Digital Video Processing Software

Cardinal®
Technologies, Inc

Disclaimer

Cardinal® Technologies, Inc. provides this publication *as is* without warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability or fitness for any particular purpose. Further, Cardinal Technologies, Inc. reserves the right to revise this publication and to make changes from time to time to the content hereof without obligation of Cardinal Technologies, Inc. to notify any person of such revision or changes. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

Trademarks

The Cardinal logo is a registered trademark of Cardinal Technologies, Inc. SNAPplus and REELtime are trademarks of Cardinal Technologies, Inc. Photostyler and Animator Pro are registered trademarks of AutoDesk Inc. All other products mentioned are trademarks or registered trademarks of their respective companies.

Copyright

© Copyright 1993 Cardinal Technologies, Inc. All rights reserved. No part of this publication may be reproduced, or distributed without the prior written permission of Cardinal Technologies, Inc. 1827 Freedom Road, Lancaster, PA 17601.

TABLE OF CONTENTS

Introduction **1**

REELtime Digital Video Processing Software 3
Manual Organization 4

Part I **5**
A Quick Start–up Guide

Hardware Requirements 7
Loading REELtime 7
REELtime Quick Start–up 8

Part II **9**
Capabilities

Chapter 1 The File Menu 11

1.1 Preferences 13
1.1.1 Scroll Bars 13
1.1.2 Picture Adjust 14
1.1.3 Color Adjust 14
1.1.4 Acquisition Window 14
1.1.5 Video Input 15
1.1.6 Video Rate 15
1.1.7 Video Source Name 15
1.2 Open 16
1.2.1 List Files of Type 16
1.2.2 Play Control Dialog Box 16
1.2.3 The Info Dialog Box 17
1.2.4 Speed Control 17
1.3 Exit 17
1.4 About REELtime 17

Chapter 2 The Capture Menu 19

2.1 Small Frame 21
2.2 Large Frame 21
2.3 The Capture Dialog Box 22
2.3.1 File Types 22
2.3.2 File Name 22
2.3.3 Frame Rate 22
2.3.4 Starting Frame No. 23
2.3.5 Number of Frames 23

2.3.6 Set 23
2.3.7 Start 23
2.3.8 Cancel 23

Chapter 3 The Options Menu 25

3.1 Grayscale Palette 27
3.2 Color Optimized Palette 27

Part III 29
A Step–by–Step Instruction Guide

Chapter 4 Setting–up Preferences 31

Adjust the Video Scroll Bar 34
Adjust the Picture Quality 34
Adjust the Colors 34
Adjust the Acquisition Window 35
Select Video Input 35
Select the Video Rate 36
Enter a Video Source Name 36
Ending the Preferences Session 36

Chapter 5 How to Open a Video File 39

5.1 If you can't find the files 40
5.2 Operating the Play Dialog Box 40
5.3 About REELtime 41
5.4 Exit 41

Chapter 6 How to Capture Video 43

Grayscale 45
Color 45
Small Frame 46
File Type 46
Frame Rate 46
Set 47
Start 47

Part IV 49
A Video Tutorial

Chapter 7 A Video Tutorial 51

7.1 AVI 53
7.2 Brightness 53
7.3 Compression 53
7.4 Contrast 53
7.5 DVI 53
7.6 FLIC File 53
7.7 Flicker 53
7.8 MCI 54
7.9 Monitors – Grayscale 54
7.10 Monitors – Interlaced, Non–interlaced and Multiscan 54
7.11 Monitor Sizes 54
7.12 Palette 55
7.13 Pixel 55
7.14 Resolution 55
7.15 Scanning Frequencies 56
7.16 Scanning Images 57
7.17 Sync Signals 57
7.18 Sync Signal Types 58
7.19 WAVE File 58

Part V 59
Applications

Introduction

REELtime
Digital Video Processing Software

REELtime is a tool for creating video clips that can be used in multimedia presentations, or edited in programs such as Animator Pro and PhotoStyler. You can capture live video sequences and store them on your computer's hard disk in digital format.

Grabbing single frames and converting them to the correct file format used to take hours. With REELtime this task can now be accomplished in a matter of seconds. Using a presentation package like ImageQ from ImageNorth, you can add audio to the clip during your presentation.

REELtime operates under the Windows 3.1 software environment in combination with Cardinal Technologies' SNAPplus board.

The input video signals can be Composite, S–Video or RGB at NTSC or PAL frequencies. These signals are input to the SNAPplus board, saved to hard disk in FLC or TGA format and incorporated into a variety of multimedia applications.

Manual Organization

This manual is divided into five parts.

Part I	Getting Started	page: 5
Part II	Capabilities	page: 9
Part III	Step–by–Step Instructions	page: 29
Part IV	A Video Tutorial	page: 49
Part V	Applications	page: 59

In Part I you will find hardware requirements, how to install REELtime on your system and how to get started.

In Part II we describe the capabilities of REELtime. We explain the functions of the commands in the menu bar and show you how to use them.

In Part III we present a step–by–step instruction guide on how to execute the various functions of REELtime.

In Part IV we discuss commonly used terms and we explain their meaning.

In Part V we show you some examples on how to get the most out of REELtime.

Throughout this text we will use terminology pertaining to the MS–DOS and Windows environment; we therefore assume that you possess a working knowledge of MS–DOS and Windows.

Part I

Getting Started

Hardware Requirements

The minimum system requirements for REELtime are:

CPU:	80386DX/33Mhz 80486SX/25Mhz
RAM:	8Mb; 16Mb recommended
Fixed Drive:	4Mb of free space
Diskette Drive:	3.5" 1.44Mb
SNAPplus Board:	one

Loading REELtime

1. Make certain that you have **Windows 3.1** installed. If this has not been done – do it now.
2. Create a directory on your hard drive and call it REELtime.
   Example: C:> md REELtime – (*Enter*)
3. Copy all files on the REELtime diskette to the REELtime directory; the assumption is to use drive A.
   Example: C:> copy a:*.* c:\REELtime – (*Enter*)
4. Go into Windows; double–click on the Program Manager icon.
5. Click on **NEW** to create a new program group.
6. In the Description field type:
   REELtime. You can leave the Group File field blank.
7. Click on **OK** to create a new Windows folder called **REELtime.**
8. With the REELtime folder open, click on **NEW** in the program manager window to create a new program item.
9. In the Description field type:
   REELtime.
10. In the Command Line field type:
    c:\REELtime\REELtime.exe
11. Click on **OK** to create a new program item.
12. The REELtime

icon should now appear in the work group.

