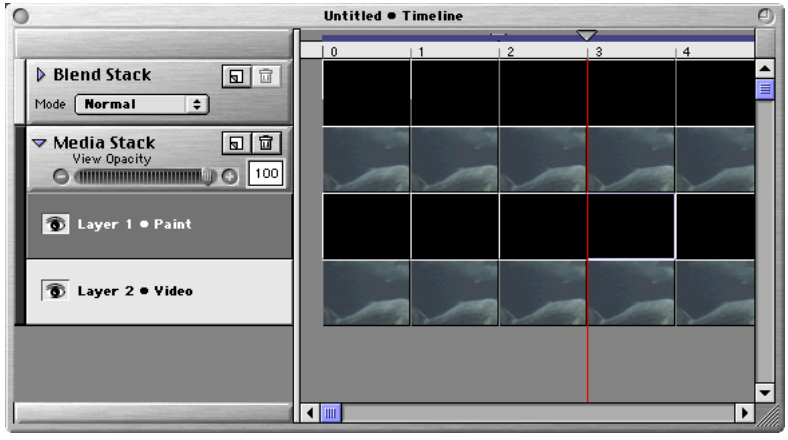
- The Media Stack lists all paint and video layers in the project. These layers are the building blocks of your composition. Use the Media Stack to create imagery and control sources. If the project has no Blend layers, the order of the Media stack determines the output.
- The Blend Stack arranges layers from the Media Stack in logical relationships, like one layer matting the visibility of another. If the project has Blend layers, then the Blend Stack determines your final output.

Note: Remember, if you don't create any layers in the blend stack, then the output is determined by the layer order of the Media stack.

As you work, you can switch the document window between displaying the Media Stack and displaying the Blend Stack. The two views may be quite different. For example, the order of layers in the Media Stack doesn't influence the display order of the Blend Stack.

Using the Timeline

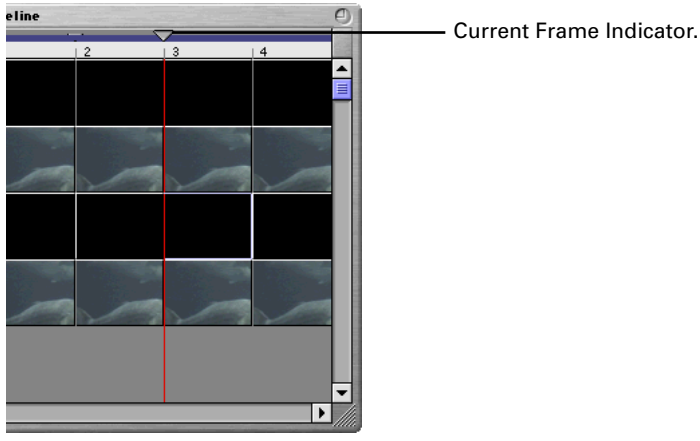
The Timeline lists the components of your project. The Timeline shows layer display order and provides control over layer opacity.



The timeline shows all layers in your project and their order.

Moving Through Time

The Timeline has a Current Frame Indicator that shows which frame you're on. The current frame is also listed in a SMPTE readout in the Transport palette.



Current frame is designated by the Current Frame Indicator.

The primary tools for moving through time are on the Transport palette. The Timeline also provides some methods for moving to other frames:

- You can drag the triangular top of the current frame indicator.
- You can click the thumbnail of the frame you want.
- You can drag the slider at the bottom of the Timeline window and scrub back and forth for a real-time flip book effect. This is a handy way to preview video at thumbnail size.

Timeline Thumbnail Options

RotoDV allows you to set options for displaying thumbnails on the layer tracks. At lower display levels, the Timeline window has less to update, so you can move through it more quickly.

To set Timeline options:

1. From the menu, choose **Edit> Project Settings.**

Timeline Thumbnail options can be adjusted in the Project Settings dialog.

2. Under Timeline Thumbnails, select the thumbnail display level you want.
   - **None—**The layer has no thumbnail images.
   - **First and Last Frame—**Only the first and last frame are given thumbnails.
   - **Every Frame—**Every frame has the thumbnail image. This is the highest display level.

Layers in the Media Stack

RotoDV lets you work with any number of layers in a project. These layers are the building blocks of your composition. The Media Stack lists all paint and video layers in the project.

- Video layers contain imported movie clips—captured video or animations. Editing is not allowed in a video layer, but you can select and copy imagery for use in paint layers. A video layer will have an alpha channel only if it is enabled in the Clip Options dialog. (See “Setting Clip Options” on page 46 for information.)
- Paint layers are 32-bit layers where you can paint with the Brush tools, use Selection tools and apply effects.

Generally, each layer adds imagery to the project; however, some layers may hold resources for controlling or developing imagery in other layers. This use of layers ensures that the original footage isn’t altered and provides tremendous flexibility for developing imagery and making changes.

Adding a Layer to the Media Stack

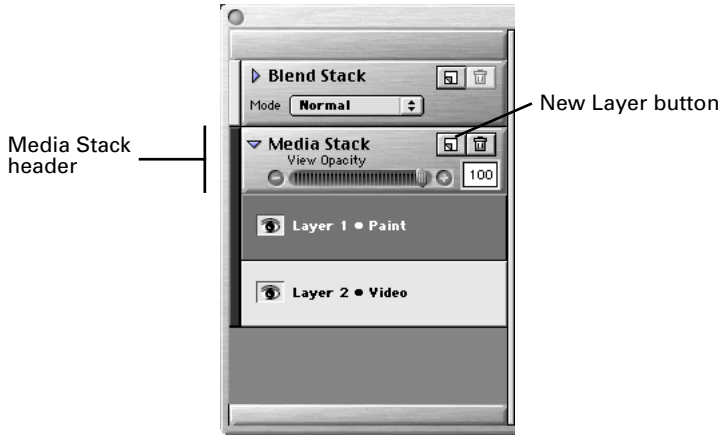
There are two ways to add layers to the media stack: create a new paint layer, or import a video clip. Each creates a different type of layer, however video layers can be converted to paint layers.

Creating a Paint Layer

By default one paint layer is created in the Media Stack for every new project. You can add paint layers as required.

To add a new paint layer:

- Click the New Layer button in the Media Stack header in the Timeline. You can also create a new paint layer by choosing **Layer> New Paint Layer** or by pressing **Command-L**.



Click the new layer button to add a paint layer.

Note: Frame numbering on imported clips will always start at #0 to conform to STMPE conventions.

Importing a Clip

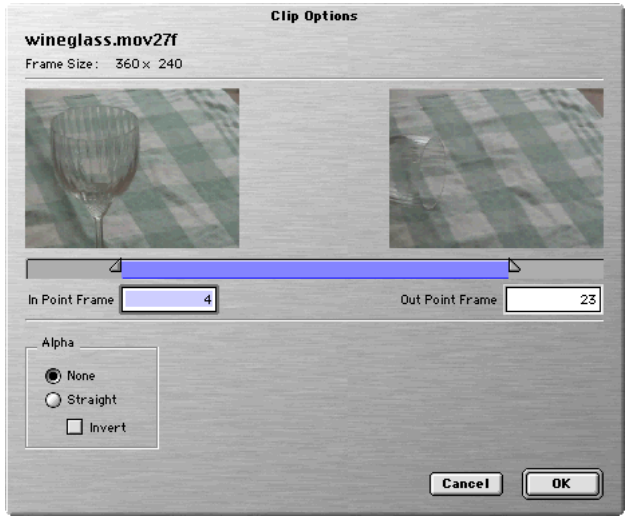
When you import a clip (captured video, animation or still image) to the project, RotoDV gives you choices of several pre-processing functions, like defining the alpha and setting in and out points.

