

# User's Manual

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Version 3.0

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*Mac Vision*

Koala Technologies  
70 N. Second Street  
San Jose, CA 95113



**DEMO**

**NOT FOR  
RESALE**

 <sup>TM</sup> **Koala**  
Technologies Corporation

# MacVision® Owner's Manual

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## **Colophon**

Software: Koala MacVision®, Letraset ReadySetGo™ and ImageStudio™, Adobe Illustrator™ and Streamline™, Loop Software PictureBook™ Mainstay Capture and Deneba Canvas. Hardware: MacVision, Macintosh II, LaserWriter II NTX and Linotronic 300.

Halftone images scanned by MacVision, enhanced with ImageStudio and output on a Linotronic L300 (133-line screen.)

Fonts: Adobe Optima and Garamond.

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With MacVision it is possible to make images of two dimensional objects such as maps, charts, posters or photographs as well as three dimensional objects of all sizes. MacVision can also be used to digitize images contained on video tapes or laser disks.

As you make digitized images of documents, video frames, and objects, keep in mind that many of these are covered by copyrights owned by their originators or publishers and are protected by the U.S. copyright laws. Under this law, the copyright owner not only has the exclusive right to make and distribute copies of the work, but also has the exclusive right to prepare derivative works based on the original work.

Preparation of a derivative work by using MacVision to make a digitized image of an object and then change shading or gray scale, move or delete parts of the image, or use the original image as a component in a new image without the express permission of the copyright owner constitutes copyright infringement. If you are found to be infringing a copyright, the copyright owner can have your work removed from production and distribution. You can also be required to pay damages as well as legal fees arising from the copyright enforcement action.

Be sure to determine whether materials you are digitizing with MacVision are covered by a copyright or are in the public domain. Many old documents, images and objects are now in the public domain due to actions of their copyright holders or the expiration of the original copyright. Always check to determine the copyright status of any documents or objects you use to make MacVision images.

Whenever you use MacVision to digitize copyrighted work, the safest procedure is to obtain the express permission of the copyright owner or their designated representative. Just as you would not like others to make use of your work without permission, please show respect for the property rights of others.

## **Federal Communications Commission Radio Frequency Interference Statement**

“This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in accordance with the manufacturer’s instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specification in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection such interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one or more of the following measures:

- ▲ reorient the receiving antenna
- ▲ relocate the computer with respect to the receiver
- ▲ move the computer away from the receiver
- ▲ plug the computer into a different outlet so that the computer and receiver are on different circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

The user may find the following booklet prepared by the Federal Communications Commission helpful: ‘How to Identify and Resolve Radio-TV Interference Problems.’

This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402. Stock No. 004-000-0035-4”

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Chapter 1

# Introduction

## Welcome

Congratulations on your purchase of MacVision, the original video digitizer for the Macintosh. With MacVision and a video camera you can capture images from the real world and use them in Macintosh documents, including your desktop publishing, multimedia presentations or HyperCard stacks.

Whether you are a beginner or an expert, you'll find MacVision's simplicity and ease of use lets you produce creative and highly professional images. You can print these images on non-PostScript printers or PostScript laser printers or high-resolution typesetters. And you can quickly and easily experiment with a wide range of lighting, composition and special effects.

**Note:** This manual assumes you know the basics about using a Macintosh computer. If you are unfamiliar with opening icons, selecting buttons, using pull-down menus and sizing windows, read your Macintosh system software manual or take the Macintosh Guided Tour before you continue.

# MacVision Overview

MacVision captures video images using a combination of hardware and software. The MacVision hardware is an external video digitizer with composite video input and serial data output. The digitizer connects to a Macintosh's modem or printer port and converts analog information from a video signal source to digital information that your computer can process. This video signal source can be any NTSC output (or PAL output with the proper hardware.)

MacVision lets you optimize the scanning process to suit individual tastes. You do this by adjusting the contrast and brightness with two large knobs on top of the digitizer. To help you adjust these controls properly, MacVision provides a real-time center column graph display of the image's gray values.

You can preview an image using **Pre•Views**. **Pre•Views** repeatedly updates an image to make it easy for you to see exactly what you'll be scanning — before you start.

After you digitize an image, MacVision holds it in memory and displays the image in a window from where you can modify, store or print it. A digitized image is composed of an array of pixels, or tiny dots, with 8 bits of grayscale resolution per pixel (8-bits gives you 256 shades of gray).

You can crop, enhance and save a MacVision image in one of several file formats such as RIFF, TIFF, EPSF, PICT, PICT2 and MacPaint. MacVision can import RIFF and TIFF files. For more information on file formats, see *Appendix E, File Formats*. For more information on how MacVision works, see *Appendix A, How MacVision Works*.

# What You Need Before Starting

To use MacVision, you need:

- ▲ NTSC (RS-170 or RS-170A compatible) composite video source. Some examples are camcorders or cameras, still video cameras, VCRs (four heads/freeze frame) or laser disk players.

**Note:** The key to obtaining superior MacVision images is to use a high-quality video camera that is NTSC RS-170 or RS-170A compatible. If you have a choice, use a black & white rather than a color camera. With color cameras, images may have patterns that cannot be completely removed. When using still cameras, use one with “full frame” capabilities.

- ▲ Video coaxial cable terminated with a male RCA plug at one end for the MacVision digitizer. At the other end, the cable should have a connector that is compatible with your video equipment’s “video out” port.
- ▲ Any of the Macintosh family of computers: Macintosh Plus, SE, SE/30, II, IIX, IICx IICI, or Macintosh Portable.
- ▲ Macintosh System 6.0.2 or later.
- ▲ Minimum one megabyte of memory — two megabytes is recommended.
- ▲ Hard disk is optional, but recommended for image storage. Storage estimate: three or four images per megabyte.

**Note:** If you have an older version of the Macintosh system software, we suggest you contact your authorized Apple dealer to obtain a later version.

# Macintosh Hardware Considerations

## Macintosh Monitors

You can view 256 shades of gray on a:

- ▲ Macintosh II series computer with an 8-, 24- or 32-bit video card and a monochrome or color monitor.
- ▲ Macintosh SE/30 with a grayscale or color video card and monitor.

With a standard Macintosh Portable, Plus, SE or SE/30, the screen displays a one-bit black and white image.

## Macintosh Printers

MacVision can print images on PostScript-compatible printers or typesetters. You can also print MacVision images using non-PostScript printers.

## MultiFinder

MacVision is compatible with current versions of the Macintosh System, Finder and MultiFinder. When used with MultiFinder, you must run MacVision in the foreground while scanning. You can run other MacVision operations such as printing as background tasks.

If you encounter a *Not Enough Memory* message while using MacVision under MultiFinder, you may be able to increase the application's memory size on the Get Info dialog box. See your Macintosh system software manual for instructions.

## AppleTalk Networks

Some AppleTalk networks such as AppleShare or Tops must be turned off before scanning images with MacVision. A handy way to do this is with an A/B switch. For more information, see *Appendix G, Troubleshooting*. If you want to edit or print MacVision images, leave the network turned on.

## Product Contents

You should find the following items in your MacVision package:

- ▲ MacVision digitizer with cable
- ▲ External power supply
- ▲ Program disk
- ▲ MacVision User's Manual

## How to Use This Manual

This manual contains the following chapters:

*Chapter 1 Introduction* gives an overview of how MacVision digitizes video images. It also lists what you need to use MacVision, what the product includes, how it interacts with other applications and hardware and how to use this manual.

*Chapter 2 Getting Started* shows you how to set up the MacVision hardware and software. It tells you how to start the application and select important video input settings.

*Chapter 3 Using MacVision* includes procedures that walk you through tasks you can perform with MacVision. If you're new to the Macintosh or MacVision, be sure to look through this chapter.

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*Chapter 4 Reference* contains alphabetical topics for menus, tools and windows. The commands on each menu are listed in the order they appear on that menu. After you become comfortable using the Macintosh and MacVision, use this chapter to look up items of interest.

*Appendixes* offer detailed information about how MacVision works; tips on selecting a camera and lighting; background about halftones, grayscale and bitmaps; descriptions of various file formats; MacVision specifications; and troubleshooting instructions.

A *Glossary* and *Index* are included at the end of this manual to explain important terms and to help you find information quickly.

# Getting Started

This chapter takes you through the simple steps for installing and starting MacVision for the first time. Whether you're a new or experienced Macintosh user, be sure to read this chapter while you set up MacVision.

## Installing the MacVision Hardware

1. Connect the RCA male plug of a video coaxial cable into the MacVision digitizer.
2. Connect the other end of the video cable into your video source's "video out" jack.
3. Connect the round DIN connector on the digitizer serial cable into the Macintosh modem or printer port.
4. Plug the digitizer power module into the digitizer and then an AC outlet.

**Note:** Be sure to use a **video-quality cable** rather than an audio cable for connecting the camera to the digitizer. Signal loss and distortion produced by lower quality audio cables will degrade the image. Cable lengths exceeding 20 feet can also reduce the image quality. Good quality video cables and adapters are available from most video and electronics dealers.

If your video source does not have a built-in viewfinder, you can view the video output with a television monitor connected to the video output cable using a “T” or “Y” connector.

## Installing MacVision Software

1. Create a new folder on your hard disk called “MacVision”.
2. Copy the files from the MacVision program disk to the new folder.

The MacVision program disk contains the application and a sample image file. You can install MacVision on a hard disk or run it from a copy of the original disk if you prefer. Be sure to put the original MacVision disk in a safe place.

For information on initializing disks or copying files, refer to your Macintosh system software manual.

## Memory Requirements

If your Macintosh computer has 2MB or more of Random Access Memory (RAM), you can use MacVision with MultiFinder. **If your computer has 1MB of memory, you must use MacVision with the Finder.**

If you decide to use MacVision with MultiFinder, you should specify the amount of RAM before launching the application. Do this by clicking the application icon once and choosing **Get Info** from the File menu. At the bottom of the Get Info dialog box, the suggested (minimum) memory size and the current application memory size appear. You can change the current application memory size.

MacVision requires 900K in RAM — 1,500K is recommended. By increasing the application memory size, you will be able to open more windows and images while running MacVision.

# Starting MacVision

1. Turn on the power to the MacVision digitizer and the video source.
2. Choose **Control Panel** from the Apple menu and click the Monitor icon to verify that your Macintosh monitor is set to the preferred number of gray levels.
3. Double click the MacVision icon to launch the application.

MacVision checks for the proper version of the System and ROM. If the system cannot support the application, MacVision displays a message to let you know.

## Getting Help

1. Choose **Help** from the Apple menu.

Or:

Press the Command-? shortcut keys.

The MacVision Help dialog box appears with a pop-up menu at the top that lists the available topics.

2. Choose a topic from the pop-up menu.

The middle of the Help dialog box displays a Help panel containing an explanation for the topic you chose. If you choose another topic from the pop-up menu, the Help panel is updated to give you new information.

3. Click OK when you finish viewing help information.

# Enable/Disable Watchdog

- ▲ Choose the **Enable Watchdog** or **Disable Watchdog** command from the Video menu.

If this toggle command displays **Enable Watchdog**, the Watchdog command is turned off. If this command displays **Disable Watchdog**, the Watchdog command is turned on.

When the Watchdog command is turned on, it instantly tells you if MacVision becomes unlinked from your video input device. For instance, if the video is turned off or if cables come loose or disconnected. It does this by repeating the System alert sound and flashing the video menu title to warn you.

## Chapter 3

# Using MacVision

This chapter contains step-by-step procedures to help you quickly start using MacVision.

Before starting this chapter, you should be familiar with the basics of using the Macintosh. Also, you should have already installed MacVision. For more information about installing and starting MacVision see *Chapter 2, Getting Started*.

## Selecting Video Input Options

1. Choose **Input Options** from the Video menu.
2. Verify that the input options match your video and Macintosh environment and the desired input quality.

The **serial port** is initially set to Modem; if you have connected the digitizer to the printer port, select Printer.

The **video standard** is initially set to NTSC (the system used in the U.S., Japan, and most of North and South America). If your video equipment uses PAL (the system used in Europe and other countries), select PAL.

For more information about these input options, see *Chapter 4, Reference*.

# Using Pre•Views

## Adjusting B & C (Brightness and Contrast)

1. Turn on any lights and follow your video system instructions to set the lens and adjust the controls. For more information about lighting, see *Appendix C, Tips on Lighting*.
2. Choose **Pre•Views** from the Video menu.

Adjust B & C is the default option selected on the Pre•Views dialog box. It displays a continuously updated bar chart that shows gray values sampled from the video image. MacVision samples a column down the middle of the video frame.

If you are using a video camera, you can get an intuitive feel for how this feature works by moving your hand in front of the camera lens while watching the levels of gray change on the bar chart.

3. Examine the gray values on the bar chart to determine whether to adjust the brightness.
4. Turn the recessed Brightness knob on top of the MacVision digitizer clockwise to increase the brightness or counterclockwise to decrease it. You will see the brightness changes as you turn the knob.

Don't force the rotation of the knobs since this can damage the digitizer.

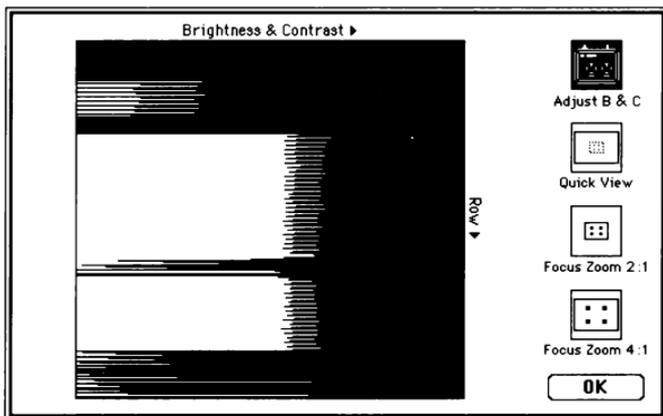


Figure 3-1 The Adjust B & C Graph.