Quick Start

You start REELtime from the Windows environment; proceed as follows:

Step 1

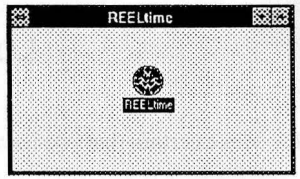
Change to the directory where you installed Windows, i.e.

CD:\WINDOWS (*Enter*)

WIN/S (*Enter*) **(We recommend starting Windows in the standard mode to avoid severe breaks in the video clips.)**

Step 2

Make certain you have loaded REELtime properly and you have established a new work group. Your Program Manager window should display the REELtime icon, which we are showing here.



Step 3

Connect a video source, such as a VCR, to the video input connector of the SNAP-plus board – supply video and connect a monitor to the VGA output.

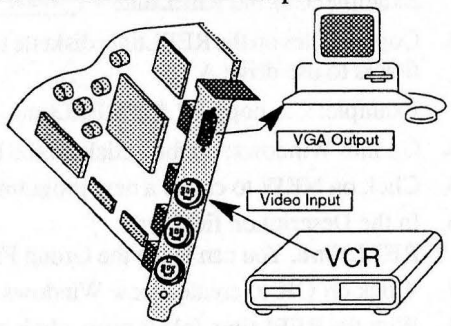
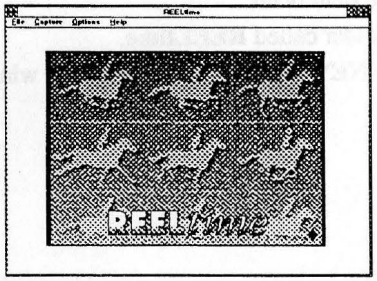


Figure 1 – Component Hook–up

Step 4

Double click on and the REELtime picture will be displayed.



You can wait for the REELtime picture to disappear or you can click on it, using the left mouse button. You will be left with a blank REELtime screen – you are now ready to use the Digital Video Processing Software.

Part II

Capabilities

In Part II of the User's Manual we explain the pull–down menus, what their functions are, how to access them and what they are used for.

Contents

Chapter 1	The File Menu	11
Chapter 2	The Capture Menu	19
Chapter 3	The Options Menu	25

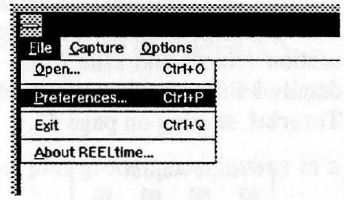
Chapter 1

The File Menu

1.1 Preferences 13
1.1.1 Scroll Bars 13
1.1.2 Picture Adjust 14
1.1.3 Color Adjust 14
1.1.4 Acquisition Window 14
1.1.5 Video Input 15
1.1.6 Video Rate 15
1.1.7 Video Source Name 15
1.2 Open 16
1.2.1 List Files of Type 16
1.2.2 Play Control Dialog Box 16
1.2.3 The Info Dialog Box 17
1.2.4 Speed Control 17
1.3 Exit 17
1.4 About REELtime 17

The File Menu

Step–by–step instructions start on page: 31



With the commands in the File menu you can:

- **Open** a file
- Set up the video parameters using **Preferences**
- **Exit** the program
- Find the version number (**About REELtime**)

Before you perform any operation in REELtime you have to adjust the video parameters using the **Preferences** dialog box. Unless you set all levels properly images that you will save on disk may not be to your liking; i.e. you may see distortions on either side, or the picture quality is not good, etc. You should pay special attention to the **Acquisition Window** adjustments; see Section 1.1.4 on page 14.

1.1 Preferences

See also page: 33

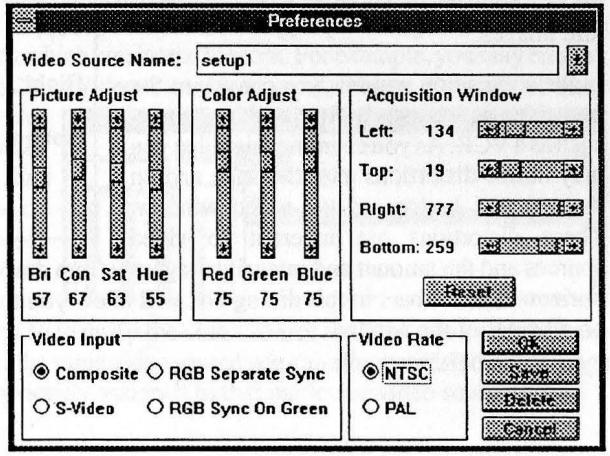
In the Preference dialog box you can adjust image or picture quality, determine the video source, the video rate, and you can eliminate or reduce distortions on the incoming video.

1.1.1 Scroll Bars

See also page: 34

The mouse is used to drag the scroll bars. With the scroll bars you can adjust the video parameters for optimum picture quality and range.

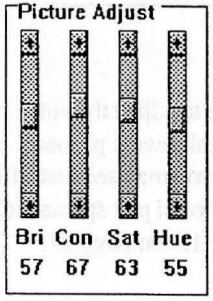
The default settings are:
Picture Adjust: 50
Color Adjust: 75
Video Input: Composite
Video Rate: NTSC
Video Source Name: Default



1.1.2 Picture Adjust

See also page: 34

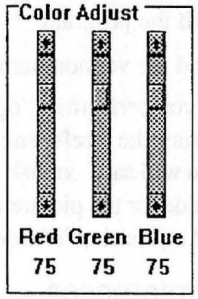
The four vertical scroll bars are used to fine–adjust **Brightness**, **Contrast**, **Saturation** (color) and **Hue** (tint.) More details will be available in the **Video Tutorial**, starting on page 53.