To import a clip:

1. Choose **File> Import Clip…**, or press **Command-I**.

2. Select the desired file in the Open dialog box and click **Open**.

   The Clip Options dialog box appears.



Set clip pre-processing options in the Clip Options dialog box.

3. Select the pre-processing options for the clip. See "Setting Clip Options" on page 46 for more information on the Clip Options dialog box.
4. Click **OK** to import the clip into a new video layer.

When you're finished pre-processing the clip, it will be placed in the Media Stack.

Media Stack Layers

In the Media Stack, any clip may be used as either a video layer or paint layer. There's a technical difference between the two layer types—editing is not permitted in video layers, while editing is fully supported in paint layers. You'll need to keep this in mind to get the behavior you want in the layer. If you want to edit the pixels directly, you'll need to use the clip as a paint layer.

- In a video layer, editing is not allowed—you cannot paint, apply filter effects, cut or paste in a video layer. You *can* select and copy imagery for use in paint layers.

- In a paint layer, you can paint using the Brush tool, cut and paste selections, or apply effects to change the actual data.

In most cases when you want to paint on video, you'll import the clip as a video layer, then create a paint layer above it where you'll paint. This is advantageous because it leaves your video data untouched, and you can make any number of changes in the paint layer.

The following occasions require using a video clip as a paint layer:

- You want to paint directly onto the video, changing its data.
- You want to apply effects directly onto the video, changing its data.

To convert a video layer to a paint layer:

- Select the video layer in the Timeline. From the **Layer** menu, choose **Convert to Paint Layer**.

Selecting a Layer to Edit

You can only work on one layer at a time in RotoDV. You'll need to identify the layer you want to edit.

- You can select a layer by clicking its listing (name) in the Timeline.
- You may change the selected layer by with the **Up and Down Arrow** keys on the keyboard.

Changing the Order of Layers

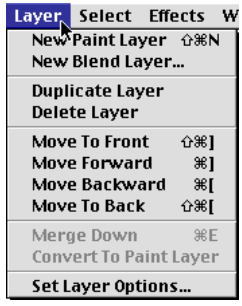
Note: The order of layers in the Media Stack does not influence the display order of the Blend Stack.

Higher layers cover those below. You can change the order of layers to achieve an arrangement that supports the editing you are doing. For example, if you wish to place some painted-in clouds behind a mountain, you can create the clouds on an individual layer and place that layer below the layer containing the mountain.

To change the order of layers in the Media Stack:

1. Select the layer you want to move in the Timeline.
2. Pull down the **Layer** menu and choose the type of move you want:
   - **Move To Front—**The layer moves to the top of the display order.
   - **Move Forward—**The layer moves up one position in the display order.

- **Move Backward**—The layer moves down one position in the display order.
- **Move To Back**—The layer moves to the bottom of the display order.



Use Move commands in the Layer menu to change order of layers in the Timeline.

You can also use the Move command key shortcuts listed on the menu.

Changing the order of a layer forces RotoDV to redraw the current frame.

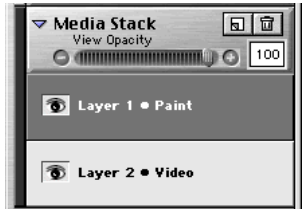
Controlling Layer Visibility

Note: These controls set layer visibility/opacity within the Media Stack. They have no influence on the Blend Stack. To change opacity in blend layers, you need to work in the Blend Stack.

When a layer has reduced opacity, lower layers show through. This can be useful for some kinds of editing—for example, if you're using one layer as a guide for working in another layer.

To set layer opacity:

1. Select the layer you want to change.
2. Adjust the View Opacity slider in the Media Stack or enter a specific level in the text field.

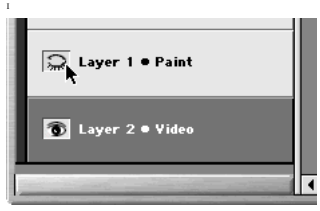


The opacity of a selected layer may be adjusted with the View Opacity slider at the top of the Media Stack.

Visibility

The visibility control sets whether or not a layer is seen in the document window. You might want to hide a layer so that it won't distract you while you work on another.

- Click the **Eye** icon to show/hide the layer.



Click a layer's Eye icon to hide or show a layer in the document window.

- Option-click a layer's **Eye** icon to make it the only visible layer.

  Option-click again to show all layers.

Manual Rendering

Certain actions, (hiding/showing layers and changing the background color) require you to update the project manually. When this update is required, the word "Unrendered" appears in the Timeline.

When the project needs updating, "Unrendered" appears in the timeline.

You have two options when you see “Unrendered” in the timeline:

- Choose **File> Render** to force the project to update now. This command may take a few seconds to complete. The Render command always updates the project to show the current state.
- Choose **File> Treat As Rendered** to revert to the previous view and remove the “Unrendered” message from the Timeline. This display may not accurately represent the current state of the project. If you use the Treat As Rendered command, you should always use the Render command at a later time.

Creating a Blend Stack

The Blend Stack assembles the layers from the Media Stack in more complex ways than are possible with the Media stack alone. The Media stack combines layers in the order they appear. For more complex layer interaction it’s necessary to create a Blend Stack.

Note: When it’s time to export your project, RotoDV will use the visible stack. If you haven’t created a Blend Stack, RotoDV will use the Media Stack.

The Blend Stack is built of Blend Layers. Each layer contains one or two layers selected from the Media Stack. When you create a Blend Stack, you’ll give it some compositing rules. These rules and the order of layers in the Blend Stack are what determine the imagery in your final output.

This stack hierarchy offers several advantages:

- The Blend Stack lets you combine two layers in a single composite effect. The most common use is to have one layer matte the contents of another.
- The Blend Stack allows you to use a single layer more than once. This offers advantages for developing special effects. For example, you can blend a video at 100% opacity inside a matte, then create a second blend layer and blend the same video at 15% opacity outside of the matte, or vice versa.

While the rules for building a Blend Stack are quite simple, there are many ways to take advantage of the Blend Stack.

Creating and Editing the Blend Stack

For many RotoDV projects you can get the results you want with the Media Stack alone. There will come a point when you're when your project becomes more complex and requires the use of a Blend Stack. You don't need to be done editing the layers to set up a Blend Stack. You can add layers to the Blend Stack, then return to the Media Stack for further work. You should be aware that adding layers to the Blend Stack requires additional memory. If there is not enough memory available to add a layer, you may be able to free up some memory by decreasing the real time range (page 52).

Note: Not all Media Stack layers must appear in the blend.

Any layer may be used multiple times in the Blend.

The layering order in the Media Stack is completely independent of the order of layers in the Blend.