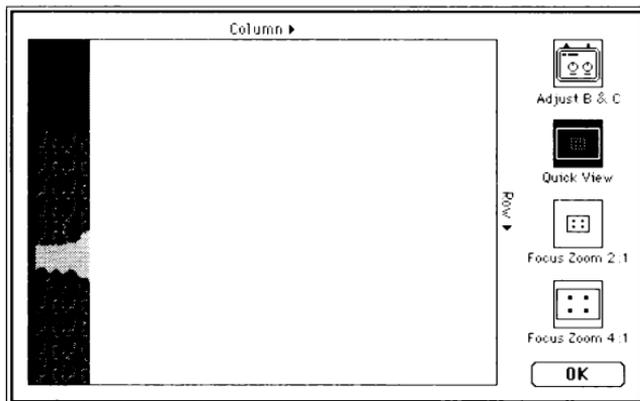
5. Compare the distance between black and white lines on the bar chart to decide whether to adjust the contrast.  
  
If the ends of the black and white lines are far apart, the contrast is high in the image sample. If the ends of the black and white lines are close together, the contrast is low.
6. Turn the Contrast knob on top of the MacVision digitizer clockwise to increase the contrast or counterclockwise to decrease it.

**Note:** To put the Brightness and Contrast in the middle, turn the knob until the outer edge of its fingertip-shaped indentation points toward the raised plastic letters that spell the word: Brightness or Contrast.

For more information about adjusting the brightness and contrast, see the Video Pre•Views topic in *Chapter 4, Reference*.

## Previewing with Quick View

1. Choose **Pre•Views** from the Video menu.
2. Click Quick View.



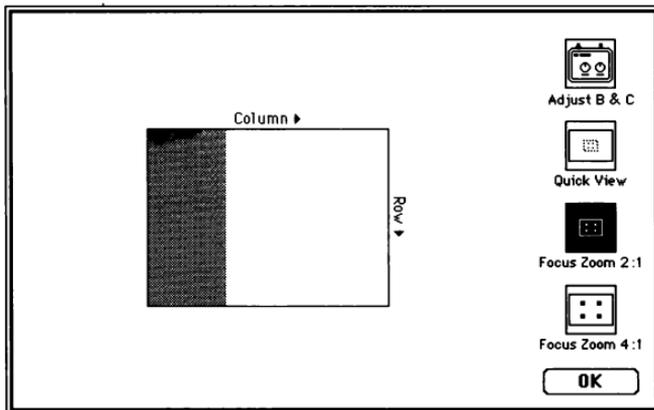
*Figure 3-2 The Pre•Views dialog box.*

The Pre•Views dialog box displays a real-time, low-resolution preview of the digitized video image. Use Quick View to quickly check the lighting, brightness and contrast settings.

Quick View, like Adjust B & C, continuously updates the information it displays. As you make changes with the Brightness and Contrast knobs, you immediately see a change in the Quick View display.

## Focus Zoom 2:1

1. Choose **Pre•Views** from the Video menu.
2. Click Quick View.
3. Drag the focus box to any part of the image if you want to select a different area.
4. Click Focus Zoom 2:1.

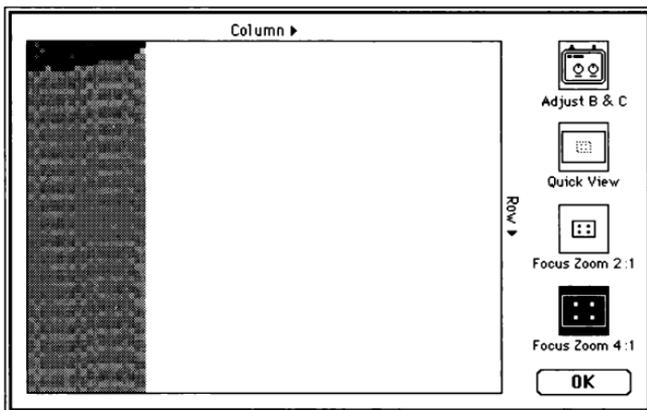


*Figure 3-3 The Focus Zoom 2:1 dialog box.*

The Focus Zoom 2:1 area displays a preview of the digitized video image inside the focus box.

## Focus Zoom 4:1

1. Choose **Pre•Views** from the Video menu.
2. Click Quick View.
3. Drag the focus box to any part of the image if you want to select a different area.
4. Click Focus Zoom 4:1.



*Figure 3-4 The Focus Zoom 4:1 dialog box.*

The Focus Zoom 4:1 area displays a close-up view of the digitized video image that you can use to focus the image.

## Scanning an Image

1. Choose **New** from the File menu.
2. Select a Capture Mode and Pixel Depth.

The default choices are Normal and 8-bit (256 grays), respectively.

3. Click OK.

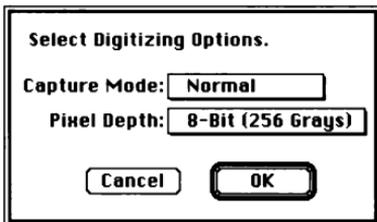


Figure 3-5 The New dialog box.

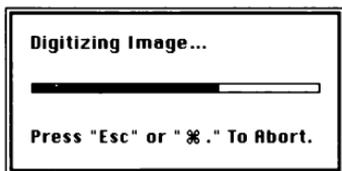


Figure 3-6 Scanning Progress message box.

MacVision displays a message box with a horizontal bar that fills up with black to show you how the scan is progressing.

**You may cancel the scan at any time while it progresses by pressing Esc or Command-Period.**

The time this process takes varies depending upon your Capture Mode choice. When the scan is complete, the new image displays in the MacVision window. You can modify this image using commands on the MacVision Edit, Style or Graymap menus. You can also save the image for use with other applications.

**Note:** If the resulting image is distorted, you can use the Swap Fields command to correct it. For more information about swapping fields, see *Chapter 4, Reference*.

# Saving an Image

1. Choose **Save** or **Save As** from the File menu.
2. Select the file format, pixel depth, compression and byte ordering options you prefer.
3. Type a name for this image file.
4. Click Save.

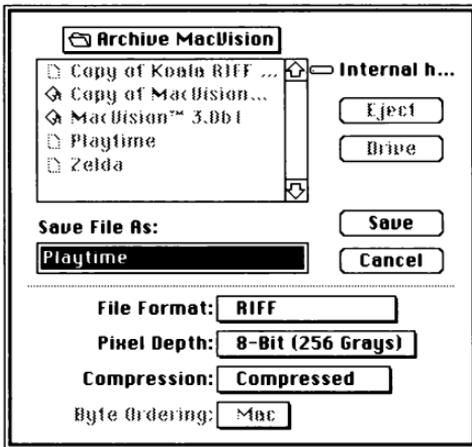


Figure 3-7 The Save As dialog box.

MacVison supports most graphic **file formats**. RIFF is the default file format. You can select the RIFF, TIFF/Grayscale, TIFF/Bitonal, EPSF, PICT/Version-1, PICT/Version-2 or MacPaint file formats for use with other applications. If you're not sure which file format to select, see the chart listing many popular applications in *Appendix E, File Formats*.

You can select the **pixel depth** for an image when you save it. You also had an opportunity to set the pixel depth when you chose **New** from the File menu.

**Compression** is available with the RIFF file format. Compression decreases the size of the image file until you choose to expand it with any application that supports these formats. This feature is handy for storing images or copying them since you use less storage space.

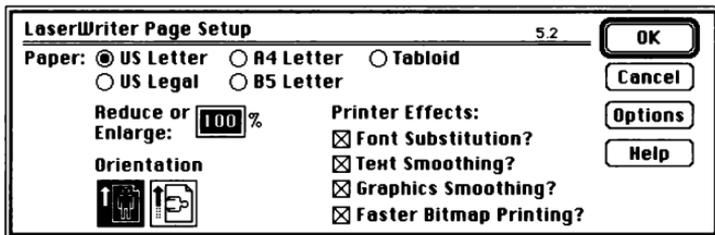
The **byte ordering** option always defaults to byte ordering for the Macintosh. If you need to transfer an image for use on an IBM PC or compatible or PS/2 computer, select PC.

## Printing an Image

### Specifying the Page Setup

1. Choose **Page Setup** from the File menu.

The Page Setup dialog box appears with the usual printing options such as paper size and orientation.



*Figure 3-8 The Page Setup dialog box for the LaserWriter.*

2. Select the page setup options you want.
3. Click OK.

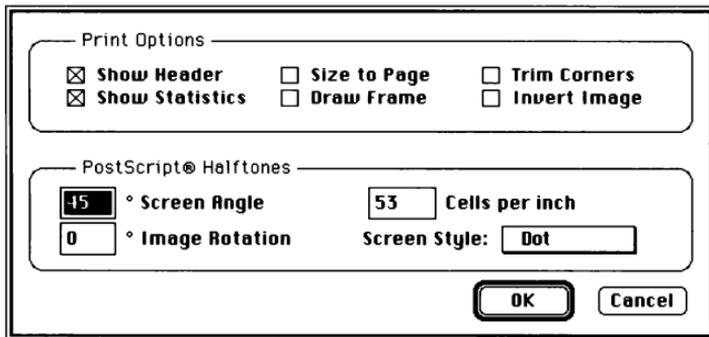
For more information about **Page Setup**, see your Macintosh system software manual.

# Print

1. Choose **Print** from the File menu.

The Print dialog box appears with custom options for printing MacVision images.

Several **Print Options** are available. Show Header and Show Statistics are turned on as the default choice. You can also select Size to Page, Draw Frame, Trim Corners or Invert Image.



*Figure 3-9 The custom MacVision Print dialog box.*

## **PostScript Halftone Options for PostScript Printers**

If you are using a PostScript printer, you can also select various PostScript Halftone options. The Screen Angle defaults to 45°, a black & white printing choice that results in optimum output.

You can select the Cells per Inch, an Image Rotation in degrees and one of several Screen Styles (or dot shapes) for the screening process. You can also select a halftone pattern for these dots from the Style Halftone submenu.

## Non-PostScript Printers

MacVision prints the image as a bitmap. Though your printer doesn't support the PostScript Halftone options, you can customize the pattern of dots in this bitmap by selecting a halftone pattern from the Style Halftone submenu.

2. Select the MacVision print options you want for printing.
3. Click OK.

The standard Macintosh Print dialog box appears.

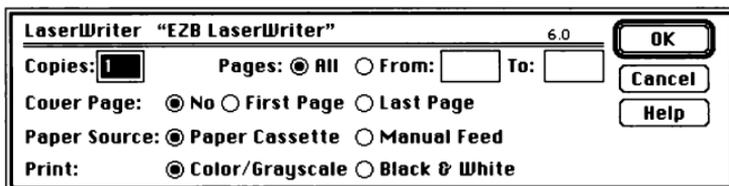


Figure 3-10 The LaserWriter standard Print dialog box.

4. Select the Macintosh print options you want for printing.
5. Click OK.

For more information about MacVision print options, see the File **Print** topic in the *Chapter 4, Reference*. For more information about the standard Macintosh print options, see your Macintosh system software manual. For more information about halftones, see *Appendix D, About Halftones, Grayscale and Bitmaps*.

## Working With MacVision

For more information about the image enhancement features in MacVision such as posterizing or using the B & C or Transfer tools, see *Chapter 4, Reference*.

# Quitting MacVision

- ▲ Choose **Quit** from the File menu.

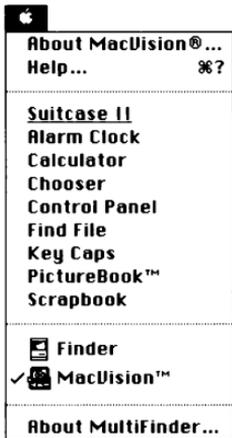
If you have made changes to an image file since it was last saved, MacVision displays a dialog box that lets you decide whether or not to save these changes.

## Chapter 4

# Reference

This chapter contains alphabetical topics for MacVision menus, commands in those menus, dialog boxes and cursors.

## The Apple Menu



The Apple menu contains two MacVision commands: **About MacVision** and **Help**.

Desk accessories that you have installed using the Font DA/Mover are available while you use MacVision.

If you use MacVision with MultiFinder, the bottom part of this menu contains a list of open applications and an **About MultiFinder** command.

### About MacVision® ...

Choose **About MacVision** for the MacVision version number.

### Help... (Command-?)

Choose **Help** to view helpful information about MacVision.

# Crosshair

The Crosshair cursor lets you select areas of an image to copy or crop. Do this by dragging diagonally to enclose the area of interest with an outline of a box. To cancel the selection, click anywhere inside the image window. Outside an image window the cursor changes to a pointer. When you move the cursor into an image window, it becomes a Crosshair cursor.

## Edit Menu

Edit	
Undo	⌘Z
Cut	⌘H
Paste	⌘V
Clear	
Copy As...	⌘K
Select All	⌘A
-----	
Crop To Selection	⌘-

The Edit menu contains several standard Edit commands including **Undo**, **Cut**, **Copy**, **Paste**, **Clear** and **Select All**.

It also offers two MacVision commands: **Copy As** and **Crop To Selection**.

### Undo (Command-Z)

Choose **Undo** to reverse the last undoable action you've taken. To perform an undo, MacVision needs enough available memory to store a "before" and "after" copy of an image for the last change made.