1.1.3 Color Adjust

See also page: 34

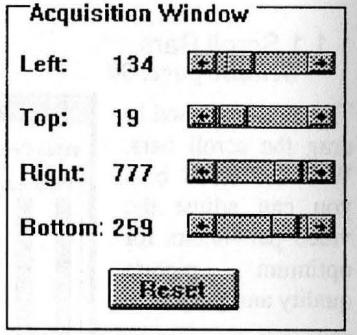
The three vertical scroll bars are used to fine–adjust the **Red, Green** and **Blue** color levels of your incoming video. More details will be available in the **Video Tutorial**, starting on page 53.



1.1.4 Acquisition Window

See also page: 35

The proper adjustment of the **Acquisition Window** is a pre–requisite for obtaining a distortion free input video picture. It should be the first adjustment you make **before** you capture images.



In the acquisition window you can adjust the raw video as it comes in from a video source, such as a VCR. As you examine this video you may notice distortions on either side and on the top and bottom of the video window. These distortions are inherent to video sources and the amount and intensity may vary from device to device. Moving the horizontal scroll bars in this dialog box will allow you to cut off these distortions on all sides of the window.

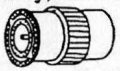
1.1.5 Video Input

See also page: 35

Video input coming from a source can be:

Composite low video quality, single cable terminating in an RCA plug

S–Video good video quality, two conductor cable plus ground with a four pin mini–DIN connector.

RGB highest video quality, four conductors plus ground, terminating in a BNC connector;  one for each conductor.

More details will be available in the **Video Tutorial**, starting on page 53.

1.1.6 Video Rate

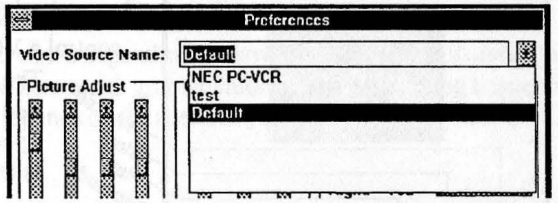
See also page: 36

Video rate refers to the type of video rate your device can supply. NTSC is commonly used in the USA and Japan and PAL is used in Europe; see the **Video Tutorial**, starting on page 53.

1.1.7 Video Source Name

See also page: 36

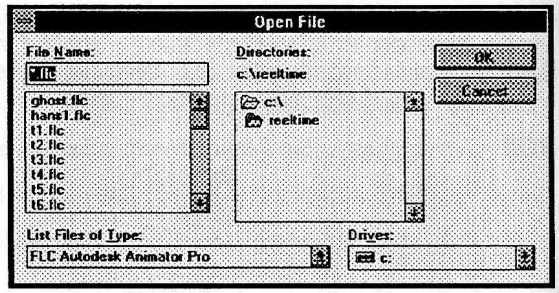
The intensities and strengths of video signals, generated by different sources, can vary a great deal. It is therefore imperative that the appropriate adjustments be made for each video source with which you intend to work. For example, you may employ several VCRs, Video Discs or Video Cameras as input devices. For each of these devices the video parameters will have to be adjusted using the **Preferences** dialog box. After you have completed these adjustments you can enter a unique name in the **Video Source Name** box to identify the video source. Instead of having to make the adjustments again for the same video source you can simply recall these settings by the name you had previously assigned to that particular video source.



1.2 Open

See also page: 39

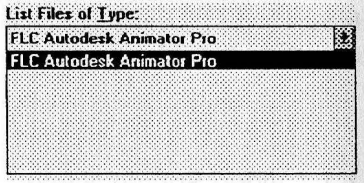
Open is used to display previously saved (on hard disk) video files. A list of input file types is available in the **List Files of Type** box.



1.2.1 List Files of Type

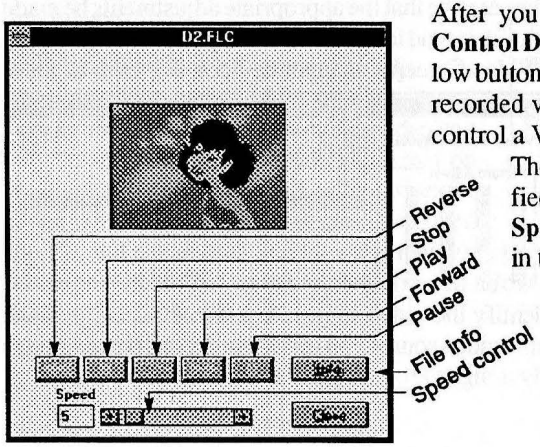
See also page: 39 – Step 2

The **List Files of Type** dialog box lists all currently available **input** file types.



1.2.2 Play Control Dialog Box

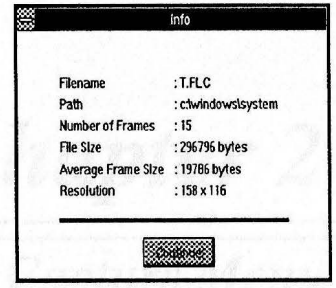
See also page: 40



After you have opened a file the **Play Control Dialog Box** will pop up. The yellow buttons control the movement of your recorded video, much the same way you control a VCR.

The obvious functions are identified in the picture. **File info** and **Speed control** will be explained in the next Sections.

1.2.3 The Info Dialog Box



The Info Dialog Box displays the parameters associated with the file you are viewing.

Filename

This entry refers to the name of the file you are viewing.

Path

This entry shows the file path.

Number of Frames

This entry shows how many frames you had captured.

File Size

This entry shows the size of the file in bytes.

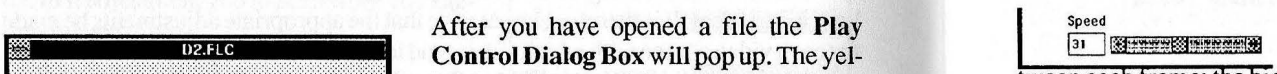
Average Frame Size

This entry shows the average frame size – file size/number of frames=average frame size.