Creating a Blend is the process of arranging the layers from the Media Stack in logical relationships. Two factors control the full result of the Blend—the settings of the individual blend layers and the order they appear in the stack. You can modify either to get a different blending result.

To create a new blend layer:

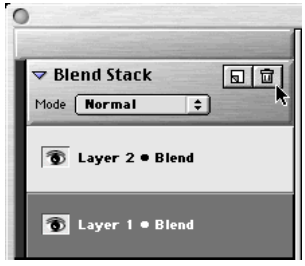
1. Choose **Layer> New Blend Layer.** Alternatively, you may click the **"New Document"** icon in the Blend Stack field of the Timeline.
2. RotoDV opens the Blend Layer Options dialog, described in "Blend Layer Options" on page 114.
3. Use the dialog to define this blend layer.

   When you close the dialog, RotoDV creates a new layer for the specified blend.

To delete a blend layer:

1. If necessary, click the disclosure triangle to expand the Blend Stack and view the separate layers.
2. Select the layer you want to delete.

3. Click the **"Trash Can"** icon in the Blend Stack field of the Timeline. You can also select **Layer>Delete**.



Delete the selected layer in the Blend Stack by clicking on the Trash Can icon in the Timeline.

To change the order of blend layers:

The order of layers in the Blend Stack is a major determinant in the overall blend result. Layers that are higher in the stack cover those that are lower, so you can achieve different blend results by changing the display order.

- Choose **Layer> Move** and choose the type of move you want.

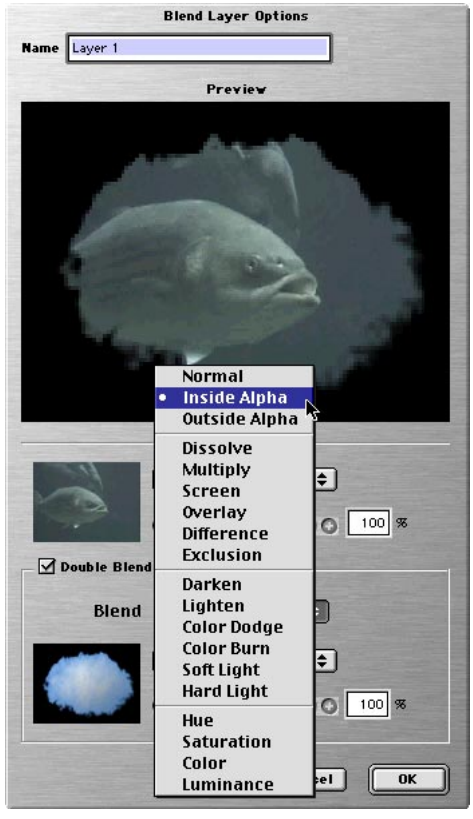
To edit a blend layer:

Sometime after creating a blend layer, you might need to change it. You might want to switch the alpha usage (inside versus outside) or choose a different blend mode, for example.

1. If necessary, click the disclosure triangle to expand the Blend Stack and view the separate layers.
2. Double-click the layer you want to edit.
3. Make the necessary changes in the Blend Layer Options dialog, described in "Blend Layer Options" on page 114.

Blend Layer Options

The Blend Layer Options dialog is where you specify which one or two component layers are used in this layer and how they're used. You'll use this dialog when designing a new blend layer or when editing an existing one.



The Blend Layer Options dialog. Blending modes are shown in the Blend pop-up menu.

Two types of blend layers are possible—Single and Double.

- A Single layer has only one layer, which is displayed directly according to its order in the Blend Stack and opacity setting.

- A Double layer combines two layers in a blending operation. Often you'll use a blending mode for special effects.

To set blend layer options:

1. Enter a name for the layer in the name box, if you like.
2. Click the checkbox if you want a Double layer.
3. Use the Layer pop-up to choose the one or two layers you want in this blend.

   The pop-ups list all layers from the Media Stack plus the special "Underlay" layer. The Underlay is calculated on the fly from the composited result of all underlying blend layers.
4. Use the Blend pop-up to set the type of blending operation you want (Double only).
   - **Normal**—The top layer component covers the lower component.
   - **Inside Alpha**—The top layer component fills the alpha region of the lower component.
   - **Outside Alpha**—The top layer component fills the inverse of the lower component's alpha.
   - **Blending Modes**—The remaining options are the blending modes, described in **Appendix A: "Blending Modes."** In these cases, the top component blends with the lower component, following the rules of the selected mode.
5. Click **Blend** to apply the settings.

Viewing the Blend Stack

As you work, you can toggle the display in the document window between viewing the Media Stack and viewing the Blend Stack. You can continue to edit when viewing the Blend Stack; but it's easier to work while viewing the Media Stack.

To switch your view between the Media Stack and the Blend Stack:

- Click the **Blend Stack/Media** Stack view headers on the Timeline to switch between the two views. You can also toggle between the views by pressing the \ (**Backslash**) key on the keyboard.

9 Working with Paint

About Painting

This chapter is about working in paint layers. Paint layers support tools and operations that aren't possible in video layers. In paint layers, you'll use the Brush tools to develop imagery. You'll use selections to manipulate imagery. And you'll use keys and effects to create and modify imagery.

The Brush is an important and flexible tool. You'll find the major Brush tool features described in this chapter.

The paint that you apply in a paint layer comes from the Color palette, where you can choose the color using one of two color pickers.

One special type of painting does not use colors. Cloning draws its medium from imagery in any frame of any layer. To help you manage cloning options, RotoDV provides a special palette—the Clone palette. Nearly all of the standard brush and painting features apply equally to cloning. Special cloning procedures are covered in "Cloning" on page 121.

Painting Features

RotoDV's various painting features are described in the following pages.

Painting in a Field

RotoDV allows you to apply paint one field at a time, to the interlaced video fields. Working in Field Mode, your imagery is recorded at 60 fields per second (NTSC), instead of 30 frames per second.

Moving imagery will benefit from working in fields. RotoDV allows you to switch back and forth between working in the whole frame and in separate fields. You can save time by using Field Mode only where it provides benefit. See **Appendix B, "Field Rendering,"** for more information on working with fields.

To use Field Mode:

On the Transport palette, click the **Field Mode** button.

Use the Field Mode button in the Transport palette to switch between frame and fields.

When you're working in Field Mode, each "Frame Forward" (using either the button on the Transport palette or the **Right Arrow** key) actually moves forward one field. The readout to the right of the SMPTE display shows which field you're on—1 or 2. Field dominance is set in either the New Project or Project Settings dialog box.

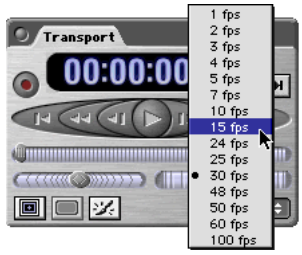
Painting While the Movie Plays

RotoDV allows you to paint while your project plays. This is a great way to get streaks of paint swimming around the frame.

To paint while the movie plays:

1. Transport to the frame where you want to start painting.
2. Select the paint layer you want to work in.

3. If you like, change the frame rate in the Transport palette.



Slowing down the frame rate in the Transport palette command pop-up can help when painting on video while it plays.