For example, to undo an image crop, MacVision must have enough memory to store copies of the image before and after you crop.

### Cut (Command-X)

This dimmed command is available for use with desk accessories that might be used in conjunction with MacVision. It has no direct affect on MacVision images.

## Copy (Command-C)

Select part of an image to be copied or choose **Select All** from the Edit menu. Then choose **Copy** to place a copy of a MacVision image on the Clipboard in the PICT format. From the Clipboard, you can copy or cut and paste the image into other Macintosh applications. If your Macintosh is using Color QuickDraw, copying passes grayscale information with the image.

## Paste (Command-V)

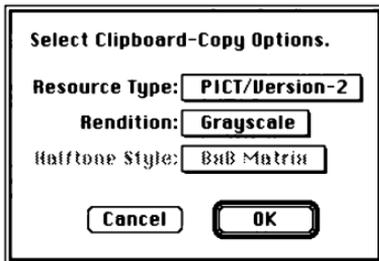
This dimmed command is available for use with desk accessories that might be used in conjunction with MacVision. It has no direct affect on MacVision images.

## Clear (Command-B)

This dimmed command is available for use with desk accessories that might be used in conjunction with MacVision. It has no direct affect on MacVision images.

## Copy As... (Command-K)

Select part of an image to be copied or choose **Select All** from the Edit menu. Then choose **Copy As** to select the options that you want to use for copying an image to the Clipboard.



*Figure 4-1 The Copy As dialog box.*

On the Copy As dialog box, you can specify a resource type of PICT1 (the original black and white PICT format), or PICT2 (the color and grayscale PICT format). You can also set the image rendition to either Grayscale or Halftone.

And if you select Halftone, you can also select a Halftone Style such as 8 by 8 Matrix, Tapestry, Line Screen, and so on.

## Select All (Command-A)

Choose **Select All** to select the entire MacVision image.

## Crop To Selection (Command--)

Choose the **Crop To Selection** command to keep only the currently selected part of an image. Cropping lets you view only the part of an image you want to work with.

# File Menu

File	
New ...	⌘N
Open ...	⌘O
-----	
Close	
Save	⌘S
Save As ...	
-----	
Page Setup ...	
Print ...	⌘P
Print Selection ...	
-----	
Quit	⌘Q

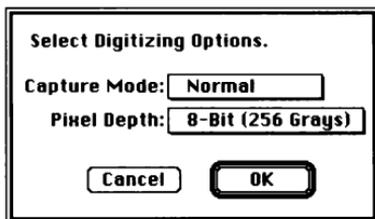
The File menu contains several standard Macintosh commands that you may already know how to use: **New**, **Open**, **Close**, **Save**, **Save As**, **Page Setup**, **Print** and **Quit**. These commands often include special MacVision options.

For example, the **Page Setup** command displays special MacVision options at the bottom of the standard dialog box that let you select a file format and pixel depth. The **Print Selection** command lets you print only the selected area of an image.

## New (Command-N)

**Note:** Before you choose **New** to scan an image, you should adjust the contrast and brightness controls on top of the MacVision digitizer. Do this while using the Video Pre•Views dialog box options to help you. For example, you can examine a bar graph showing the gray values found in a column at the center of the image. You can also preview the image itself and use the Focus options to help you focus your video camera.

Choose **New** when you are ready to scan a new image. Before scanning starts, the Select Digitizing Options dialog box appears to let you select a capture mode and pixel depth for the image you are about to scan.



*Figure 4-2 The Select Digitizing Options dialog box.*

### **Capture Mode**

The Capture Mode pop-up menu lets you select the video capture method you want to use. The default is Normal. You can also choose Enhanced, Interpolated or Field.

A field is a collection of horizontal scan lines making up half a video frame. The even field contains even numbered scan lines and the odd field contains odd numbered scan lines. Each of the Capture Mode options determine how MacVision manipulates the image (a video frame) that it receives from your video output device

- ▲ The **Enhanced** option offers the highest quality because it samples two consecutive frames of a video image. With the extra video frame, MacVision can filter out any undesirable information that may occur on every other frame. Scanning with Enhanced takes twice as long, but if you are using a color video output device, Enhanced can often eliminate unwanted patterns that would otherwise mar an image.
- ▲ With **Normal**, the default option, MacVision digitizes two fields and interlaces them to build an image. If you are using a black and white video input device, this is probably the best Capture method to select.
- ▲ With the **Interpolated** option selected, MacVision examines one field and averages the values to create the other field. For example, if the odd field is examined, lines 1 and 3 are averaged to create a value for line 2, lines 3 and 5 are averaged to create a value for line 4, and so on. This option is a good choice if you are using lower-quality video output devices.
- ▲ If you select the **Field** capture option, MacVision digitizes the image using only one field. Since this method saves memory and storage space, it is a good choice if you have limited memory or storage space.

For more information about how MacVision scans video images, see *Appendix A, How MacVision Works*.

## **Pixel Depth**

MacVision will always digitize an image using an 8-bit pixel depth (256 grays). The Pixel Depth pop-up menu lets you tell MacVision to interpret, display and save that video image using 256, 64 or 16 gray levels. 256 gray levels is the default choice and the one that results in the highest possible image quality.

With 256 shades of gray, MacVision interprets a digitized image using an 8-bit pixel depth. For 64 shades of gray, MacVision interprets using a 6-bit pixel depth. And for 16

shades of gray, MacVision interprets using a 4-bit pixel depth. The lower the pixel depth, the lower the memory and storage space requirements.

**Note:** If you choose 64 or 16 gray levels, you would need to rescan the image if you decided later that you need a higher resolution of 256 or 64 gray levels respectively.

After you select the Capture Mode and Pixel Depth options and click OK, MacVision starts digitizing the image. While MacVision scans a video image and assembles it in memory, a message displays with a progress indicator to show you how the scan is progressing.

When the scan is done, the resulting image displays in a new image window. MacVision sizes the window to take advantage of your Macintosh computer's screen size. To see the entire image quickly, choose the **Fit To Window** command.

## Open (Command-O)

Choose **Open** to open an existing image. MacVision can open RIFF and TIFF (grayscale) files, so you can display files in both these formats in the Open dialog box.

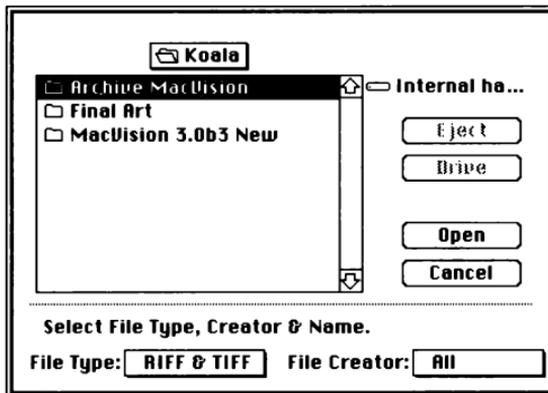


Figure 4-3 The Open dialog box.

At the bottom of the Open dialog box are two pop-up menus you can use to select a file type or file creator.

## File Type

Select a file type to display both RIFF and TIFF files, only RIFF, only TIFF or All files. This option lets you selectively browse through stored files. MacVision opens RIFF or TIFF files exclusively, so even though you can view all files, you can only open RIFF or TIFF files.

## File Creator

You can select to view all files or only MacVision files in the Open dialog box.

**Note:** If you save a MacVision image in the PICT, PICT2, EPSF or MacPaint format, you cannot reopen them using MacVision.

Choose the View command to select an image file to bring to the top of the desktop. Image files are large (200 to 300 kilobytes). If your Macintosh does not have enough memory to open another image, a message displays to let you know.

## Close

Choose the **Close** command to close the active, or topmost, image window when you are finished. If you have not saved the changes you've made to an image, MacVision displays a dialog box asking if you want to save those changes before closing the window.

You can also close a file by clicking the close box in the upper left corner of the window.

## Save (Command-S)

Choose **Save** to store the latest changes you have made to an image and continue working with it. If the image has never been saved, a dialog box displays so you can name the file and decide what folder and/or disk to store it in. This dialog box is the Save As dialog illustrated in the File **Save As** topic.

If you have not made changes since you last saved, the Save command is dimmed. When you save an image, it remains in the active window. The file remains untitled and unsaved as a MacVision file until you save it in the RIFF format.

For information about selecting a file format and other output options before saving, see the File **Save As** topic.

With the RIFF compressed format, you can select how many bits per pixel to use. You can also set the bits per pixel when scanning an image with the **New** command. This option determines whether you want 256, 64 or 16 gray levels in an image. Likewise, it affects the size of an image file you save in the RIFF compressed format. See the File **New** topic.

## Save As...

Choose **Save As** to save a new file, to save a copy of an existing file with a different name or to save a file to a different folder or disk. You can also specify file output options that indicate the file format, pixel depth, state of compression and byte ordering for an image you will save.

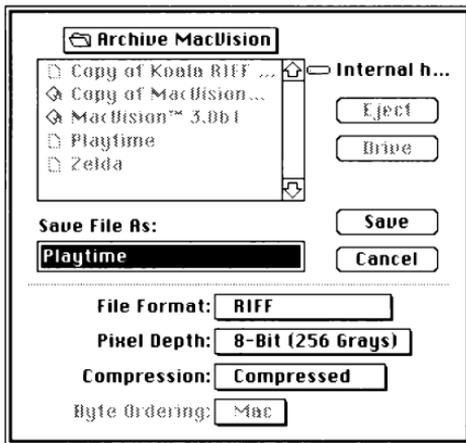


Figure 4-4 The Save As dialog box.

## **File Format**

You can save an image file in these file formats: RIFF, TIFF/Grayscale, TIFF/Bitonal, EPSF, PICT/Version-1, PICT/Version-2 and MacPaint. The RIFF file format is the default choice and native format for MacVision.

## **Pixel Depth**

You can select how many bits per pixel to use for an image when you save using the RIFF compressed file format. This option specifies whether you want 256, 64 or 16 gray levels in an image. It also affects the size of an image file you save. For more information, see the File **New** topic.

## **Compression**

If you choose the RIFF file format, you can also select whether or not to compress the image. Compression packs information about an image more tightly in the file to save storage space on disk.

## **Byte Ordering**

To transfer a MacVision image file to an IBM PC or PS/2 computer or their compatible computers, change the byte ordering before you save the file. When you transfer the file using a send/receive utility or over a network, it will be in the correct format for either of those computers.

**After you save a file with PC byte ordering, MacVision can no longer open it.**

## Page Setup...

Choose **Page Setup** to select options from the standard Macintosh Page Setup dialog box. This dialog box lets you select the paper size, an enlargement or reduction percentage, the page orientation, printer effects and other options. See your Macintosh system software manual for more information about these options.

## Print... (Command-P)

Choose **Print** to print the image in the active window. A MacVision Print dialog box displays to let you select printer options. It also lets you set parameters for PostScript halftones.

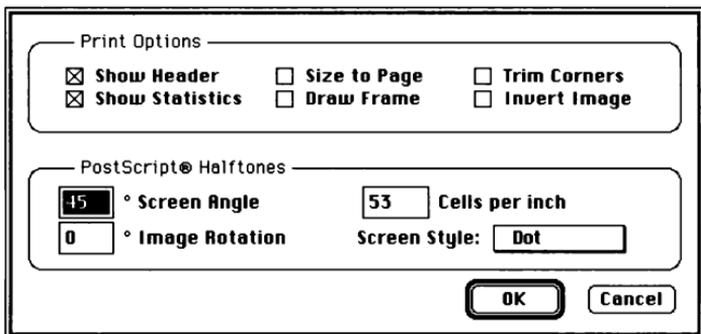


Figure 4-5 The MacVision Print dialog box.

### Print Options

The default choices are to show a header and statistics for an image. You can also size an image to use the available page size, draw a frame around an image, trim the corners of an image to give it a rounded appearance or invert an image.

### PostScript Halftone Options

You can select the screen angle, the number of cells per inch, the image rotation and the screen style.

The standard halftone **screen angle** used by lithographers for black and white images is 45 degrees since it is the least noticeable. The default number of **cells per inch** is 53. You can select dot, line, square, oval, square dot, lined dot, triangle, bubble or hourglass shaped dots from the Screen Style pop-up menu.

**Note:** Not all of the possible combinations of cells per inch and screen angles are supported by all PostScript printers. If you specify a combination that isn't available for your printer, it uses the closest available combination. See your printer manual for more information.

For more information on halftones, see *Appendix D, About Halftones, Grayscale and Bitmaps*.

## The Standard Macintosh Print Dialog Box

After you specify the custom print options for MacVision and click OK, the standard Macintosh Print dialog box displays.

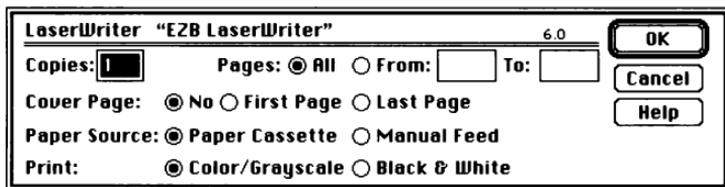


Figure 4-6 The standard Macintosh Print dialog box.

The options in this dialog box let you select the number of copies to print, a page range and so on. See your Macintosh system software manual for more information about these options.

## Print Selection...

Choose the **Print Selection** command to print the currently selected area of a MacVision image.

When you choose the **Print Selection** command, a MacVision Print dialog box appears that lets you select custom options for MacVision images (see Figure 4-5). After you select the special print options for MacVision images and click OK, the standard Macintosh Print dialog box appears to let you select the usual print options.