Resolution

This entry refers to the resolution of your captured video. A **Small Frame** will result in poorer resolution and a **Large Frame** will result in better resolution; (see page 21.)

1.2.4 Speed Control



The speed bar adjusts the playback speed of the current file. The number to the left represents the delay time between each frame; the higher the number, the slower the playback speed – the lower the number the faster the playback speed.

The actual speed of playback varies depending on how much graphic information is displayed in each frame and how much graphic information is changing between frames. Playback speed also depends on the speed of your computer and video card.

1.3 Exit

Exit will leave the REELtime program.

1.4 About REELtime

Clicking on this entry will display the version of the REELtime Digital Video Processing Software you are working with.

Chapter 2

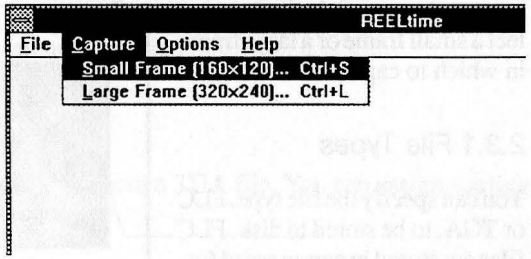
The Capture Menu

2.1 Small Frame 21
2.2 Large Frame 21
2.3 The Capture Dialog Box 22
2.3.1 File Types 22
2.3.2 File Name 22
2.3.3 Frame Rate 22
2.3.4 Starting Frame No. 23
2.3.5 Number of Frames 23
2.3.6 Set 23
2.3.7 Start 23
2.3.8 Cancel 23

The Capture Menu

Step–by–step instructions start on page: 45

The commands in the **Capture** menu are used to capture and save live video on your hard disk.



You can:

- ☞ Capture video in a small frame.
- ☞ Capture video in a large frame.

2.1 Small Frame

The size of the small frame is approximately 160x120 pixels. A small frame occupies about 18 Kb of disk space. The resolution of a small frame is not as good as that of a large frame. If you want to store video frames with better resolution you should use the **Large Frame** command; see the next Section.

Advantage: uses less disk space; higher frame rate (more frames/second) faster playback speed.
Disadvantage: lower resolution.

2.2 Large Frame

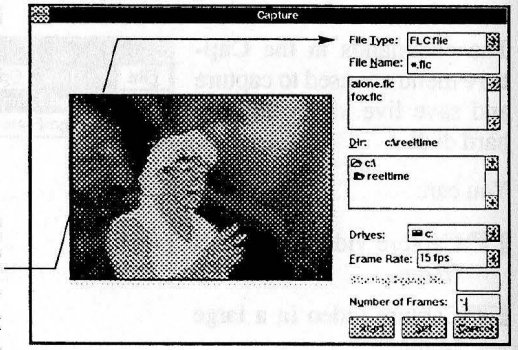
The size of the large frame is approximately 320x240 pixels. A large frame occupies about 75 Kb of disk space. The resolution of a large frame is better than that of a small frame. If you want to store video frames with lower resolution you should use the **Small Frame** command; see the previous Section.

Advantage: higher resolution.
Disadvantage: uses more disk space; lower frame rate (less frames/second) slower playback speed.

2.3 The Capture Dialog Box

See also page: 46

The options in the Capture dialog box are the same whether you select a small frame or a large frame in which to capture live video.



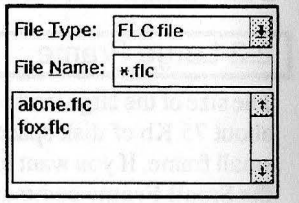
2.3.1 File Types

You can specify the file type, FLC or TGA, to be stored to disk. FLC files are stored in compressed format, they therefore use less disk space than TGA files. TGA files are stored as is, they use up disk space but are easier to edit and the color resolution is much better than FLC files. Of course if you intend to export these files to other programs, such as Photostyler or Animator Pro, you have to make certain that you use the correct format. Photostyler can process TGA files, while Animator Pro can process FLC files.

FLC file names can be 8 characters long and TGA file names can be 4 characters long.

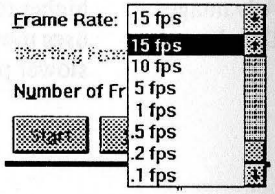
2.3.2 File Name

You can assign a unique file name to each video sequence that you are recording; later on you can open the file by that name.



2.3.3 Frame Rate

The frame playback rate on a VCR is 30 fps (**f**rames **p**er **s**econd.) This means that in one second 30 individual frames are shown on your monitor. The pauses between frames (at that rate) can not be discerned by the human eye; the motion appears very smooth.



The frame rate of capture in REELtime can vary from 15 fps down to .1 fps.

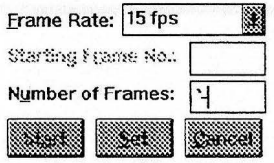
At 15fps we can capture every 2nd frame; 30/15 = 2; playback is smooth.
At 5fps we can capture every 6th frame; 30/5 = 6
At 1fps we can capture every 30th frame; 30/1 = 30
At .1fps we can capture every 300th frame; 30/.1 = 300; playback is jerky.

As we can see a video, captured at 15fps, will play back much smoother than one captured at .1fps.
So why do we want to capture video at .1fps?
At .1fps we can capture more video (a longer sequence of the tape) than we can at 15fps. However, at .1fps we skip more frames than we would at 15fps and therefore the playback looks jerky when captured at .1fps.

2.3.4 Starting Frame No.

This function is active **only** when you record a TGA file. You can assign starting numbers to the frames of your sequence.

2.3.5 Number of Frames



You can specify how many frames you want to capture; the default is 30. The maximum number of frames you can capture, using the small frame window, is 457; using the large frame window you can capture a maximum of 104 frames – the minimum is one frame.

To be able to capture the maximum number of frames you need 16Mb of RAM
If not enough disk space is available, nothing will be saved

2.3.6 Set

When all the settings in the Capture Dialog Box are to your satisfaction click on Set and they will become current.