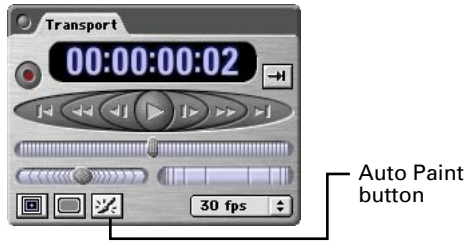
4. Click the Transport palette: **Record** button to enable recording. There is a short pause as the project "cues up"
5. Start painting. The first click in the document window starts recording. You can also click the play button in the Transport palette to set the project in motion, then apply paint.

Auto Paint

Note: Note: RotoDV will only carry paint forward if you turn Auto Paint on *before* you make your first paint stroke.

The Transport palette's **Auto Paint** button (**Command-B**) lets you automatically carry over paint you apply in one frame when you advance to the next. This is quite useful for projects where the painted area grows or changes shape like the first tutorial at the beginning of the manual. You might use RotoDV for photographic retouching on a film clip. You'll paint to retouch the image in the first frame; then with Auto Paint on, advance through the frames. The same paint will be applied in all frames—as long as the retouched element has the same framing, you can "carry on."

Remember: Auto Paint carries forward paint applied with a brush, by pasting or by dropping a selection by **Option**-clicking. See "Auto Paint" on page 66 for more information.



To automatically carry paint forward to the next frame, click the Auto Paint button in the Transport palette before applying the paint to be copied.

Note: Use the paint tool and eraser to edit the applied paint as you move forward and the paint appears to move in the frame.

Note that you can enable/disable this feature at any time. In a given project, you'll use Auto Paint for some design elements, and not others. When the design suggests it, Auto Paint will save you time and deliver excellent results.

Auto Paint also functions across paint layers. For example, if you start painting in one paint layer with Auto Paint on, then move to a different paint layer, the paint you have applied is copied into the frame where you switched layers.

Auto Paint moves the applied paint to the new layer at the point where you switched layers.

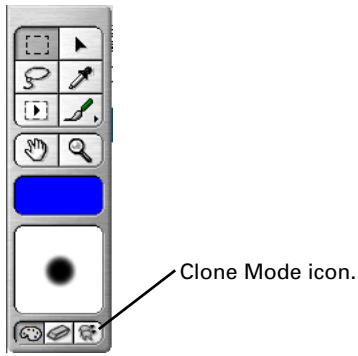
Cloning

Cloning lets you move imagery between locations, frames and layers with every brush stroke. You load your brush with imagery from one place, time or layer, then paint with it in another. As you advance to paint in subsequent frames, you can have the frame reference to the clone source advance as well.

You can assign cloning behavior to any Brush tool.

To use a cloning brush:

1. Choose the Brush tool and dab you want.
2. Click the Clone button in the Tools palette, or press **Command-S**.



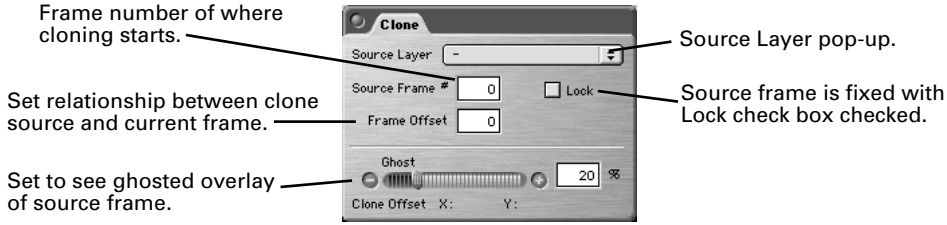
Click on the Clone button in the Tools palette to create a cloning brush.

Clone Brush Setup

Cloning requires a few steps of preparation, most of which take place in the Clone palette.

To set up for cloning:

1. Display the Clone palette by clicking the **Clone** button on the Button Bar or selecting **Window>Show Clone**, or press F7.



Setting up a Clone brush

2. Use the Source Layer pop-up to select the layer you want as the source.

   Any video or paint layer may be used as the clone source. If the source clip you want to use isn't in the project yet, you'll need to bring it in first. You may even use the layer where you're going to paint as the source (which can be useful for touch-up work).

3. Use the Transport palette to advance to the frame where you want to paint.
4. Use one of the following two methods to set the frame-to-frame alignment:

   - On the Clone palette enter the Source Frame number you want. This identifies the specific frame in the source layer you want to start cloning.
   - Adjust the Frame Offset by typing a number in the text field. This identifies the temporal relationship between the source frame and the current frame (where you'll paint). For example, "-3" means "the source frame is three frames behind the current frame."

   The two controls are interdependent. When you change one, RotoDV adjusts the other accordingly.

5. The Lock option sets the behavior of the source frame when you advance in the project.

   - When Lock is enabled, the source frame you set is fixed—advance in the project and you'll still be cloning from the specified source frame.
   - When Lock is off, the source frame maintains its relationship to the current frame—advance in the project and the source frame advances with you.

6. If you want to see a ghosted overlay of the source, adjust the **Ghost** slider to describe the opacity of the overlay. The ghost overlay will be helpful in deciding the x, y location of the source material.

Clone source frame (Fire) can be seen through foreground frame (Ric). The tip of the flame near Ric's mouth shows where cloning has already taken place.

At any time, you can hide the overlay (set **Ghost** slider to zero) to see your project clearly.

7. Click on a paint layer in the Timeline where you want to work—your destination layer.
8. Choose a cloning brush.
   - To create a cloning brush, choose any type of Brush tool, then click the Clone button in the Tools palette. The large color chip will change to a clone icon.
9. Set the clone source location within the frame by **Option-Clicking** on the spot you want to sample from. You can repeat this step whenever you want to change the source location.

Note: The position difference between the clone source and destination is called the X, Y Offset. You'll find a readout of this offset at the bottom of the Clone palette.

10. Click at the location where you want to apply the clone imagery—the destination.
11. Now you can paint. Each stroke brings in more imagery from the clone source.

Selecting and Editing Paint

Selections allow you to move and transform pixel imagery with operations like rotate and scale. You can use selections to copy imagery from one frame to another or from one paint layer to another. Selections also can constrain image effects and painting with the Brush tool.

Selections are independent of layers, but are valid in only one layer at a time. That is, once you create a selection, you can use it in any paint layer. The selection applies within the current layer, so you need only move to the layer where you want it to be effective.

RotoDV allows you to select a region within the current frame, the entire frame, or a range of whole frames. For the most part, this chapter discusses regional selections that are valid only in the current frame. Operations that may be used on a range of frames differ from those for regional selections. This chapter includes a separate section for selecting and working with a range of frames.

Selections and Paint

In the document window, you'll see the region described by a moving black and white marquee, often called "marching ants." Because the selection mask may be feathered the actual path that the ants follow may be an approximation of the soft edge.

The image pixels within the selection region are what you're really interested in. It's this collection of pixels—the paint—that you'll re-color, copy or move. It's important to maintain the distinction between this collection of colored pixels and the mask that distinguishes them from the rest of the current frame in this layer. Different operations refer to one or the other.