If you have not selected part of an image, the **Print Selection** command is dimmed on the menu.

## Quit (Command-Q)

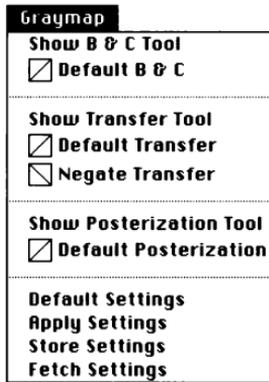
The **Quit** command gives you the choice to save each file you have changed. Then it closes all MacVision windows and returns you to the Finder.

## Grabber

The Grabber cursor combines the functions of the horizontal and vertical scroll bars. You can use the Grabber for more direct movement of an image inside a window.

Select the Grabber by pressing the Option key while the cursor is inside an image window. If you press and hold down the mouse button, you can release the Option key and use the mouse to scroll an image around in the window.

# Graymap Menu

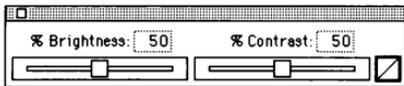


The Graymap menu contains several commands that let you work with the B & C (Brightness and Contrast) and Transfer graymaps for an image.

You can show and hide the B & C, Transfer or Posterization tools. You can reapply default B & C, Transfer, or both graymap settings. You can reverse the Transfer graymap. And you can store, fetch, and apply graymap settings.

## Show/Hide B & C Tool

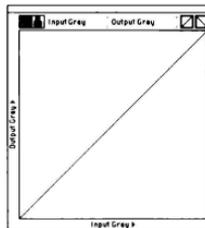
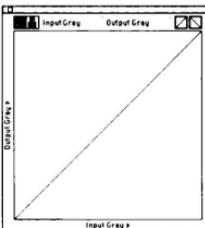
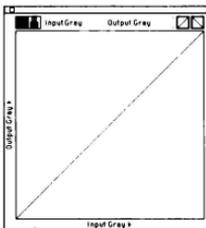
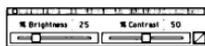
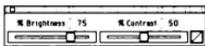
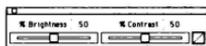
Choose **Show B & C Tool** to adjust contrast and brightness. When you do this, MacVision changes this command to **Hide B & C Tool** and the B & C Tool dialog box appears.



*Figure 4-7 The B & C Tool dialog box.*

You can change the percentage of brightness or contrast by dragging the sliders left or right.

When you finish working with the B & C Tool, click the close box in the upper left corner or choose **Hide B & C Tool** to close the dialog box.



Original Brightness

Increased Brightness

Decreased Brightness

*Figure 4-8 Changing an image's brightness.*

For more information about the graymap shown in these illustrations, see the **Show/Hide Transfer Tool** topic.

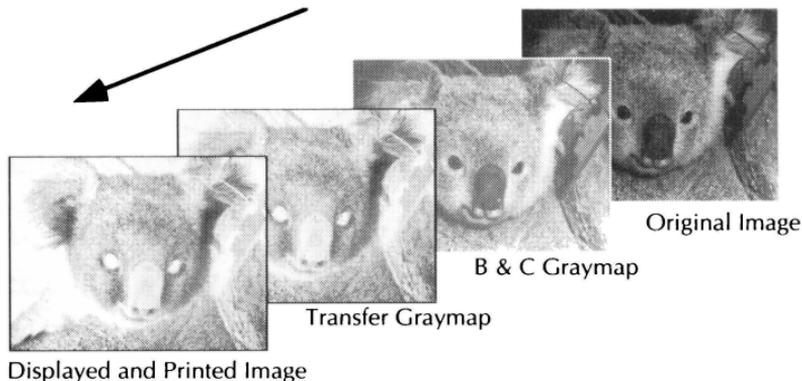
## Default B & C

Choose the **Default B & C** command to clear any changes you've made to the Brightness & Contrast graymap.

## Show/Hide Transfer Tool

Choose the **Show Transfer Tool** command to work with the Graymap Editor. Choose **Hide Transfer Tool** or click the dialog box's close box to hide the Transfer Graymap Tool when you finish.

The Transfer Graymap Tool lets you assign, or map, gray values that will display on the screen and be printed in place of the actual gray values in an image. Gray values in the original image remain the same so you can try out different effects and return to the original image whenever you like.



*Figure 4-9 Graymaps act like filters between the original and the output image.*

You specify gray values for the Brightness and Contrast (B & C) graymap using the B & C Tool. The changes you make there affect the B & C graymap (see Figures 4-8 and 4-9).

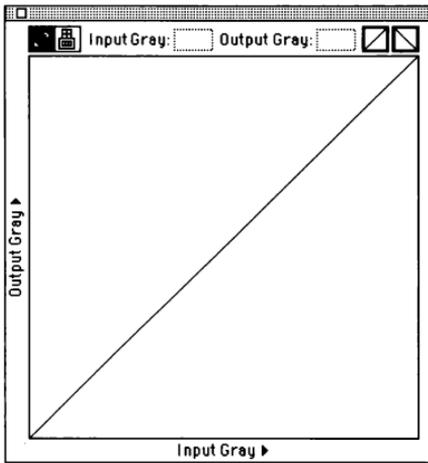
You can remap individual gray values on the Transfer graymap using the Transfer Tool (see Figures 4-9 and 4-10).

### **Draw Tool**

MacVision starts with the Draw tool selected. It is the best choice for making “freehand” changes to the graymap.

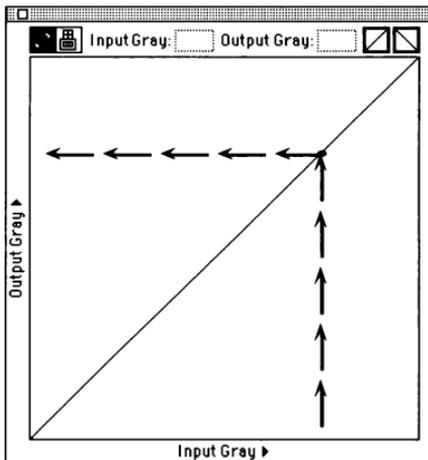
### **Plot Tool**

Click the Plot tool if you want to make very precise graymap changes — one gray level at a time. Use this tool in conjunction with the Input Gray and Output Gray indicators at the top of the dialog box.



*Figure 4-10 The Transfer Graymap Tool.*

The Transfer Graymap dialog box displays a graph showing the relationship between the original image's gray values (Input) and the currently displayed gray values that go to your screen or printer (Output). Input gray values are on the horizontal axis and output gray values are on the vertical axis.



*Figure 4-11 Gray Value Input and Output.*

When the graph displays a diagonal line from the lower left to the upper right corner as it does initially, there is a 1:1 (one to one) relationship between input and output. If the line is reversed (from the bottom right to the top left), the graph indicates that the output is opposite to the input. This produces an image that looks like a photographic negative.

The pixel depth specified in the Video Input Options dialog box also specifies the number of gray values available for an image in the Transfer Graymap dialog box.

<u>Pixel Depth Options</u>	<u>Gray Values in Graymap</u>
8 (256 Gray Levels)	256
6 (64 Gray Levels)	64
4 (16 Gray Levels)	16

For a 256-gray level image, each gray value is assigned a number between zero (white) and 255 (black). If you move the cursor inside the graph, the numbers in the input and output boxes at the top of the Graymap Editor change. These input and output numbers show the output gray value that would be used in place of the input gray value if you clicked at the current cursor location.

### **The Transfer Graymap**

If you draw new lines in the graph, you are changing the Transfer graymap. If you adjust the Posterization or click the graymap icons, you are also changing the Transfer graymap. The Transfer graymap is represented on the graph by a solid line.

### **The Brightness & Contrast Graymap**

If you drag the sliders to increase or decrease the Brightness or Contrast controls in the B & C Tool dialog box, you are changing the B & C graymap. The B & C graymap is represented on the graph by a dotted line.

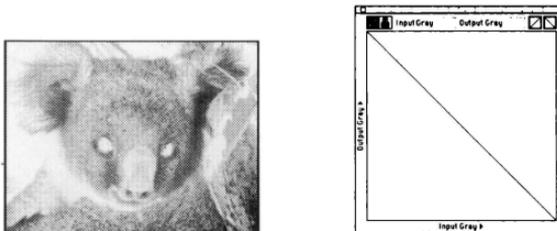
**Note:** As you make changes to either the Transfer or B & C graymap, MacVision changes the image on screen. This way you can see the results of any changes as you make them.

## Default Transfer

Choose the **Default Transfer** command when you want to clear any changes you've made to the Transfer graymap.

## Negate Transfer

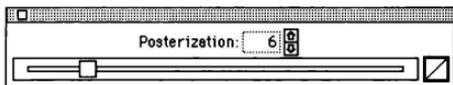
Choose the **Negate Transfer** command to reverse the Transfer graymap. This is a fast way to create a photographic negative effect.



*Figure 4-12 Negating the Transfer map.*

## Show/Hide Posterization Tool

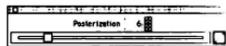
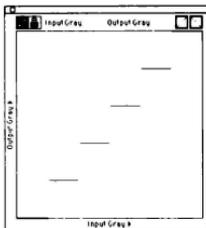
Choose the **Show Posterization Tool** command when you want to select the number of gray levels for an image. Using fewer gray levels creates a poster-like effect.



*Figure 4-13 The Posterization Tool dialog box.*

When you finish posterizing an image, choose the **Hide Posterization Tool** command or click the close box to close the dialog box.

You can drag the slider left or right or click the Up or Down Arrow buttons to change the poster levels in an image. To create a posterized effect try using six or eight levels of gray.



*Figure 4-14 Posterizing an image at six levels of gray.*

## Default Posterization

Choose **Default Posterization** when you want to quickly return an image to the original number of gray levels: 256, 64, or 16 depending upon the pixel depth you set initially.

## Default Settings

Choose **Default Settings** to revert to the default graymap settings: 50% and 50% for the B & C graymap; 1:1 for the Transform graymap; and 256, 64 or 16 gray levels for posterization depending on the pixel depth you set initially.

## Apply Settings

Choose **Apply Settings** to apply the graymap settings to the image. This also resets the graymap settings to default values.

## Store Settings

Choose **Store Settings** to store the current graymap settings so you can fetch them later with the Fetch Settings command. The last stored settings are saved when you quit MacVision. They are restored when you launch the application. This is a good way to create the same effect easily for several images.

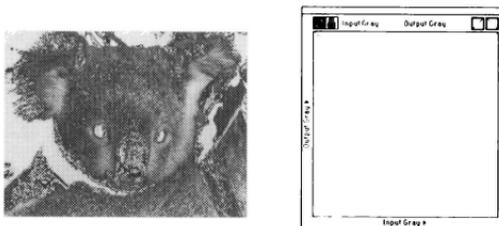
## Fetch Settings

Choose **Fetch Settings** to recall the last graymap settings you stored with **Store Settings**.

## Experimenting with Graymaps

You should experiment with the Graymap Tools since the effects are cumulative: you can produce some fascinating effects.

For example, you might try solarizing an image. A solarization effect is one that can happen in a darkroom when light hits a partially developed print. You can simulate this effect by reversing some gray levels on the Transfer graymap.



*Figure 4-15 Solarize an image by darkening light areas.*

# MacVision Image Window

The MacVision image window, illustrated in Figure 4-16, is a standard Macintosh document window. The window also contains a menu bar and scroll bars.

After you scan an image, it appears in an image window. As with other Macintosh document windows, you can change the size and position of a MacVision image window by dragging the bottom edge or by clicking the Zoom box. You can use the scroll bars to view parts of an image that extend beyond the edges of an image window.



*Figure 4-16 The MacVision Image Window.*

# Pointer

The Arrow Pointer is a standard Macintosh cursor that you use to select something on the desktop. For instance, you use the Arrow Pointer to choose commands from menus, click buttons and so on. In MacVision, the Pointer is available outside a MacVision image window, in dialog boxes and within the horizontal and vertical scroll bars.

## Style Menu



The Style menu contains the **Grayscale** command and **Halftone** submenu that let you choose a grayscale or halftone image type. MacVision defaults to the best image type available for the Macintosh you are using.

This menu also contains the **Hue Setup**, **Smoothen**, **Shave**, **Soften**, **Sharpen**, **Shadow** and **Shape** commands that let you use special effects to enhance an image. The best way to learn about these special effects commands is to experiment with them. The **Smoothen**, **Soften**, **Sharpen**, **Shave**, **Shadow** and **Shape** commands are cumulative. Using them repeatedly and mixing the commands can produce a wide variety of effects.

### Grayscale

**Grayscale** is the default image type when you use MacVision on a Macintosh with grayscale capabilities. When using grayscale images with a PostScript printer, you can select PostScript Halftone options in the MacVision Print dialog box.

## Halftone Submenu



MacVision offers 11 halftone patterns for simulating halftones on low-resolution output devices such as screens or printers.

### Halftone Patterns

The **Halftone** submenu lets you select a halftone pattern for rendering the original grayscale image. The 8 x 8 ordered matrix is the default halftone pattern.

Although the pattern names provide some indication of the effect they produce, the best way to understand their effects is to try them out. You can apply a different halftone pattern to different parts of an image by selecting the area and choosing a Halftone pattern.

For more information about halftones, see *Appendix D, About Halftones, Grayscale and Bitmaps*.