2.3.7 Start

Click on Start to start the capture process. As soon as you initiate Start the entire capture sequence gets placed into RAM (**R**andom **A**ccess **M**emory) and from there it gets written to disk. When you capture video at .1 fps you will notice that the message below the video window ***Grabbing frames to RAM*** stays up for some time before it informs you that it is ***saving to file – Frame 0.***

2.3.8 Cancel

Click on Cancel to cancel the entire operation and you will return to the main REELtime window.

Chapter 3

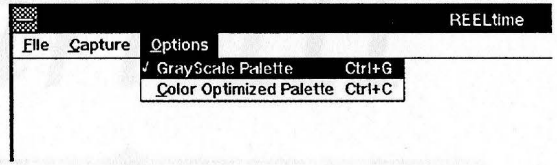
The Options Menu

3.1 Grayscale Palette 27
3.2 Color Optimized Palette 27

The Options Menu

See also Step 2 – page: 45

The commands in the **Options** Menu are used to select the video capture palettes. The Options Menu is effective on FLC files only.



You can:

☞ Capture video in Grayscale.

☞ Capture video in Color.

3.1 Grayscale Palette

Grayscale is the **Default** setting. Once you invoke Grayscale Palette the video will be captured in grayscale. This mode has to be set **before** you do any capture.

When saving to TGA files, the grayscale palette is simulated by removing the saturation from the incoming video. This will work for composite video and s–video, but will not work for RGB video. REELtime cannot save RGB video as grayscale for TGA files.

3.2 Color Optimized Palette

Once you invoke Color Optimized Palette the video will be captured in color. This mode has to be set **before** you do any capture.

When saving to an FLC file, REELtime will convert the digitized video from 16–bits (65,536 colors) down to 8–bits (256 colors). REELtime has been designed for optimum efficiency; it looks at the colors used in the entire clip, and selects 256 colors to represent all of these colors. If a grayscale palette is selected, these 256 colors will be converted to 256 shades of gray.

Part III

A Step–by–Step Instruction Guide

Part III of the User's Manual is a step–by–step instruction guide to show you how you can display captured video files, set the video parameters to obtain good video frames, and how to capture video sequences on your hard disk.

The steps you must follow have been clearly called out.

Contents

Chapter 4	Setting–up Preferences	31
Chapter 5	How to Open a Video File	37
Chapter 6	How to Capture Video	43

Chapter 4

Setting –up Preferences

Adjust the Video Scroll Bar 34
Adjust the Picture Quality 34
Adjust the Colors 34
Adjust the Acquisition Window 35
Select Video Input 35
Select the Video Rate 36
Enter a Video Source Name 36
Ending the Preferences Session 36

Setting–up Preferences

For a general discussion see page: 13

Before you attempt to capture video you should make the various adjustments to get a good picture, using the **Preferences** dialog box.

Step 1

Connect a video source to the input of your SNAPplus board, connect a monitor and supply a video signal; see page 8.

Step 2

Start Windows in **standard** mode, i.e. **WIN/s.**

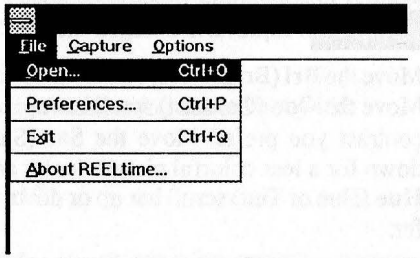
Step 3

Open REELtime, i.e. double click on

Step 4

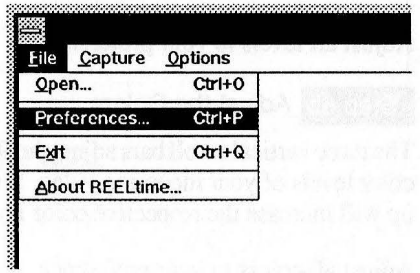
In the Menu Bar click on:
File

You will get the File pull–down menu, pictured to the right.



Step 5

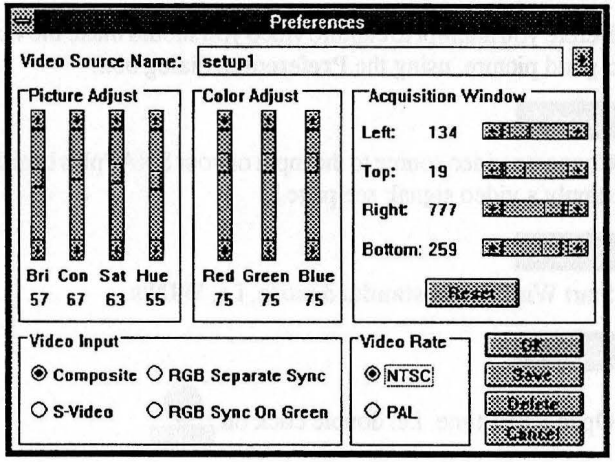
From the File pull–down menu select:
Preferences



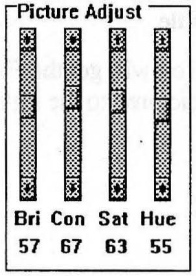
Step 6 Adjust the Video Scroll Bar

See also Section 1.1.1 – page: 13

With the mouse you can drag the scroll bar or you can click on the arrows to move the scroll bar one step at a time. Place the cursor over the arrow and hold the left mouse key for continuous travel. When the scroll bar is in the center position its level is at 50, or mid point; please observe the changing numbers below as the scroll bar moves.



Step 6a Adjust the Picture Quality

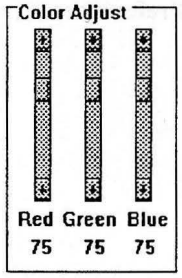


Move the **Bri** (Brightness) scroll bar up for a brighter picture. Move the **Con** (Contrast) scroll bar up or down to obtain the contrast you prefer. Move the **Sat** (Saturation) scroll bar down for a less colorful picture (color adjust) and move the **Hue** (Hue or Tint) scroll bar up or down for the tint you prefer.

When an RGB signal is input to the SNAPplus card Saturation and Hue can not be adjusted.

Adjust all levels to your preference.