- "Selection" refers to the area within the marquee. The selection is created with the Lasso and Marquee tools or by selecting the entire frame (**Select> All**, or **Command-A**).
- "Paint selection" refers to the collection of pixels from the region. Sometimes, when the context is clear, this may be simply "paint," "pixels" or "imagery."

Creating Selections

Selections may be used in any paint or video layer. They apply to one layer at a time—the layer currently selected for editing. It doesn't matter which layer is selected when you create the selection. But it does matter when you attempt to use the selection. Be sure to choose the layer you want before trying any operation on the layer pixels.

To choose which layer the selection will affect:

You may use either of these methods.

- Use the **up** and **down** arrow keys to select the layer you want.
- Click the name of the layer you want in the Timeline.

Using Selection Tools

The selection tools are the principal method for creating selections. Refer to the "Selection Tools" on page 73 for more information on the selection tools.

Lasso

Use the Lasso to draw a freehand shape around the region you want to select.

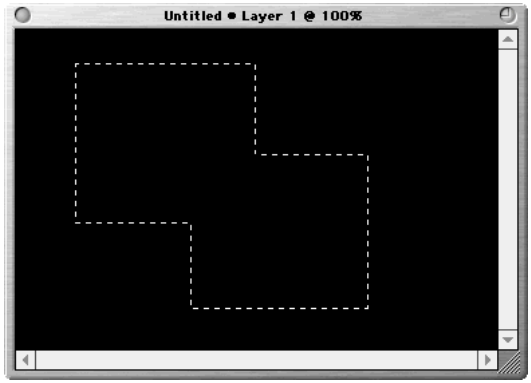
Rectangle

Use the Rectangle selection tool to create rectangular selections. Just drag in the document to create the selection.

Adding to and Subtracting from a Selection

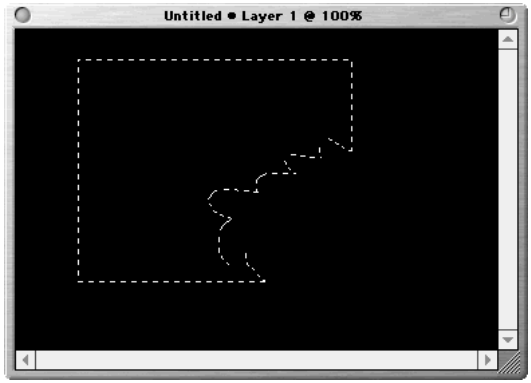
Once you've created a selection, you can add to or subtract from it using a key modifier. This technique works with either of the selection tools.

- Hold down **Shift** and use the tool to add to the selection.



A rectangular selection is drawn, then a second rectangle is added to the selection.

- Hold down **Option** and use the tool to subtract from the selection.



A rectangular selection is drawn, then the lasso tool is used to subtract an irregular area from the selection.

Moving a Selection

You might create a selection, then decide you want to reposition it. Note that this refers to moving the selection path—not the pixels within it. You can move the selection marquee by dragging within the selection region with a selection tool, or by holding down the **Command** key on the keyboard and pressing the arrow keys.

Selection Commands

Note: This command is context-sensitive. In the Timeline, it selects all frames.

In some cases, when there is no active selection, an operation will apply to the entire frame. For example, Select> Fill would fill the entire frame if no selection was active. The same applies to any of the Effects.

Select All (Command-A)

To select the entire frame, choose **Select> Select All**.

Deselect (Command-D)

To disable any selection, choose **Select> None**.

Inverse (Command-Shift-I)

Sometimes it's easier to select "everything but" the imagery you want. You can then invert the selection to get the region you want.

- With a selection active, choose **Select> Inverse**. If a pixel was selected before, it won't be now, and vice versa.

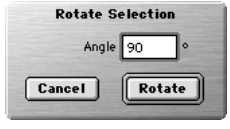
Fill (Command-Shift-F)

Fill floods the active selection with the current color. The Fill command is not available in erase or clone mode.

Note: The Rotate, Scale and Feather commands affect the selected imagery, not just the selection marquee.

Rotate…

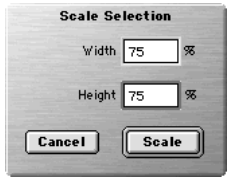
To rotate the selected area, choose **Select> Rotate**. This brings up a dialog box to specify the angle through which you want the selection rotated.



Enter an angel to rotate the selected area. Enter a negative angle to rotate counter-clockwise.

Scale…

Use the Scale command to enlarge or shrink the selected area. Enter the same percentage in both boxes to scale without distorting the image in either dimension.



Use the Scale Selection dialog box to alter the size of a selected area.

Feather… (Command-Option-D)

Selection tools offer options for feathering; however, you might want to change the feathering on an existing selection.

- With a selection active, choose **Select> Feather.** In the dialog, enter the feathering distance and click **OK.**

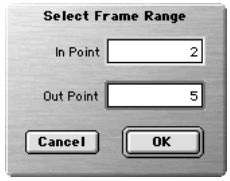
The Feather dialog is used to set or change the feathering of a selection

Hide Edges (Command-H)

To conceal the marching ants (selection marquee), choose **Select> Hide Edges**. The selection is still valid, but the marquee isn't shown. If you need to see marquee again, choose **Select> Show Edges**.

Frames…

This command on the Select menu allows you to type in a range of frames to select. You can also select a range of frames from the Timeline by clicking on the first frame and shift-clicking on the last frame in the desired range.



Enter the frame range to select, or select the frames in the Timelime window.

Manipulating Paint Selections

The principal reason for creating a selection is to separate a region of pixels for editing. RotoDV offers the basics, like Cut, Copy, and Paste, as well as transformations and special features for getting paint into other frames.

Moving Paint in the Frame

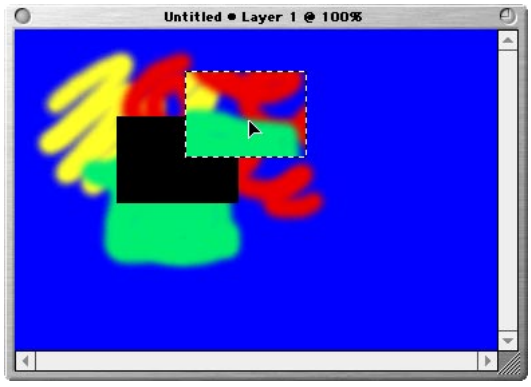
Often, you'll want to move a bit of imagery in the frame. This operation moves the painted pixels, not the selection marquee. A paint selection that has been moved floats over its layer. When you deselect it, the paint stops floating and merges with the layer. This is called "dropping" the selection.

It's possible to move a paint selection partially out of the frame. Only the portion within the frame will be visible, and when you drop the selection, only this portion is retained.

To move a paint selection by dragging:

1. Create a selection.
2. Choose the Move tool.

3. Drag the paint selection where you want it.



The selected area can be dragged with the Move tool.

4. Drop the selection by clicking outside the marquee, or choose **Select> None** (**command-D**).

   Option-click to drop the paint without loosing the selection.