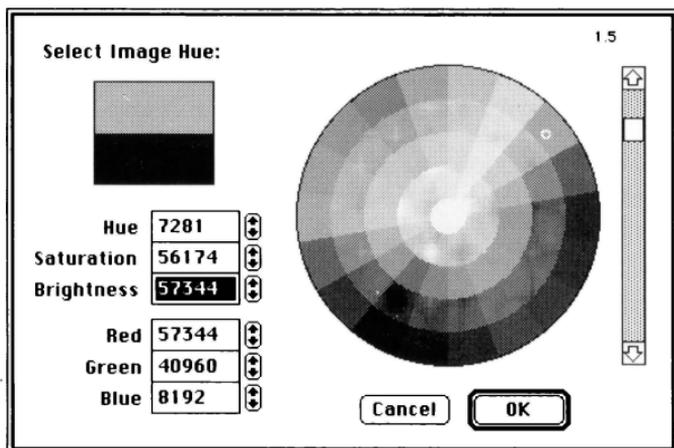
### Hue Setup...

Choose Hue (if you have a color monitor and Monitors in the Control Panel is set to Color) to select a color that should replace white in an image. When you choose **Hue Setup**, the standard Macintosh Color Picker dialog box displays as illustrated in Figure 4-17.

If you aren't familiar with the HSB or RGB color models, you can easily select a color on the color wheel. You might note the three values for either color model so that later you can match a hue exactly.

## The Select Image Hue box

The Select Image Hue box at the top left of the dialog box displays the current color in the bottom half of the box. It displays the new color you picked in the top half of this box.



*Figure 4-17 The standard Macintosh Color Picker dialog box lets you select a color using the HSB color model, the RGB color model or the color wheel.*

### Hue, Saturation and Brightness

Hue, Saturation and Brightness is called the HSB color model. If you use HSB regularly, you can click the Up or Down Arrow buttons or type the value for hue, saturation and brightness.

### Red, Green and Blue

Red, Green and Blue is called the RGB color model. If you use this model, you can either click the Up or Down Arrow buttons to select a color or type the red, green and blue values directly in the text boxes.

## The Color Wheel

This color wheel lets you select a given hue and saturation simultaneously. The center of the wheel displays zero saturation with no hue mixed in. Colors at the outer edge of the wheel have maximum saturation with no gray mixed in — they are pure hues.

Click the color in the color wheel that you want to select and the new color displays in the top half of the Select Image Hue box.

## Experimenting with Hues

You can create a sepia image, for instance, by selecting a brown color with a hint of violet. Then choose **Negate Transfer** from the Graymap menu to reverse the image. The brown now replaces black instead of white in the image, like the sepia drawings that were created in the 18th century.

## Smoothen

Choose **Smoothen** to blend the edges in the selected portion of an image. If you haven't selected part of an image, MacVision smooths the entire image. **Smoothen** is useful for creating an “out of focus” effect or for reducing high contrast selectively.

## Shave

Choose **Shave** to downplay small projections along the edges in the selected portion of an image. If you haven't selected part of an image, MacVision shaves the entire image. Shave is useful for toning down jagged edges.

## Soften

Choose **Soften** to decrease contrast in the selected part of an image. If you haven't selected part of an image, MacVision softens the entire image. **Soften** is useful for reducing moiré patterns. If you soften an image to reduce moiré patterns, try sharpening afterwards to bring out the edges.

## Sharpen

Choose **Sharpen** to increase the contrast of edges in the selected portion of an image. If you haven't selected part of an image, MacVision sharpens the entire image. **Sharpen** is useful for pulling out the details in low-contrast images.

## Shadow

Choose **Shadow** to add shadows or darken the edges in the selected portion of an image. If you haven't selected part of an image, MacVision shadows edges in the entire image. **Shadow** is useful for adding or enhancing shadows in a bright image.

## Shape

Choose **Shape** to shape or highlight the edges in the selected portion of an image. If you haven't selected part of an image, MacVision shapes edges in the entire image.

# Video Menu

Video	
Enable Watchdog	
Input Options...	⌘[
Pre-Views...	⌘]
Swap Fields	⌘=

The Video menu contains the **Enable/Disable Watchdog**, **Input Options**, **Pre-Views** and **Swap Fields** commands.

## Enable/Disable Watchdog

MacVision starts with the Watchdog monitoring feature turned off. When you turn it on by choosing **Enable Watchdog**, the **Disable Watchdog** command displays at the top of the Video menu. Choose **Disable Watchdog** to turn off this feature.

The watchdog monitoring feature lets you know instantly if the connection is broken between MacVision and your video input device. For instance, your MacVision cables might become loose or disconnected, the video input device might be turned off, and so on. This feature lets you know that something is amiss by repeating the System sound and flashing the Video menu title.

## Input Options...

Choose the **Input Options** command the first time you start MacVision. The Input Options dialog box contains options you'll probably set once or only occasionally as illustrated in Figure 4-18.

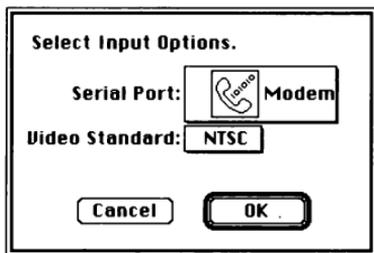


Figure 4-18 The Input Options dialog box.

**Important:** Be sure you define your video environment by setting these options before you scan an image.

### Serial Port

The Serial Port pop-up menu lets you specify whether you connected the MacVision digitizer to the Modem or Printer port on the Macintosh. The Modem port is the default choice.

## Video Standard

The Video Standard pop-up menu lets you specify whether your video input device uses the NTSC or PAL standard.

NTSC is the color system developed by the National Television Systems Committee. It is the default choice and is used throughout the United States, Japan and in most of North and South America. NTSC uses a total of 525 scan lines per frame and displays 30 frames per second.

PAL is the Phase Alternation by Line color standard used in Europe and other areas. PAL uses a total of 625 scan lines per frame, displays 25 frames per second, **and is an option available only with specific MacVision PAL hardware.**

## Pre•Views...

Choose the **Pre•Views** command to prepare for scanning an image. When you choose this command, the Pre•Views dialog box appears as illustrated in Figure 4-19.

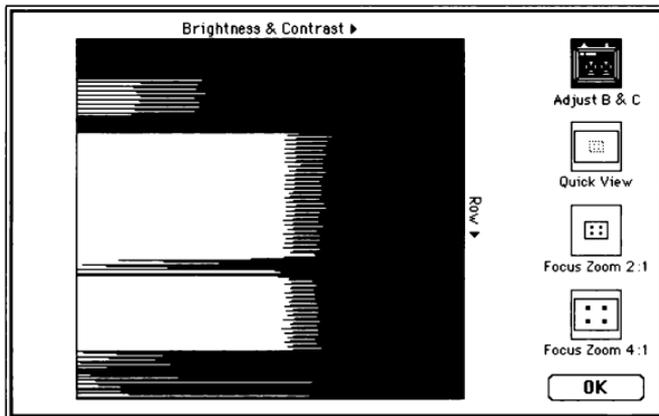


Figure 4-19 The Pre•Views dialog box with Adjust B & C.

Adjust B & C is the default option. It displays a bar chart that can help you optimally set the Brightness and Contrast. The Brightness and Contrast knobs are located on top of the

MacVision digitizer. You can also preview an image before you scan it with the Quick View option and focus using the Macintosh screen if a viewfinder or small TV monitor isn't available.

### **Adjust B & C**

The Adjust B & C option produces a real-time bar chart that is repeatedly updated in the Pre•Views dialog box. MacVision creates this bar chart by sampling the gray values in a column down the center of a video image.

The gray values found in this image sample are translated into the horizontal bar chart illustrated in Figure 4-19. You can use this information in two ways: to analyze how bright an image will be and to analyze how much contrast an image will have before you scan it.

When black lines extend left past the black end of the bar chart without line tips visible, that part of the image is most likely too black. MacVision won't be able to pick up any subtle shades near the black end. You may want to increase the **Brightness** by turning the Brightness knob on the MacVision digitizer clockwise until the black lines fall within the edges of the bar chart.

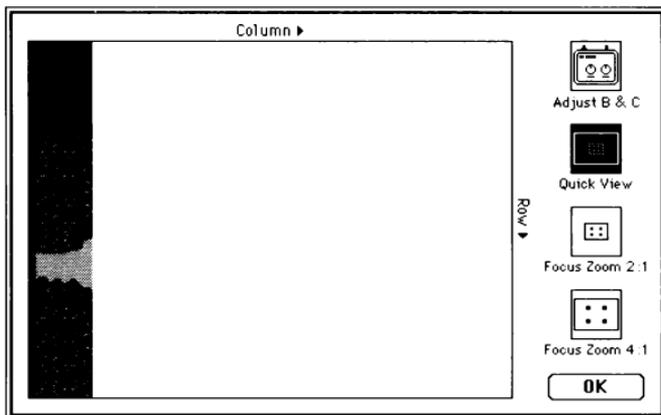
Likewise, if the white lines extend beyond the white side of the bar chart, the image is probably too light. You may want to turn down the brightness to bring the ends of the white lines back within the edges of the bar chart.

**Note:** If the bar chart is totally black, the image will be black. If it is all white, the image will be white. In either case, turn the Brightness knob until you begin to see black and white line tips. MacVision regularly updates the bar chart by taking new samples. You should begin to see a mix of black and white lines shortly after you adjust the Brightness knob.

To analyze the contrast in an image, you should compare the distance between the ends of the white and black lines. If the ends of the white lines are very far from the ends of the black lines, the contrast in the image sample is high. If the ends of the white and black lines are very close, the contrast is low. Turn the **Contrast** knob on top of the MacVision digitizer to get the contrast you want for an image.

## Quick View

You can preview an image before scanning it with the Quick View option illustrated in Figure 4-20.



*Figure 4-20 Quick View continuously updates an image preview, painting it from left to right.*

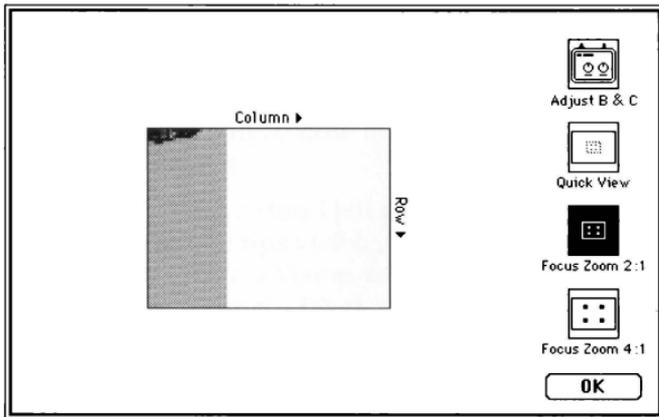
MacVision paints a low-resolution image so the preview can update more quickly. After you click Quick View, the image is painted from left to right. You can easily move around the focus box in the center of the Quick View display to pinpoint an area you'd like to focus on with either the Focus Zoom 2:1 or 4:1 options.

You can adjust the Contrast and Brightness knobs on the MacVision digitizer while viewing the Quick View display and see the changes instantly.

## Focus Zoom 2:1

The Focus Zoom 2:1 option lets you use the Macintosh screen to help you focus the image output from the video source. The image is displayed at a 2 to 1 ratio, or twice the size. This is especially useful if your video source doesn't have a viewfinder and a monitor is unavailable.

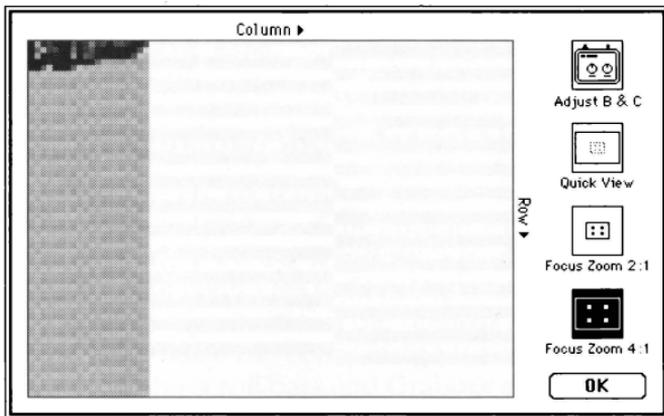
When you click Focus Zoom 2:1, MacVision displays a focus box in the middle of the image in the Pre•Views dialog box.



*Figure 4-21 Focus Zoom 2:1 displays the focus box at twice the size.*

## Focus Zoom 4:1

The Focus Zoom 4:1 option works just like the 2:1 option; however, it increases the image inside the focus box to four times the size.



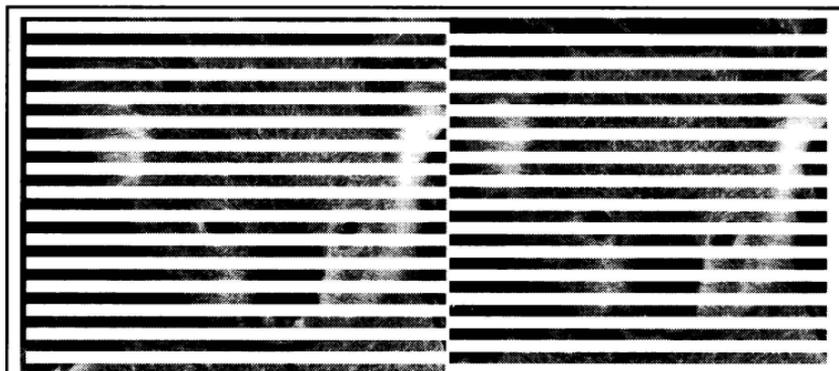
*Figure 4-22 Focus Zoom 4:1 displays the focus box at four times the size.*

## Swap Fields (Command=)

Choose **Swap Fields** to switch the sequence of the two interlaced fields that MacVision scans from a video frame. Swapping fields can correct image distortions resulting from an incorrect interlace. You can best see this kind of distortion by examining diagonal lines in an image. Figure 4-24 illustrates what happens to an image when the fields are incorrectly interlaced.