Step 6b Adjust the Colors



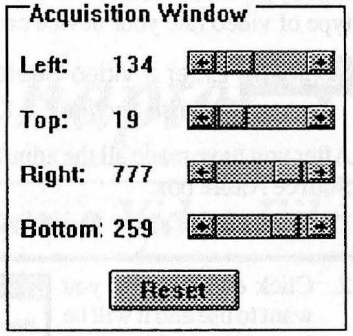
The three vertical scroll bars adjust the **Red, Green** and **Blue** color levels of your incoming video. Moving the scroll bars up will increase the respective color levels.

Adjust all colors to your preference.

Step 7 Adjust the Acquisition Window

See also Section 1.1.4 – page: 14

Distortions on either side of the video window can be reduced or eliminated by moving the respective scroll bar.



For example: take a look at the top of the video scene coming from a VCR. You can observe distinct distortions in this area. Using the **Top** scroll bar move it or click on one of the arrows to move it a step at a time, you will observe that the picture moves in the vertical direction, eliminating these distortions. You can do the same for any distortions you may have on any side of the video window by moving the appropriate scroll bar.

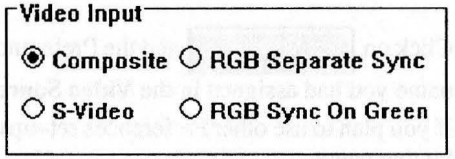
Please keep in mind that you may have to balance the left **and** the right, the top **and** the bottom to achieve the desired results. It may take a little practice to get a final, good picture. If these distortions have not been completely eliminated or reduced to your satisfaction when you open a video window, go back to the Preference dialog box and adjust them again.

Click on **Reset** if you want to go back to the settings you started out with.

Step 8 Select Video Input

See also Section 1.1.5 – page: 15

Place your mouse cursor over the radio button and click on the type of video input you are providing.

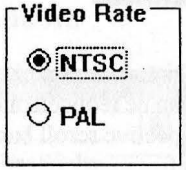


Please check in the instruction manual of the video equipment you are using for the type of video output signal it provides.

- Most consumer VCRs supply composite video.

Step 9 Select the Video Rate

See also Section 1.1.6 – page: 15



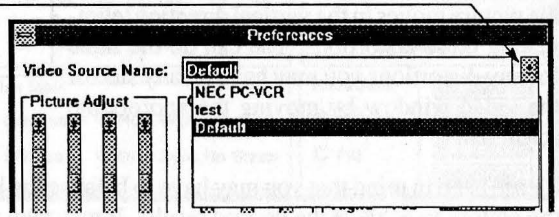
Place your mouse cursor over the radio button and click on the type of video rate your device can supply.

Step 10 Enter a Video Source Name

See also Section 1.1.7 – page: 15

After you have made all the adjustments you can enter a unique name in the **Video Source Name** box.

1. Click on this arrow to display a list of existing file names.



2. Click on the name you want to use and it will be inserted as the video source name. In this example we have **Default, NEC PC–VCR** and **test.**
3. If you want to create a new name bring the cursor over the Video Source Name box and enter the new name.

   Please observe the changing setting of the scroll bars as you recall various **Video Source Names** – to match the settings of the video source that is being recalled.

Step 11 Ending the Preferences Session

Click on [Save] and the Preferences you have set will be saved under the name you had assigned in the **Video Source Name.**

If you plan to use other Preferences set–ups you can then easily recall each of them by that name.

Click on [Delete] and you erase the highlighted Video Source Name from the list.

Click on [Cancel] to cancel the Preferences set–up session – no changes will have been made.

Click on [OK] if you want to make temporary changes without saving the adjustments.

Chapter 5

How to Open a Video File

5.1 If you can't find the files 40
5.2 Operating the Play Dialog Box 40
5.3 About REELtime 41
5.4 Exit 41

How to Open a Video File

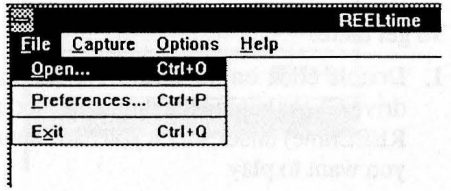
For a general discussion see Section 1.2 page: 16

You must have a video file stored on your hard disk before you can open it.

Step 1

In the Menu Bar click on: **File.**

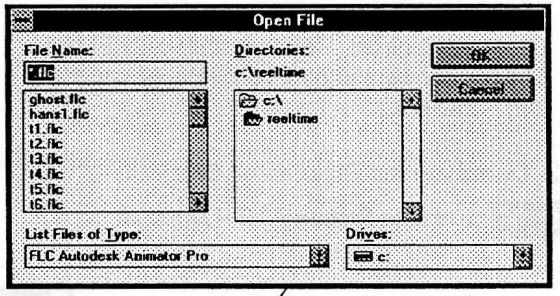
You will get the File pull–down menu pictured to the right.



Step 2

From the File pull–down menu select: **Open.**

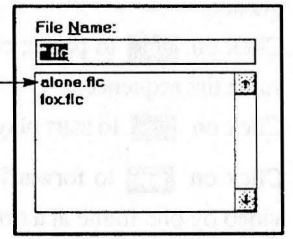
You will get the **Open File** dialog box, shown to the right.



Click on this arrow to get a list of available **input** file formats; at this time only FLC files can be opened.

Step 3

Click on a file name, in our example: **alone.flc** – this name will be placed in the File Name box.



Click on **OK** and the image file will be displayed (see picture on page 40)

You may also double click on a file name and the image file will be displayed at once.

If the files appear in the File Name box, then choose one and:

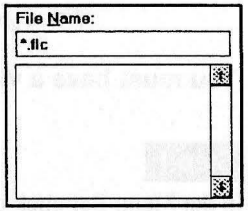
Go to Step 4

otherwise continue with Step 3a.

5.1 If you can't find the files.

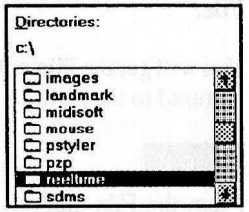
Step 3a

If you are pointing to a directory which does not contain the files you want to display, or if the File Name box is empty (see picture to the right), make sure that you are pointing to the correct disk drive and the correct directory.