Duplicating the Selection

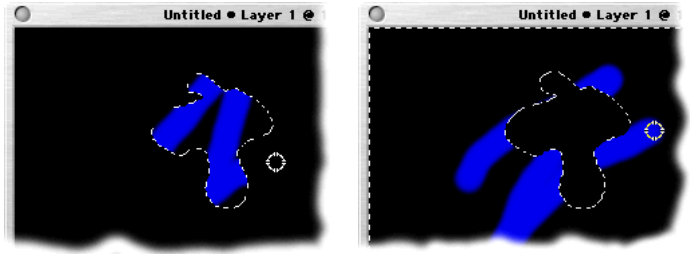
Option-clicking the selection drops the paint but does not de select-the region, this lets you duplicate the selection on the same frame or on several frames of your project.

Option-click to make lots of money with RotoDV.

- **Option-click** to drop the paint and keep the region selected. This let's you preserve the selected region for further use.
- You can copy the same selection into several frames by advancing with the **right arrow** key, then **option-clicking** on each frame to drop paint.

Masking With a Selection

You can use a selected region to mask non-selected areas of a frame. If a selected area exists on a frame, the paint tools will only apply media in that area. If you want to keep paint off a certain area in the frame, select the area, then invert the selection to paint everywhere else.



The example on the left shows paint applied into a selected area. In the example on the right the Inverse command has been applied to mask the irregular area.

- Select an area to confine paint to that area.
- Choose **Select> Inverse** to keep paint off the original area.
- Use the Feather control in the Tool Options palette or in the Select menu to smooth the edges of the mask.

Moving Paint Between Frames and Between Layers

You can cut or copy, then move to a different frame or layer and paste there. The commands for doing this are on the Edit menu.

Copy (Command-C)

(Paint and Video layers) **Edit> Copy** duplicates the selected imagery to the Clipboard.

Cut (Command-X)

(Paint layers only) **Edit> Cut** removes the selected paint from the document and places it in the Clipboard.

Clear

(Paint layers only) **Edit> Clear** removes all opacity from the pixels in the active selection. You can see through the cleared region to underlying layers or the background. Clearing is equivalent to filling the selection with Eraser paint.

Paste (Command-V)

(Paint layers only) **Edit> Paste** copies the Clipboard contents to the document. The paint selection is pasted at the same location from which it was copied. Select the Move tool to move the pasted paint where you want it.

Working with a Range of Frames

Note: Regional selection and whole frame range selection are exclusive.

Several features are available for working with a range of whole frames in a paint or video layer. These operations take place in the Timeline window, where the selected frames are outlined in your selected system highlight color. You may want to adjust the highlight color in the Appearance control panel for best results (see your Macintosh OS documentation for more information).

With a range of frames selected, the following Edit menu commands are available: Clear, Cut and Copy. After using Cut or Copy, Paste is available. See the next section for more information on pasting multiple frames.

With a range of frames selected, you may use any of the Effect menu commands to modify the imagery.

To select frames manually:

1. In the layer track of the Timeline, click on the frame at the start of the range.
2. Advance to the last frame of the range you want and **Shift-click** on it.

   RotoDV selects the range of frames delimited by the two you clicked on. In the Timeline, the selected frames are outlined with a marquee.

To select frames numerically:

1. In the Timeline, select the paint or video layer you want.
2. Choose **Select> Frames** or press **Command-Shift-A**.
3. RotoDV opens the Select Frame Range dialog that allows you to specify the range. For more information on the Select Frame Range dialog see “Frames…” on page 129.

4. When you've defined the range, click **OK.**

   RotoDV selects the specified frames.

Using Effects

The Effects menu offers several methods for creating and changing imagery. With the exception of keying, these commands are valid only in paint layers. Keying is possible in paint layers and in a video layer that has alpha data. Refer to "Setting Clip Options" on page 46 for information on video clip alpha settings.

Applying a key lets you remove, or "knock-out" pixels containing colors in a defined range. This is the method used for traditional blue or green screen effects—the desired object is filmed against a blue or green background then the background color is removed and replaced with the desired imagery.

Applying a Key for Alpha

The keying dialog lets you apply a Color, Channel, Color Range or Difference key to a layer in the Media Stack. Trial and error and experience are the best guides for which type of keyer to use.You can apply a key filter to a range of frames. You can repeat the technique on different sets of frames, using different settings or keying methods in each.

To apply a key:

1. Select the layer where you want to apply the key.
2. Select a specific frame, range of frames, or all frames. Refer to "Working with a Range of Frames" on page 133 for instructions.
3. Choose **Effects> Apply Key**, or press **Command-Shift-K** on the keyboard.
4. In the Key Filter dialog, use the Keyer pop-up at the top to choose the type of key you want. RotoDV updates the dialog to show the appropriate options.

You have four choices for setting up a key filter.

5. Set your keying options and click **OK** close the dialog and apply the key.

Settings common to several Keyer options are:

Table of Shared Keyer Options

Setting	Description
Invert	Knocks-out everything but the keyed pixels; like inverting a selection.
Linear	Use a linear function for the falloff slope. Produces a sharper falloff.
Cubic	Use a cubic function for the falloff slope. Produces a softer falloff.
Preview	Previews the effects of applying the key in the document window.

Color

This is the easiest keyer option and the one you'll probably use most.

You use the eyedropper to select a key color with the Color keyer option.

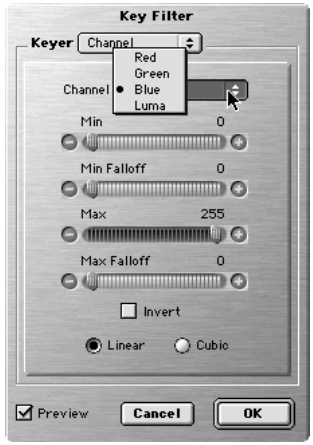
To set up the Color option:

1. Select a color in the document window with the eyedropper.
2. Adjust the tolerance slider to expand the range of color.
3. Use the softness slider feathers the edges around the knock-out area.

4. Check the Invert box if you wish to knock-out everything but the key color.

Channel

Use this option to key out a range of color in just one channel (Red, Green, Blue, or Luma).



Use the Channel option to remove a color range from a specific color channel.

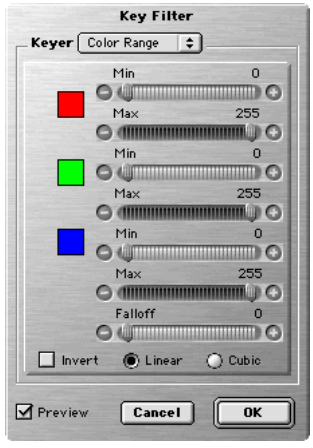
To set up the Channel option:

1. Adjust the Min and Max sliders define the lower and upper range of the color value.
2. Use the Falloff sliders determine how color values at the ends of the range transition from unkeyed to keyed.

   Falloff is like the softness slider in the Color key option. You can adjust falloff separately for the high and low end of the value range.
3. Fine tune the falloff transition by selecting the **Linear** or **Cubic** option.
4. Check the Invert box if you wish to knock-out everything but the key color.

Color Range

Defines a key color range by setting values for red, green, and blue. The key range is the region where these values intersect in the color space.



Set the range for each color with the sliders.