A field is a group of odd or even lines in a video frame. A video frame is divided into these two fields to reduce flicker that would appear on a TV screen by increasing the number of scenes presented to the eye per second. See Figure 4-23.

To determine the correct field sequence, MacVision analyzes two pairs of scan lines in the middle of the image. If it detects that the fields are interchanged, it swaps them for you. If MacVision makes the less desirable choice, you can easily swap the fields using this command.



*Even and odd fields interlaced in a video frame.*



*Enlarged view of individual pixels in fields, or scan lines, 1 through 6.*

*Figure 4-23 The correctly interlaced fields on the left side of the figure form a pyramid. The incorrectly interlaced fields at the right side of the figure produce “jaggies” down the diagonal lines.*

## View Menu



The View menu contains the **Fit To Window/Show Actual Size** command that let you switch between a reduced and a normal size view of an image.

At the bottom of this menu, MacVision lists all currently open documents by name. You can open as many images as your memory will allow.

## **Fit To Window/Show Actual Size**

Choose the **Fit To Window** command to resize an image to fit within the borders of the current window. If you resize the window while **Fit To Window** is in effect, the image is resized so it continues to fit in the window. The resized image retains the aspect ratio of the original so you won't see any distortion. Since the entire image is visible when fit to a window, the scroll bars and Grabber are inactive.

**Note:** If you are using a black and white monitor, an image that you fit in the window appears darker since the pixels are compressed. The image contrast is not affected during printing since shades of gray rather than a bitmap are used.

Choose **Show Actual Size** to return an image that is currently fit to a window to its original size. The **Show Actual Size** command restores the image to its normal size and reactivates the scroll bars and Grabber.

## **Image Window Name (Command-0—9)**

MacVision displays a list of the open documents in windows by their filename.

The number of images you can open at a single time depends upon the amount of available memory on your Macintosh.

To bring an image to the top of the desktop, choose the corresponding filename from this list.

# How MacVision Works

MacVision is a hardware and software system that digitizes video images generated by a video camera, still video camera, VCR or laser disk player. After a video image has been digitized, or scanned, MacVision stores it in memory and displays it in an image window on your Macintosh.

The image displays as a monochrome (black and white) image with 256 shades of gray or as a bitmap. You may save the images in a variety of file formats and print the images on Macintosh compatible printers.

## Analog and Digital Images

Video images, like photographs, are “analog” images. Analog images have a continuously changing range of brightness values going from solid black to solid white with an almost infinite number of gray levels in between.

Since your Macintosh uses digital rather than analog images, the analog video output must be converted to digital information. To make a high-quality digital image from the analog video image, MacVision takes hundreds of thousands of digital samples of the video image output. Each sample contains a digital code describing the brightness of the video image at that sample point.

The MacVision hardware is a peripheral device called a video digitizer that is used to generate the image samples. The digitizer takes a video signal, digitizes it and then transfers the information to the Macintosh through a cable connected to the Macintosh modem or printer serial port.

The MacVision software controls the sampling process, assembles the image in the computer's memory and displays it on the Macintosh screen.

The digitized image created by MacVision is a discrete grayscale approximation of the original analog video image. In digitizing an image, MacVision uses 256 discrete gray levels to approximate the continuous range of gray values in the original analog video frame. When viewed on a good monitor or printed on a high-resolution printer, digital images with 256 shades of gray have a visual quality approaching that of a photograph. Humans can at most distinguish 256 gray levels.

## Understanding TV Video

An NTSC video frame, produced by a TV camera, consists of a total of 525 horizontal scan lines. Of these, 480 scan lines contain the image and the remainder are used to frame the image and pass other information. You've probably seen the extra 45 scan lines when a TV picture rolls vertically.

The process of dividing a video image into scan lines is known as raster scanning. It effectively breaks the original scene viewed by the video input device into 480 strips of picture information stacked one on top of the other. Each scan line contains the continuously changing brightness information and a pulse to synchronize the scanning of the video input device image with the displayed image.

In creating the raster scan of a scene, the video input device starts in the upper left corner. After generating 480 scan lines the camera ends the image scan in the lower right corner ready to jump back to the upper left corner and start over.

A standard NTSC television video frame is actually formed by interlacing two video fields each with 240 horizontal lines of brightness information. This constitutes a full frame of information. One field contains the even numbered scan lines, the other contains odd numbered scan lines.

By displaying the odd field and then the even field on the TV screen, you see 60 representations of an image on the TV screen each second. (30 frames per second x 2 fields = 60 image representations.) This is done to eliminate the screen image from flickering.

When these two interlaced fields are displayed on a TV screen the human eye is tricked into seeing a single 480-line image. For maximum image quality, MacVision takes samples from both of these fields and arranges them to form a complete 480-line digital image.

The digitizing process is synchronized to individual video frames by using the horizontal and vertical synchronization pulses contained in the composite NTSC video signal. The MacVision software controls how the horizontal scan lines are sampled and assembled into a digital image in your Macintosh's memory.

Each sample of the video frame contains 8 bits of information that represent the gray levels at the point in the image where the sample was taken. With 8 bits of information per sample, the scanned image will have 256 gray levels.

The MacVision software distinguishes between the two video fields and puts the samples in the proper order in memory. In situations where MacVision cannot determine the field sequence accurately, MacVision offers a **Swap Fields** command so you can easily choose the correct field order.

# Digitizing an Image

Digitizing a horizontal scan line in a video image involves taking numerous samples of the video voltage level that represents the changes of brightness across an image.

MacVision takes 640 samples of each of the 480 scan lines and stores the results in memory as a collection of bits that describe the video frame.

Each of these individual brightness samples is known as a pixel or picture element. A pixel or picture element is a tiny dot. MacVision produces a digital image composed of 640 by 480 pixels. This number of samples results in a digital image with approximately the same horizontal and vertical proportions as the original video frame.

The digitizer hardware contains a circuit known as an analog-to-digital (A to D) converter. The A to D converter samples the analog video at each point in the 640 by 480 image matrix. For each sample, it assigns an 8-bit character that describes the brightness level of that sample point or pixel.

The 8-bit samples taken by the MacVision digitizer provide 256 shades of grayscale information. If you wanted to digitize black and white (no shades of gray), only one bit of data per pixel would be necessary. To record 16 levels of brightness four bits of data are required. And to record 64 levels of brightness, six bits of data are required.

The Macintosh II series monitors and some Macintosh SE/30 monitors can display images with up to 256 discrete shades of gray. This means they can take full advantage of the 8 bits of brightness information produced by the MacVision digitizer. When you display the digitized image on a Macintosh Plus, SE or Macintosh Portable it appears as a bitmap which simulates the shades of gray.

# Producing a Digital Image

To shorten the processing time needed to assemble image information, one sample is taken from a horizontal scan line in consecutive video fields. This reduces the effective time for each sample to 63.5 microseconds. MacVision can sample, transmit and assemble in memory the 310,000 samples in a 640 by 480 pixel image in approximately 20 seconds.

The output from the MacVision digitizer is a serial bit stream that represents consecutive vertical columns of samples. The data is sent to the Macintosh serial port at 230 kilobits per second. The serial bit stream is decoded and assembled in memory as eight 640 by 480 bit planes, each plane representing one of the eight bits of data needed for 256 shades of gray.

You can store the MacVision image in memory, display, change, print and save it in one of several file formats. You can use the digital images created by MacVision with other applications such as desktop publishing, multimedia presentations, HyperCard, draw or paint applications.

## Tips on Selecting a Video Input Device

MacVision brings together the technologies of photography, video and computers. In photography the sharpness and resolution of an image is determined by the camera, film and lens quality.

In video the electronic image sensor in the camera is the equivalent of the photographic film, while the electronic circuitry that converts the sensor output into a video frame for viewing or recording is the camera.

The important role of high-quality lenses is the same in both photography and video. For the highest quality digital images with MacVision you should use a high-quality broadcast video camera to capture the image.

## Types of Video Cameras

Although you can use almost any home video camera with MacVision, a high-quality black and white industrial video camera will produce the best results.

Color video cameras, still video cameras and camcorders can be used with MacVision, however the image sharpness is usually less than a comparably priced industrial black and white camera. Industrial cameras are built to deliver good quality and reliable performance 24 hours a day, seven days a week for years.

The industrial camera should have a good quality fixed or zoom lens, preferably with a macro setting. The video camera should be held steady by a good tripod or copy stand mounting. For best results, all video cameras require adequate lighting of the subject.

## Inside a Video Camera

A video camera system is composed of two basic parts:

- ▲ the camera body holding the image sensor that converts light coming through the lens into an electronic signal.
- ▲ the lens that forms the optical image of the subject on the sensor.

When selecting a video camera, pay special attention to the type of image sensor used and the specifications of the lens.

Video cameras have two types of image sensors: tube and solid state. The tube type is called a videcon and is used in most low-priced consumer and industrial cameras.

The tube type sensor does not produce as sharp an image as a solid state sensor. The videcon also has a limited light range making it less able to produce images in low light and more likely to be damaged by exposure to bright light such as the sun.

The solid state sensor uses a semiconductor chip called a Charge Coupled Device or CCD. The CCD sensor is more expensive than the videcon but has better sensitivity, wider dynamic range, better resistance to vibration and shock, is smaller and lighter and produces a crisper image. A CCD also produces an image with less distortion at the edges and corners. Video cameras using a CCD image sensor give you the best results with MacVision.

# Types of Lenses

For many MacVision applications a fixed focus lens will be adequate. To change what is in the picture, the camera can be moved closer to the subject or farther away. For a given level of quality, fixed focus lenses are less expensive than zoom lenses. A lens with an 12mm focal length is normally used with small video cameras.

A zoom lens can change focal length either manually or under electronic control. Using a zoom lens can add considerable flexibility to your camera. The typical zoom range is a ratio of six to one, although some lenses zoom from a 2.5mm wide angle to a 75mm telephoto.

Most home video cameras incorporate zoom lenses. With industrial cameras, the lens is purchased as a separate item so it can be selected to meet the specific needs of the system.

Due to the compromises made in designing zoom lenses, a fixed focus lens generally produces a higher quality image at any particular focal length. For most uses, however, the convenience of the zoom lens more than offsets the slight loss of picture quality.

Whether you choose a fixed or zoom lens, for additional flexibility get one with a macro feature. With a macro setting the lens can be made to focus down to just a few inches from the subject. This macro capability will add great versatility to your camera system and allow you to do close-ups of small objects.

Camera system prices generally include a power supply, cables and cable adapters.

# Video Monitors

One advantage of the consumer or home video cameras is that they usually incorporate a miniature video monitor as a viewfinder. This lets you see exactly what the camera is including in a video frame.

Since industrial cameras do not have integrated monitors, you can either invest in a small video monitor or use MacVision's Focus option in the Pre-Views dialog box to instantly observe what the camera is seeing. Compact video monitors are of great help when composing and adjusting MacVision images.

# Video Recorders

Video recorders and disks are also an excellent source of images that can be digitized by MacVision. To digitize an image from a video recorder, be sure you use the freeze frame feature of the recorder.

Older video recorders achieve freeze frame by rotating a special playback head over a selected portion of the tape. In order to have a good freeze frame feature, a video recorder must have at least four heads.

Newer video recorders achieve still frames by digitizing the frame, storing it in memory and then repeatedly reading it from memory and converting it back into an analog video signal. The technique used to create the still frame can have a great effect on the quality of the resulting MacVision image. The digital type of VCR freeze frame generally produces the best results.

# Still Video Cameras

Still video cameras have been introduced at the retail level that offer advantages and disadvantages when used with MacVision.

A major advantage is that you can freeze a moving image that might otherwise be lost. The disadvantage is that low-end still video cameras do not offer the best image quality. Some of these cameras record a single field rather than a full frame, or two fields of information. This means that MacVision receives only about half the video image information.

Higher quality still video cameras that operate in the full-frame mode are available.

## Quality Loss Due to Motion

When a sequence of frames of a moving subject are recorded, each frame is slightly blurred by the motion of the subject or the camera.

A video frame is 1/30th of a second in duration. This is the equivalent of taking a picture with a still camera at a shutter speed of 1/30th of a second. At this relatively slow shutter speed, any movement of the subject or the camera can produce a blur in the picture.

Video cameras should be mounted on a sturdy tripod or copy stand so that there is no camera movement while the image is being digitized by MacVision. Copy stands provide a camera mount, well-balanced lighting and a holder for flat artwork. Since MacVision takes about 20 seconds to produce an image, be sure that lighting and other factors remain constant during the frame digitizing time. Also, your subjects must remain totally still for the entire digitizing time.

## Appendix C

# Tips on Lighting

Proper lighting plays a major role in obtaining good results with the MacVision Video Digitizer. Proper lighting can make the subject look more three dimensional and realistic.

MacVision combines photography and computers so it is essential that you have some understanding of the principles of photographic lighting.

Some of the basics of photographic lighting are presented here. For more information, a number of excellent books on lighting are usually available at camera stores and public libraries.

The general principal of good lighting is to balance the light and dark areas and provide a good range of grayscale tones. Too much light makes the subject look washed out; too little light causes the subject to recede into the background; wide extremes of light are generally to be avoided.

# Lighting Three Dimensional Objects

Proper lighting of three dimensional objects requires at least two lights: a key light and a fill light.

The **key light** provides the main lighting of the subject, clearly separating it from the background. The key light is placed closest and at an angle to the subject.