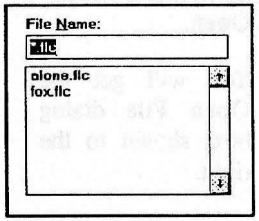


To get there:

1. Double click on the disk drive (in our example: drive C) containing the directory (in our example: REELtime) under which you had captured the file you want to play.

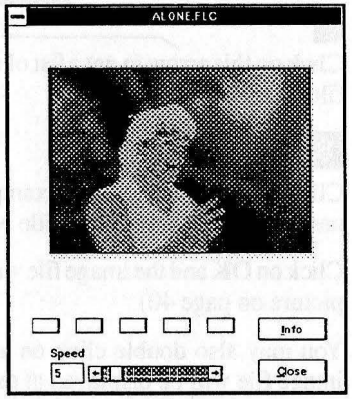


2. Double click on the directory name i.e. REELtime. The file names will now be displayed under the File Name box.



5.2 Operating the Play Dialog Box.

Step 4 *See also Section 1.2.2 – page: 16*



Click on to reverse the direction of the video by one frame at a time.

Click on to stop the play; click on play and the video will start from the beginning of the sequence.

Click on to pause; click on play will resume the sequence.

Click on to start play.

Click on to forward the direction of the video by one frame at a time.

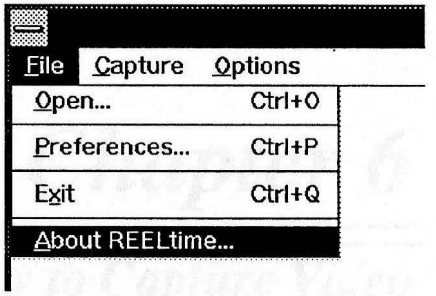
Click on to get information about the frame.

Click on to vary the play back speed.

Click on to close the play dialog box.

5.3 About REELtime

Click on **About REELtime** and the version number of the software will be displayed, see below.



5.4 Exit

Click on **Exit** to end the REELtime session.

Chapter 6

How to Capture Video

Grayscale 45
Color 45
Small Frame 46
File Type 46
Frame Rate 46
Set 47
Start 47

How to Capture Video

For a general discussion see page: 21

Step 1

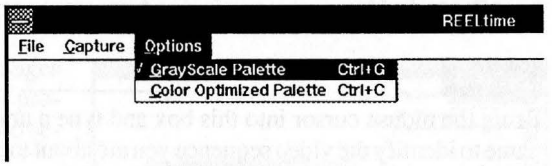
Make sure you have a video source hooked up to the SNAPplus board (see page 8.)

Step 2

Decide whether you want to capture the video in **Grayscale** or **Color.**

Step 3

Click on the **Options** Menu.



Step 3a ***Grayscale***

Click on **Grayscale Palette.**
The system is now set to capture video in grayscale.

Go to Step 4

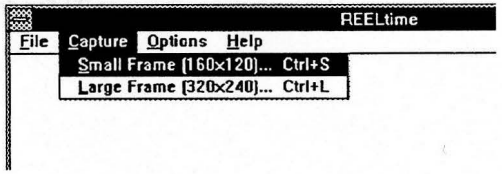
Step 3b ***Color***

After you have chosen **Options** click on **Color Optimized Palette.**
The system is now set to capture video in color.

Step 4

In the Menu Bar click on : **Capture**

You will get the Capture pull–down menu pictured to the right.



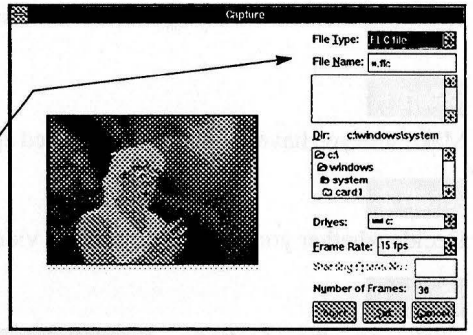
Step 5

Choose either a **Small Frame** or a **Large Frame.** The resulting Capture Dialog Box will be the same for either frame, except that the video window size will be different. Since the steps are the same we will discuss the procedure for a **Small Frame** only.

Step 6

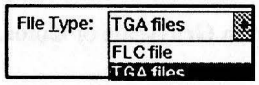
Click on **Small Frame** and you will get the Capture Dialog Box, pictured to the right.

See also Section 2.3 – page: 22



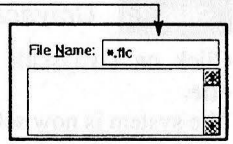
Step 7

Click on **File Type** to get a listing of file types and make your choice; see page 22 for details.



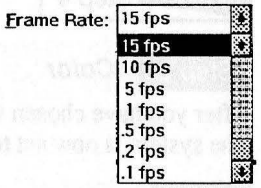
Step 8

Bring the mouse cursor into this box and type a unique name to identify the video sequence you are about to capture.



Step 9

Click on **Frame Rate** to get a list of rates available – make your choice by clicking on the one you wish to employ; see page 22 for details.

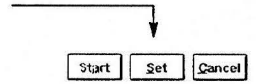


Step 10

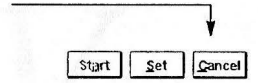
Enter the number of frames you wish to capture in your video sequence; see page 23 for details.

Step 11

Click on **Set** – the settings will now become current.

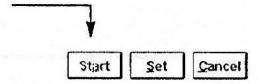


Note:
If you change your mind click on Cancel and the pull–down window will disappear.

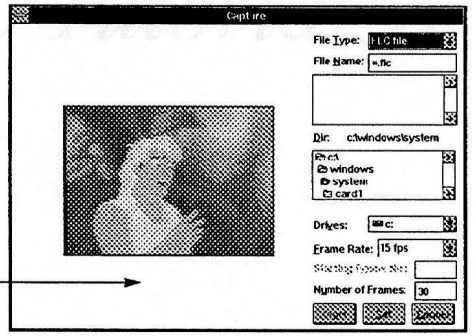


Step 12

Click on **Start** – recording will now begin. The sequences, starting from the time you clicked on **Start** will now be recorded to your hard disk.