To set up the Color Range option:

1. Adjust the sliders to define the range for each color. Min and Max sliders define the lower and upper range of the color value.
2. Use the Falloff slider determine how color values at the edges of the color range transition from unkeyed to keyed.
3. Fine tune the falloff transition by selecting the **Linear** or **Cubic** option.
4. Check the Invert box if you wish to knock-out everything but the key color.

Difference

Used to key out the pixels in the selected layer which differ from the layer selected in the Background pop-up.

Compare two layers and knock-out the different pixels with this keyer option.

To set up the Difference option:

1. Select a layer in the Background pop-up to compare to the selected layer.
2. Adjust the tolerance slider to expand the knock-out area.
3. Use the softness slider feathers the edges around the knock-out area.
4. Check the Invert box if you wish to knock-out everything but the difference area.

To use the Difference keyer option to isolate a subject:

1. Duplicate a layer.
2. Paint over the desired subject with the background color.
3. Select the original layer and apply the Difference key with the duplicate layer selected in the Background pop-up.

The pixels which differ from the original layer will be knocked-out.

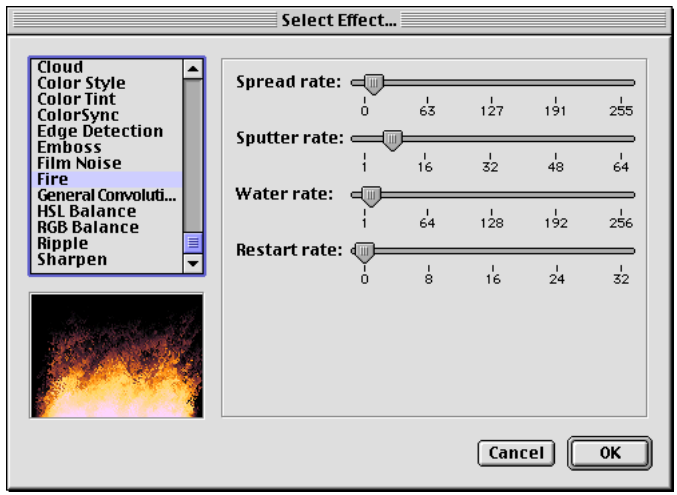
Applying a QuickTime Effect

Applying a QuickTime effect allows you to modify the imagery in a paint layer in interesting ways. In some cases, the effect might generate its own imagery. You can apply the effect either to a region of the current frame or to a range of frames.

To apply a QuickTime effect:

1. Select the paint layer where you want to apply the effect.
2. Select a specific frame, range of frames, or all frames. Refer to "Working with a Range of Frames" on page 133 for instructions.
3. If desired, select the region to which you wish to apply the filter.
4. Choose **Effects> Apply QuickTime Effect.** RotoDV displays the Apply QuickTime Effect dialog.

Note: If you are using QuickTime version 4, a "Save" button appears under the list of effects. This allows you to save your effect control settings for later use.



Select Effect... dialog lists QuickTime effects in scrollable window at left. Sliders and menus at right control the effect. A preview of the effect is shown at bottom left.

5. Use the pop-up to select the effect you want to apply.
6. Use the controls on the right to fine tune the effect.
7. Click OK to apply the effect.

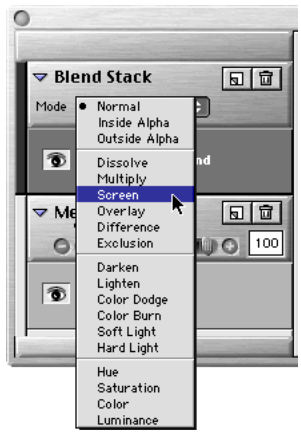
The pop-up lists the effects that ship with the version of QuickTime you have installed.

A Blend Modes

Blend modes control how one set of color data interacts with another. Each blend mode produces a different visual result. The differences may be subtle or profound, depending on the color data and the specific blending modes. The blend modes allow you to achieve the color effects you're looking for. Note that the strength of a blend mode effect is controlled with the opacity of the media.

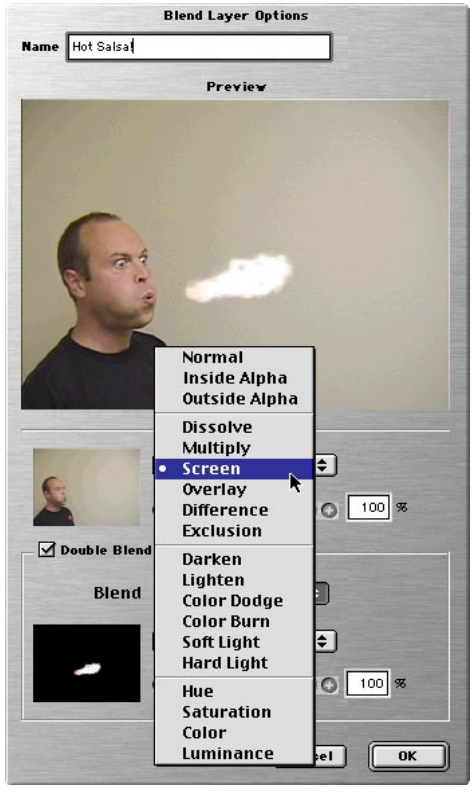
Blend modes are available in three areas of RotoDV:

- **Timeline**—The Mode pop-up on the Blend stack determines how the stack interacts with the other layers. This is the equivalent of the Opacity slider on the Media stack.



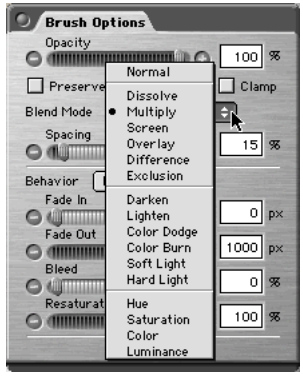
Use the Mode pop-up on the Blend stack to set how the stack interacts with other layers.

- **Double Blend Layer—**The colors in one component layer are blended with another using the selected mode. Tis uses one layer in the blend stack as a way of combining layers.



Blend modes are shown in the Blend Layer Options dialog.

- **Brush Options palette—**Color applied with the Brush tool blends with color already in the layer using the selected mode.



Blend modes are shown in the Brush Options palette.

For Blend layers, you can change the blend mode at any time. Refer to the body chapters for information on setting the blend mode.

In the case of color applied with the Brush tool, the blend result is built into the pixels of that paint layer. This means you must set the blend mode before painting. After you've applied paint, you cannot change its blend mode.

If you're designing a custom brush tool, you'll set the blend mode appropriate for the brush function you want. The blend mode is included when you save a custom brush.

Blend Modes

Normal

The color is applied directly, replacing other colors. This is the default mode.

Dissolve

Color is applied in a scatter pattern. The result is that some pixels of the applied color appear, yet some of the old are still visible.

Multiply

The applied color is used as a multiplier on existing color. As long as the applied color isn't white, the result is always darker.

Screen

The inverse of the applied color is used as a multiplier on the inverse of existing color. As long as the applied color isn't black, the result is always lighter.

Overlay

Overlay uses a mixture of Multiply and Screen, depending on the value of the existing color.

Difference

In each color channel (RGB), the difference between color values is calculated. These differences define the resultant color.