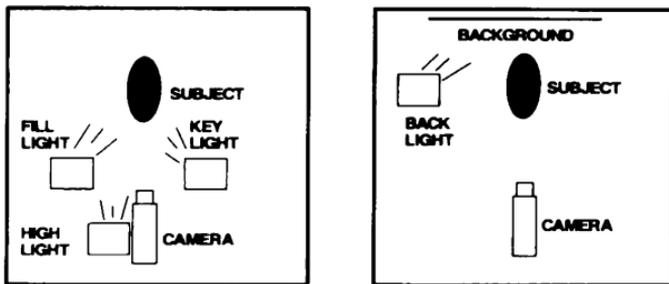
The **fill light** sculpts the subject and provides the grayscale tones that are important to realistic images. The fill light is placed slightly further from the subject than the key light.

In some situations a third light, called a **high light**, is used to further mold the subject. When making images of people, you can use a high light to make the hair look radiant and more distinct from the background.

You can obtain some interesting lighting effects by carefully using only one light:

- ▲ A key light alone can create a moody, brooding image.
- ▲ A high light alone creates an ethereal looking image.
- ▲ Lighting only the background produces a silhouette.

## Three Dimensional Lighting



*Figure C-1 Three Dimensional Lighting.*

# Lighting Two Dimensional Art

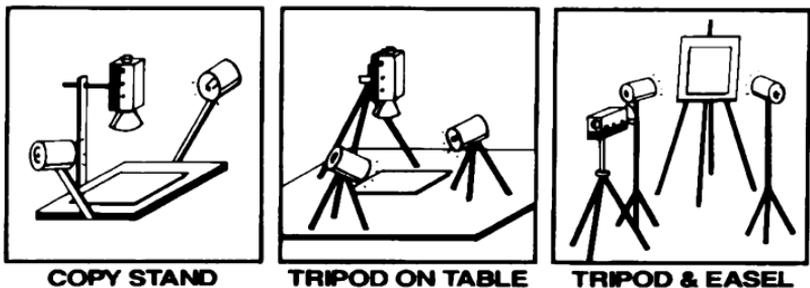
The best way to capture images of flat art such as drawings, posters or photographs is to place the art on a flat surface and mount the camera at a right angle to the art. Three types of camera setups are well suited to making images of flat art:

- ▲ A photocopy stand that combines a flat surface, camera mount and light fixtures into a convenient table top unit. Most photo stores carry copy stands.
- ▲ A small rigid tripod can be used to hold the camera aimed down at the artwork laying on a table.
- ▲ A tripod standing on the floor with the camera pointed horizontally at the artwork on a vertical easel.

Keep art flat while photographing. It should be held flat by weights, tape or, best of all, a sheet of glass.

Light flat art at an angle. Use two lights to ensure even lighting over the surface of the art.

## Two Dimensional Lighting



*Figure C-2 Two Dimensional Lighting.*

## Appendix D

# About Halftones, Grayscale and Bitmaps

Your Macintosh environment is a major factor in determining how a MacVision image appears on the screen and in print. For example, an image can display more shades of gray if you use Color QuickDraw on a Macintosh II than if you use the original QuickDraw on a Macintosh Plus.

This appendix explains the underlying techniques involved in reproducing images on Macintosh screens and compatible printers.

## Macintosh Screens and Printers

When reproducing an image on a Macintosh computer, there are two major concerns: how the image appears on the screen and how the image is printed.

### Macintosh Screen Displays

No matter which Macintosh computer you use, the screen displays 72 pixels or dots per inch horizontally and vertically. Each pixel is square and all are the same size. Square pixels produce higher quality graphics on the screen than other pixel shapes such as rectangles.

**Note:** QuickDraw uses 72 dots per inch to calculate screen information, though the actual screen measurement may vary slightly.

On a **monochrome screen such as on a Macintosh Plus, SE or Portable**, each pixel is either turned on (bright) or turned off (dark.) Each pixel represents one bit in a two-dimensional bit image. If a pixel is white, the bit for that pixel is set to zero; if the pixel is black, its bit is set to one. A bit image is a black and white image.

To allow all Macintosh applications to handle graphics consistently, Apple offers QuickDraw as part of the developer Toolbox. QuickDraw performs all graphic operations on the Macintosh screen, provides a standard way for storing bit images and draws text and graphics on the screen.

On a **grayscale screen such as on a Macintosh II or an external grayscale screen for an SE/30**, the brightness intensity of each pixel can be set independently. By varying the brightness, shades of gray can be more accurately depicted. This means that more than one bit of information is needed to define each pixel.

Apple introduced Color QuickDraw to handle this extra grayscale information by storing a pixel image rather than a bit image. A pixel image is a multiple-bit-per-pixel bitmap that can specify either color or grayscale information.

With Color QuickDraw, you can select how many shades of gray or color will display on the screen by setting Monitors to Black & White, 4, 16 or 256 shades of gray or color on the Control Panel. So, even with a MacVision image that contains 256 gray levels, you will see fewer shades of gray on the screen if you have reduced the number of grays on the Control Panel.

## Macintosh-compatible Printers

QuickDraw also prepares an image for printing.

On a **non-PostScript printer** such as the Apple ImageWriter, QuickDraw converts information about an image into a one-bit-deep bitmap. The resolution achieved depends upon the image and your choices in the Page Setup and Printer dialog box as illustrated in the chart below.

ImageWriter Print Resolution		
Print Quality	Dots Per Inch	
	Tall Adjusted On V x H*	Tall Adjusted Off V x H*
<b>Best</b>	144 x 160	144 x 144
<b>Faster</b>	72 x 80	72 x 72
<b>Draft</b>	—	—

\* Vertical times Horizontal.

On a **PostScript printer** such as the Apple LaserWriter, QuickDraw translates image information into the PostScript page description language or into bitmap information in a form that PostScript can use. A LaserWriter, for example, prints at a resolution of 300 dots per inch.

Some laser printers for the Macintosh can produce resolutions of 400 or 600 dots per inch. If you need typeset quality, laser imagesetters can produce dramatically higher resolutions of up to 2,540 dots per inch.

Resolution is reduced when the Faster Bitmap Printing option in the Page Setup dialog box or the Black & White option in the Print dialog box are selected. You can choose the highest resolution by turning off Faster Bitmap Printing and selecting Color/Grayscale in the Print dialog box.

# What are Halftones?

The halftone techniques developed for lithographers are simulated to reproduce images on Macintosh screens and printers.

Halftones were first developed to reproduce continuous-tone images such as photographs or illustrations in letterpress and offset printing. Since both printing processes place a uniform ink density on paper, the shades of gray in a black and white photograph would be lost leaving only black or white.

Lithographers need to break up the ink density to reproduce shades of gray. They do this by creating a halftone photograph from an original continuous-tone photograph.

To create a halftone photograph, a lithographer places a halftone screen between the original photograph and the film in a camera. A halftone screen is a glass or film sheet covered with tiny dots of different sizes. On the resulting halftone photograph, the original image is divided into dots.

These halftone dots produce an optical illusion. They cause the human eye to see different gray levels as though the image had been printed with varying densities of ink.

Each gray level has a corresponding halftone dot size. For example, if a halftone image has 256 shades of gray, there are 256 dot sizes. Black areas have the largest dot size. Also, halftone dots are available in different patterns and shapes.

Halftone photographs are used in newspapers, magazines and fine art — examples are all around. Examine a newspaper photograph closely and you can probably see the halftone dots. They are especially visible in lighter gray areas since those dots are smaller. You might use a magnifying glass to see these halftone dots more clearly.

The resolution of a halftone photograph corresponds to the spacing of the dots. Spacing is defined in lines per inch. For instance, newspapers use halftone screens with 55 to 85 lines per inch. Magazines use halftone screens with 120 to 150 lines per inch. Fine art uses halftone screens of 200 lines per inch.

## **Printing Halftones on a Macintosh**

The ImageWriter can print up to 144 x 160 dots per inch and the LaserWriter can print up to 300 dots per inch. So, you might think it a simple matter to reproduce halftone images at least as good as those used in magazines with an ImageWriter or LaserWriter.

However, the halftone dots used on halftone screens vary in size while the dots printed on an ImageWriter or LaserWriter are all the same size.

For this reason, computers simulate the different sizes of halftone dots with dithering. Dithering is a process that creates different sized “cells” for each shade of gray by clustering groups of dots that are the same size.

Dithering makes it possible to reproduce a continuous-tone image with different gray levels, but it reduces the effective resolution of your printer. The resolution on an ImageWriter printer would be too low for quality mass reproduction.

With a 300 dot per inch laser printer, you can produce a barely acceptable halftone image. With a 2,540 dot per inch laser imagesetter, you can produce halftones with 256 gray levels at 150 lines per inch resolution. The chart below shows the relationship between gray levels and resolution.

## Gray Levels Chart

Halftone Resolution	Printer Resolution			
	Dots Per Inch			
Lines Per Inch	300	600	1270	2540
50	36	144	256	256
75	16	64	256	256
100	9	36	161	256
120	6	25	112	256
150	4	16	72	256

**Note:** The Cells Per Inch option in the MacVision Print dialog box is the equivalent of specifying how many lines per inch a PostScript halftone should use.

## MacVision Halftones

With MacVision, you can produce halftones in two ways. If you have a PostScript printer, you can specify PostScript Halftone options on the MacVision Print dialog box.

PostScript Halftone options only change the way the image appears in print. Since the saved image file stays the same, you can try the different PostScript Halftone options and easily return to the original image.

**Note:** Halftone information is used when MacVision saves a file in the EPSF format.

You can also choose a Halftone pattern from the **Halftone** submenu on the Style menu. These halftone patterns affect the image on the screen as well as in print. An image file is unchanged by these halftone patterns if you save with the

RIFF or TIFF file formats. If you save an image in the RIFF or TIFF formats, you can try different halftone patterns to find the one that works best. And you can redisplay the RIFF or TIFF image in grayscale at any time by choosing **Grayscale** from the Style menu.

If you use a non-PostScript printer, you can apply the **Halftone** patterns on the Style menu to reproduce images as halftones. If you have a PostScript printer, select PostScript halftone options by applying a **Halftone** pattern on the Style menu. The PostScript Halftone options permit finer halftoning.

Appendix E

# File Formats

MacVision can translate digitized images into files in the formats used by major publishing, graphic arts, presentation and image processing applications for the Macintosh.

MacVision can save files in the Raster Image File Format (RIFF), Tag Image File Format (TIFF Bitonal and Grayscale), Encapsulated Post Script File (EPSF), PICT 1, PICT 2 and MacPaint formats. MacVision can open files in the RIFF and TIFF formats.

## Files and File Formats

### RIFF Files

MacVision uses the RIFF file standard as its native file format. You can open RIFF files with ImageStudio to edit or enhance the image.

You can save RIFF files in 4-, 6- or 8-bit formats in either compressed or non-compressed form.

## TIFF Files

You can save TIFF files with Intel or Motorola byte ordering. This option lets you use MacVision TIFF files with either the Apple Macintosh (Motorola) or IBM PC (Intel) computers. This feature is valuable when transferring files into applications such as Aldus PageMaker, which is available for both the Macintosh and IBM. You can open TIFF files with Digital Darkroom to edit or enhance the image.

TIFF files may be saved in 4-, 6- or 8- bit formats. Dithered bitmap images may also be saved in the TIFF format.

## RIFF File Compression

RIFF files saved with MacVision may be full-size or compressed. Compression reduces the size of the files by about one-third. For example you can save a 300K byte image in a compressed file using about 200K bytes. If an image has a lot of detail, less compression is possible. For example, a dark image can be compressed more than a floral scene.

## Encapsulated PostScript Files

You can save images in the Encapsulated PostScript (EPSF) format to print them on PostScript-compatible output devices such as the Apple LaserWriter or Linotronic typesetters. You can open EPSF files with graphics applications such as SuperMac PixelPaint Professional to edit or enhance them.

A typical Macintosh EPSF file contains a PICT resource along with an encoded version of the raw grayscale data. This information is used for screen display prior to printing.

**EPSF is saved with PostScript halftone screen density and rotation angle values selected in the MacVision Print dialog box.** You can select Mac or PC byte ordering.

## **PICT/Version 1**

The PICT file standard was introduced by Apple as a format for saving MacDraw images with two levels of brightness (black and white.) You can open PICT files with MacDraw and other drawing applications such as Canvas or SuperPaint.

## **PICT/Version 2**

PICT2 is an extended version of the PICT format. Apple developed PICT2 to handle grayscale and color images. MacVision can create PICT2 files when you are using a Macintosh II or SE/30 computer. Macintosh Plus or SE computers display PICT2 files if you have System 6.0.2 or later; however, you won't see grayscales.

## **MacPaint Files**

Images stored in the MacPaint format contain one unit of information for each pixel or dot displayed.

You can open these images with most popular paint and illustrator-type applications to add text, produce line art or apply special visual effects. The MacVision implementation of the MacPaint file format produces a 576 by 720 pixel bitmapped image. This makes loading and editing of image files in MacPaint and compatible applications easier, although it crops a small amount from each side of the image.

## File Format Chart

<u>Application</u>	<u>RIFF</u>	<u>TIFF*</u>	<u>TIFG*</u>	<u>PICT</u>	<u>PICT2</u>	<u>EPSF</u>	<u>Paint</u>
Canvas 2.1		▲		▲	▲		▲
Cricket Paint				▲	▲		▲
Design Studio	▲	▲	▲	▲	▲	▲	▲
Digital Darkroom		▲	▲	▲	▲		▲
Freehand 2.0		▲	▲	▲		▲	
Illustrator		▲	▲	▲	▲		▲
ImageStudio 1.5	▲	▲	▲	▲	▲		▲
PageMaker 3.0		▲	▲	▲	▲	▲	▲
PixelPaint Pro. 1.0		▲	▲	▲	▲	▲	▲
Photoshop		▲	▲	▲	▲	▲	▲
Quark Xpress	▲	▲	▲	▲	▲	▲	▲
ReadySetGo 4.5a	▲	▲	▲	▲	▲	▲	▲
Streamline		▲	▲	▲	▲		▲
SuperPaint 2.0				▲			▲

\* TIFF represents TIFF/Bitonal and TIFG representsas TIFF/Grayscale.