Exclusion

The value of the applied color is used to modify existing color. With white applied, existing color is inverted. Black has no effect. Where the applied color equals the existing color, the result is black.

Darken

The applied color is compared to the existing color. The darker of the two is used.

Lighten

The applied color is compared to the existing color. The lighter of the two is used.

Color Dodge

The existing color becomes less saturated.

Color Burn

The existing color becomes more saturated.

Soft Light

Depending on the value of the applied color, Soft Light lightens (value above 50%) or darkens (value below 50%) existing color. The distance from 50% value determines the amount of lightening/darkening.

Hard Light

Hard Light uses Screen where applied color has value above 50% and uses Multiply where applied color has value below 50%. The distance from 50% value determines the amount of the effect.

Hue

The hue of the applied color replaces the hue of existing color. Existing saturation and luminance are unchanged.

Saturation

The saturation of the applied color replaces the saturation of the existing color. Existing hue and luminance are unchanged.

Color

The hue and saturation of the applied color replace the hue and saturation of the existing color. Existing luminance is unchanged.

Luminance

The luminance of the applied color replaces the luminance of the existing color. Existing hue and saturation are unchanged.

B Field Rendering

About Field Rendering

In interlaced video, the frame is divided into two fields, sometimes identified as "odd" and "even" because they're comprised of the odd and even scan lines, respectively. When the video frame is displayed, first one field is drawn—skipping every other line—then the other field is drawn, filling in the skipped lines. The field that is drawn first is called the dominant field.

Because of this field interlacing, 30 frames-per-second video is more accurately described as 60 *fields*-per-second. When developing video imagery in RotoDV, you can take advantage of this higher level of temporal fidelity to achieve smoother motion. For the best results on material that is destined for video display, you'll want to use field rendering.

To take full advantage of field rendering in your work, you'll need to address it at three phases—on the way into RotoDV, during your work in RotoDV, and on the way out of RotoDV.

On the Way In

Full frame, real-time video capture hardware delivers interlaced fields. The type of source video and your capture settings will determine the field order. Refer to the documentation that came with your hardware for more information.

When rendering animations in a 3D program, you should use field rendering to generate interlaced fields. The 3D program may allow you to specify the field order.

While Working in RotoDV

When you begin a new RotoDV project, you should specify the field dominance that matches your source video clips and intended output.

When you open an interlaced video clip in RotoDV, you should separate the fields according to the field dominance (order) of the source material and project. (Separating fields on a clip is part of pre-processing, covered on page 48.) The field dominance should be consistent throughout all source materials used in the project.

While working in RotoDV, you should use Paint on Fields Mode when developing fast-moving imagery. This allows you to paint into the odd and even fields separately, giving you better temporal fidelity. Paint on Fields Mode is not necessary for static or slow-moving imagery. Fortunately, RotoDV allows you to switch in and out of Paint on Fields Mode, so you can use it only where it's needed. See page 66 for information on working in field mode.

On the Way Out

When you're finished in RotoDV and you're ready to output the work, you should make the movie with the Paint on Fields option set to the correct dominance. This ensures that the project is delivered as 60 fields with the field order your other software and hardware are expecting.

Note: DV video is second field dominant.

It is important to use the same field dominance throughout all phases of the project. In most cases the dominance will be determined by your video input/output hardware. If you accidently use a different field dominance, at some point, the fields will be displayed in the wrong order, and the results will be of lesser quality.

C RotoDV Shortcuts

About Keyboard Commands and Shortcuts

Keyboard commands appear in RotoDV menus opposite the corresponding command. Other shortcuts work by holding down a modifier key before clicking the mouse. Following are tables which list of all RotoDV shortcuts grouped by category.

Menu Command Keys

Table of Menu Shortcuts

Keys	Command
command + A	Select > All
shift + command + A	Select > Frames...
command + B	Edit > Auto Paint
command + C	Edit > Copy
command + D	Select > None
option + command + D	Select > Feather...
option + command + E	Layer > Merge Down
command + F	Effects > Last Filter
shift + command + F	Select > Fill
command + H	Select > Hide Edges (of selection)
command + I	File > Import Clip...
shift + command + I	Select > Inverse...
command + K	Edit > Project Settings...
shift + command + K	Effects > Apply Key...
command + M	File > Make Movie...
command + N	File > New Project...
shift + command + N	Layer > New Paint Layer
command + O	File > Open...
command + Q	File > Quit
command + R	File > Render
shift + command + R	File > Treat As Rendered

Table of Menu Shortcuts

Keys	Command
option + command + R	Edit > Set Real-Time Range...
command + S	File > Save
shift + command + S	File > Save As...
command + V	Edit > Paste
command + W	File > Close
command + X	Edit > Cut
command + Z	Edit > Undo / Redo (command)
command + ;	Edit > Preferences...
command +]	Layer > Move Forward
shift + command +]	Layer > Move To Front
command + [	Layer > Move Backward
shift + command + [	Layer > Move To Back

Transport Shortcuts

Table of Transport Shortcuts

Key	Control
spacebar	toggle Play/Stop
control + spacebar	Record mode
left arrow	Step backward
right arrow	Step forward
option + left arrow	Go to start
option + right arrow	Go to end
control + left arrow	Rewind
control + right arrow	Fast Forward
slash	toggle Play Mode (play-to-end / loop / back and forth)

Tools Palette Shortcuts

Table of Tools Palette Shortcuts

Key/Control	Tool/Mode
B	Brush tool
H	Hand tool
I	Eyedropper tool
L	Lasso tool
M	Marquee tool
Q	Quick Preview tool
V	Move tool
Z	Zoom tool
C	Color material mode
E	Erase material mode
S	Clone material mode
double-click on zoom tool	Zoom document window to 100%

Current Selection Shortcuts

Table of Selection Shortcuts

Key/Control	Action
delete	clear current selection
command + left arrow	nudge current selection left
command + right arrow t	nudge current selection right
command + up arrow	nudge current selection up
command + down arrow	nudge current selection down
option + click/drag	make a copy of current selection

Timeline Shortcuts

Table of Timeline Shortcuts

Key/Control	Action
up arrow	select layer above
down arrow	select layer below
backslash	toggle the active stack (Media Stack / Blend Stack)
click on stack label	activate Media or Blend stack
click on layer label	select layer
double-click on layer label	open layer options dialog
click on layer eye	toggle: show / hide layer
option + click on layer eye	toggle: hide other layers / show all layers
click on thumbnail	select frame and move time cursor
shift + click on thumbnail	select range of frames

Window and Palette Shortcuts

Table of Show/Hide Window and Palette Shortcuts

Key	Action
tab	show/hide all palettes
shift + tab	show/hide all palettes except Button Bar
F1	show/hide Transport palette
F2	show/hide Tools palette
shift + F2	show/hide Tool Options palette
F3	show/hide Brushes palette
shift + F3	show/hide Brush Options palette
F4	show/hide Dabs palette
shift + F4	show/hide Dab Options palette
F5	show/hide Color palette
shift + F5	show/hide Swatches palette
F6	show/hide Info palette
F7	show/hide Clone palette
F8	show/hide Lightbox palette
F12	show/hide Timeline window
shift + F12	update Timeline window

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