**Note:** This file format chart lists the file formats currently supported by several popular Macintosh applications. It is intended to give you an idea of the kind of formats available in various software categories. As these products are updated, the supported file formats may change.

# MacVision Specifications

## Electrical Specifications

### Input Video Signal

- ▲ NTSC (RS-170 or RS-170A) color or monochrome composite video
- ▲ RCA standard phono jack input connector

### Serial Data Input and Output

- ▲ Data transfer rate - 223.8 Kbps
- ▲ Data configuration - 8 data bits
- ▲ 1 stop bit, no parity
- ▲ Round DIN connector to Macintosh serial port

### Reset Command

The MacVision hardware is reset to the left edge of the video frame by transmitting a 4 millisecond Break command from the Macintosh to the digitizer.

Appendix G

# Troubleshooting

Most MacVision problems arise from the video camera and the cables connecting the camera to the digitizer unit. We suggest that you use a video monitor to view the output of the camera when troubleshooting a MacVision installation.

Many video cameras and camcorders have a small video monitor that is used as the viewfinder. Professional video cameras generally do not have a built-in monitor and you can either use a separate TV monitor or rely on your Macintosh monitor and the options in the Pre•Views dialog box. The monitor can be connected using a “Y” or “T” connector in the cable running from the camera to the MacVision digitizer.

## No Video Signal

Be sure the MacVision digitizer output plug is firmly inserted into the modem or printer port on the back of the computer.

Check to see that the proper port has been selected by choosing **Input Options** from the Video menu.

If the Watchdog command on the Video menu is turned on (**Disable Watchdog** displays), MacVision will alert you if the cables become loose or disconnected.

If possible, check your AC adaptor to be sure it is putting out 9 volts AC current.

If the Watchdog command is turned off (**Enable Watchdog** displays on the Video menu), you can either turn on the Watchdog command to check the connections or choose **Pre•Views** from the Video menu. If no signal is being received from the camera when you choose **Pre•Views**, there will be a screen message to let you know the application is receiving no signal. This message verifies that the MacVision software is working and that the problem is no input video signal.

## Picture Has Fine Vertical Lines

This condition can be caused by the digitizer having reversed fields in the video frame while scanning. Diagonal lines will be fuzzy or saw-toothed. Choose **Swap Fields** from the Video menu to reverse the fields and clarify the image.

## Picture Has Coarse Vertical Lines

This condition can be caused by your Macintosh being connected to a network that generates system interrupts while MacVision is scanning. Disconnect the network and make a few new MacVision images. If the lines are no longer present the network is most likely the problem.

## Scanning While on a Network

For many networks, you can turn off the AppleTalk option after choosing the **Chooser** command from the Apple menu. As soon as you close the Chooser dialog box, the network is turned off and you can scan a MacVision image.

With other networks such as AppleShare, the AppleTalk option is disabled. In this case, you should physically disconnect the network before scanning with MacVision. A simple way to disconnect a network without unhooking cables is to add an A/B switch.

An A/B switch is a small box that lets you turn a knob between the A and B settings. You can set up this A/B switch box so that the network is connected when the knob is turned to A and disconnected when you select B. Then, when you need to scan an image, just turn the knob to the B setting and after you finish, turn it back to A.

## **Image Appears Dark**

Adjust Brightness to increase the white level of the image.

## **Image Appears “Flat” Due To Lack Of Contrast**

Adjust the Contrast control while using QuickView.

## **Image Appears “Grainy”**

Adjust the lighting on the subject. Go to the Style menu and choose **Grayscale** rather than **Halftone**.

## **Does MacVision work with still video cameras?**

Yes, MacVision works with still video cameras. However, many of the consumer-level still video cameras only send a video signal in the field mode, as opposed to most video cameras and higher-end still video cameras, that send a video signal in full frame mode (two fields of information).

With field mode, MacVision receives only half the information it usually receives. Thus the image may appear out of focus or otherwise distorted.

## **Monitor doesn't display grayscale**

Macintosh Plus and SE monitors and some other monitors are unable to display grayscale images. They only display black and white. Check the Monitor option by choosing **Control Panel** from the Apple Menu to find out how many gray levels your monitor can display.

MacVision automatically adjusts to black and white monitors by halftoning the image to show the gray levels as patterns of black and white dots. When an image is displayed in halftone patterns the quality is reduced. Also, the **Grayscale** command is dimmed in the Style menu since it cannot be used with a black and white monitor.

MacVision stores images with grayscale information, so even if you cannot see grayscale on your particular monitor, you can print grayscale images and display grayscale files on a monitor that supports grayscale.

## **How do I connect MacVision to my Mac 128K, 512K or 512KE?**

The MacVision software will not run on these machines as the minimum memory requirement for MacVision is 900K RAM. These three machines do not have enough RAM to run MacVision.

## **Does MacVision have OCR capabilities?**

MacVision is designed to digitize images. The MacVision software does not have character recognition capabilities. MacVision can provide an image capable of being read by OCR software if the image is digitized with high resolution equipment and with high quality lighting and set-up.

## **Monitor does not display color**

MacVision will accept a color video signal as its video source. However, MacVision only displays black and white or grayscale on the monitor. The colors are filtered out to facilitate digitizing.

## Scrambled image displayed on monitor

This condition indicates there may be a problem with the MacVision hardware. Occasionally resistors, capacitors and/or diodes go bad. Call Koala Technologies customer support for information about repairs.

## Slow scan that stops before completion

Same as scrambled image.

## What kind of resolution can I expect from MacVision?

First, consider the video source. The higher the resolution of your video source the better the performance of MacVision.

Second, MacVision software provides four levels of quality for capturing images. Each level produces a different resolution. For more information about these capture modes, see the File **New** topic in the *Chapter 4, Reference*.

Third, the type of printer you use determines the printed resolution.

## Insufficient memory to run MacVision

If your Macintosh has 2MB or more of Random Access Memory (RAM), you can use MacVision with MultiFinder. **If your computer has 1MB of memory, you must use MacVision with the Finder.**

If you decide to use MacVision with MultiFinder, specify the amount of RAM before launching the application. Do this by clicking the application icon once and choosing **Get Info** from the File menu. You can change the current application memory size at the bottom of the Get Info dialog box.

MacVision requires 900K in RAM — 1,500K is recommended. By increasing the application memory size, you will be able to open more windows and images while running MacVision.

# Glossary

The following is a list of selected terms used in the fields of video, computer graphics, graphic arts and printing.

**analog signal** — A signal such as that produced by a TV camera which varies in voltage over time in a continuous manner.

**Bit** — An acronym for BInary digiT. A single piece of information such as a zero or one. See also *byte*.

**bit image** — A collection of bits in memory representing a two-dimensional surface. The screen is a visible example of a bit image. See also *pixel image*.

**bitmap** — A set of bits representing the position and binary state of a corresponding set of items. See also *bit image*.

**bitonal** — Black and white.

**brightness control** — A control that sets the overall level of intensity or brightness of a displayed image.

**byte** — A group of 8 bits. The byte is a common unit of measure for memory and file sizes. A single byte can represent any of 256 different characters or 256 discrete levels of brightness.

**CCD** — Charge Coupled Device. A semiconductor device used in TV cameras to convert light into an electrical signal. The CCD output voltage is an analog representation of the

brightness. The CCD output is sampled and converted into a digital representation of the image.

**composite video** — An analog video signal containing brightness, color and synchronization information. Most video cameras and VCRs produce a composite video output.

**continuous-tone image** — An image with an infinite number of gray levels. A photograph (a good example of a continuous-tone image) contains as many as one million tones or shades of gray.

**contrast control** — A control that sets the upper and lower limits on the brightness of a displayed image. When the upper and lower limits are close together, the image has low contrast. With a much wider range of possible dark and light values, the image has a higher contrast.

**digitized sample** — The digital bit pattern representing the brightness level of a sample of an analog video image. MacVision creates 8 bit digital samples providing 256 levels of brightness information.

**digitizer** — Any device that creates a digital representation of a continuous-tone image. MacVision is a video digitizer because it creates a digital representation of an analog video image.

**dithering** — The process of grouping pixels or dots of the same size into clusters to form halftone dots of various sizes and shapes. This is done to produce shades of gray in an image printed on a computer screen or printer.

**EPSF format** — Encapsulated PostScript File format. A file format that is generated by applications that produce PostScript output. An EPSF file contains a low resolution dithered bitmap derived from the original digitized image along with an encoded version of the raw grayscale data. A PostScript-compatible printer can reconstruct the EPSF image as a high resolution halftone output.

**filter** — A term derived from photography. Optical filters change the appearance of a photograph by emphasizing or reducing certain wavelengths of light. The same types of effects can be achieved with digital images using electronic filters. Electronic filters can also be used to sharpen or blur an image and can be applied to selected portions of the image.

**gray level file format** — File formats such as RIFF, TIFF and EPSF that permit saving gray level information.

**graymap** — The relationship between the input grayscale information of an image and the output grayscale. Manipulating the graymap can produce a wide range of image effects.

**grayscale** — The presentation of an image using a discrete number of gray levels rather than continuous tones. MacVision digitizes images into a grayscale of 256 levels.

**halftone** — A lithographic process that converts a continuous-tone image such as a video frame or a photograph into a pattern of dots for printing. Halftones are created by using screens with a fixed number of dots per inch. Gray values are represented by using various dot sizes with larger dots giving darker gray values.

**halftone pattern** — The specific way pixels are arranged to form halftone dots. There are several popular dither patterns in use. One of the most widely used is the 8 by 8 dither matrix pattern used by PostScript. MacPaint is another commonly used dither pattern standard.

**horizontal scan line** — One of the 480 horizontal lines traced on the screen of a TV monitor by the raster scan process. MacVision takes 640 samples of each horizontal scan line to form a digital image.

**interlace** — In the NTSC TV standard two 240 line fields are generated and then combined or interlaced to produce a single 480 line frame.

**landscape** — A display or printing mode in which the long dimension is horizontal.

**moire** — A grid-like or checkerboard pattern of distortion sometimes seen when an image is reduced or when the fields in a video image are reversed during scanning.

**MacPaint files** — Bitmapped images saved in the Paint file format for transfer into MacPaint and compatible paint or draw programs for editing and special effects.

**NTSC** — Television standard used in the United States.

**page description language** — A computer language that has commands for creating text and graphics images on a page. PostScript is one of the most widely used page description languages.

**paint program** — A type of graphics application that produces and stores images as bitmaps.

**PAL** — Television standard used in Europe.

**PICT format** — A file format used to store and transfer images that are compatible with the MacDraw drawing application among others.

**PICT 2 format** — An extension of the PICT file format to include color and shades of gray. Used with Apple Color QuickDraw screen and printer page description language.

**pixel** — Picture element. The unit of resolution for scanning and screen displays. Pixels can contain simple black & white information or a bit pattern for shades of gray. An 8-bit pixel contains information for up to 256 shades of gray.

**pixel image** — A multiple-bit-per-pixel image. Color QuickDraw can handle pixel images to produce shades of gray or colors on a screen or printer.

**portrait** — A display or printing mode in which the long dimension is vertical.

**posterization** — An image processing technique that limits the number of gray shades in an image to produce a high contrast, poster-like effect. Posterizing is done by changing the Transfer graymap so that a group of input shades are translated in a single output shade.

**PostScript** — A page description language created by Adobe Systems to control the final images printed by laser printers, Linotronic typesetters and other PostScript compatible printers. PostScript page and image information can be stored in Encapsulated PostScript (EPSF) files.

**raster** — The method by which TV images are generated and displayed. A continuously moving electron beam scans back and forth across the face of the picture tube moving down the screen. In the NTSC standard, the result is a frame or image consisting of 480 horizontal lines.

**resolution** — In image scanning the number of samples taken of the image. MacVision creates and displays a digital image with a resolution of 640 by 480 pixels. Other forms of resolution used in graphics are in relation to a physical standard and include the 72 DPI, dot per inch, resolution of the Macintosh screen and the 300 DPI resolution of a LaserWriter printer.

**RIFF format** — Raster Image File Format. An image file format standard that allows for storage of up to 256 shades. This format also allows compression of image data to save file storage space.

**rotate** — To revolve an image or object around a given point.

**scale** — To change the size of an image or object either vertically, horizontally or both.

**scanning** — A general term for document or image digitizing.

**screen** — A piece of glass or film containing dots used in graphic arts to create halftones from a continuous tone image such as a photograph. The screen breaks the image into halftone dots or lines for reproduction. With electronic images

the halftone effect is created by PostScript commands that control the output printer. Screens are defined by their percent density and angle of rotation.

**TIFF format** — Tagged Image File Format. A file format standard for graphics images that uses tags to identify graphics elements. The TIFF format may be used to transfer image files between computers using the Macintosh/Motorola standard and those using the IBM/Intel standard for byte ordering.

**video frame** — A video frame is the unit of image output of a video camera. A frame contains an interlaced raster image of 480 scan lines with each line containing analog brightness information. A video camera produces video frames at a rate of 30 per second. The video frame rate is the equivalent of a movie camera photographing a scene at a frame speed of 30

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