Please observe the status messages below the video window as the program grabs and saves the video sequences to disk.



Part IV

A Video Tutorial

Chapter 7

A Video Tutorial

7.1 AVI 53
7.2 Brightness 53
7.3 Compression 53
7.4 Contrast 53
7.5 DVI 53
7.6 FLIC File 53
7.7 Flicker 53
7.8 MCI 54
7.9 Monitors – Grayscale 54
7.10 Monitors – Interlaced, Non–interlaced and Multiscan . 54
7.11 Monitor Sizes 54
7.12 Palette 55
7.13 Pixel 55
7.14 Resolution 55
7.15 Scanning Frequencies 56
7.16 Scanning Images 56
7.17 Sync Signals 56
7.18 Sync Signal Types 58
7.19 WAVE File 58

A Video Tutorial

7.1 AVI

(Audio Video Interleaved) A product developed by Microsoft which synchronizes motion video and audio without the use of specialized hardware. This could be used to create *Talking Head* presentations, display animation sequences and to present multimedia slide shows.

7.2 Brightness

Brightness is the ability to intensify colors on the screen. A good brightness control allows the brightness of the image to be increased or decreased without changing the image's color attributes.

7.3 Compression

A digital process that allows data to be stored or transferred using less than the normal number of bits. DVI is an example of hardware compression and AVI is an example of software compression.

7.4 Contrast

Contrast is the difference between light and dark. The higher the contrast a monitor is capable of, the crisper the image appears.

7.5 DVI

Digital Video Interactive is a proprietary technology developed by **Intel** (and licensed by IBM) for full motion video at a high level of compression (hardware.) This technology will be supported by Windows using MCI commands.

7.6 FLIC File

7.7 Flicker

Flicker is the perception of light changing intensity. On CRT monitors it is created by the phosphor lighting up as it is struck by the electron beam and then fading when the beam is turned off. The longer the phosphor glows, the less likely is it that the image will flicker. Flicker is influenced by the monitor's refresh rate. The slower the vertical scanning frequency the more flicker.

Flicker is related to the similarities in the characteristics of the phosphorous and the human eye. Light emitted by the phosphorous on the screen's surface decays rapidly. Similarly, light initiated by chemical reactions in the human eye decays (at a slower rate), crating the impression of light even after the light source is removed. When an image is refreshed before the chemical reaction of the eye has decayed, then the eye perceives the image as a continuous steady image. When the image is

refreshed after the chemical reaction of the eye has decayed, then the eye will perceive a flickering image. The point at which the eye perceives a flicker is called the flicker threshold.

If you open and close your eyes very rapidly for a few seconds you can create flicker with your vision. While your eyes are open they are exposed to light and when you close them the light disappears. It is the same principle on a CRT screen.

Flicker causes eye strain and headaches. It is more noticeable when using graphical user interfaces (GUI's) and graphical applications. The user's peripheral vision notices it more on monitors over 14".

To avoid flicker vertical scanning frequencies of 79 Hz or higher should be used for resolutions of 1024x768 and 640x480 resolutions. Vertical scanning frequencies of 70 Hz or higher is a must for users working with graphical applications as well as Windows applications because of the white background which makes flicker more noticeable.

7.8 MCI

Media **C**ontrol **I**nterface is a high level control software that provides a device independent interface to multimedia devices and media files. MCI includes a command message interface and a command–string interface. This interface is supported by both IBM and Microsoft.

7.9 Monitors – Grayscale

Greyscale monitors display up to 256 levels of grey. Greyscale is achieved by variations of the luminance value of *white* light from black to white.

19"	1280x1024 and down
21"	1600x1280 and down

7.10 Monitors – Interlaced, Non–interlaced and Multiscan

These terms refer to the method used to scan the screen horizontally. Some high resolution monitors have too low of a horizontal scanning frequency to permit the display of all their pixels without flicker. These monitors use a scanning method called interlacing.

Interlacing breaks the image into two fields, scanning all the even horizontal lines, and then alternating, scanning all the odd horizontal lines. This is the lower cost method of vertical scanning and the trade off is an increase in flicker.

Interlacing works very well in cases such as television that displays scenes, composite, changing images. However, in text and graphic applications, horizontal lines will flicker because the displayed static image is refreshed below the flicker threshold frequency.

To minimize flicker interlaced CRT monitors use **long persistent phosphors** since they glow longer than standard phosphors. Although long persistent phosphors

glow longer, they are not as bright as normal persistent phosphors. In addition, long persistent phosphors may cause lingering images (ghosts) when an image is removed from the screen, i.e. when the cursor is moved using a mouse.

Non–interlaced monitors scan every line sequentially from top to bottom. As opposed to the every–other–row approach of interlacing, non–interlaced monitors draw the complete image in one pass. Such monitors are significantly more expensive, but produce flicker–free video in high resolution modes.

Multiscan or multiple frequency monitors can adjust to any frequency up to, and in some cases, beyond its stated maximum. As each video resolution comes with a defined set of horizontal and vertical scanning frequencies, a multiple–frequency monitor synchronizes to the particulars of a wide range of video modes.

7.11 Monitor Sizes

Low resolution applications, such as DOS based word processing generally use 13" and 14" monitors. CAD applications, graphic user interfaces (GUI's) and desktop publishing applications requiring very sharp crisp images use 17", 19", 20" and 25" monitors.

As a general rule of thumb, the following minimum resolutions should be used with the corresponding size monitor.

14"	800x600 and down
16"	1024x768 and down
17"	1024x768and down

7.12 Palette

A card's palette size is determined by the maximum number of colors it can create. An adapter's palette size is directly determined by the amount of memory on the card. In Windows, a palette is a data structure defining the colors used in a bitmap image.

7.13 Pixel

A single point of an image. A screen's resolution is commonly referred to in pixels.

7.14 Resolution

A monitor displays images by breaking them down into very small raster elements called **pixels** (picture elements), which are the smallest information building blocks of a display image. On color monitors each pixel is made up of one or more colors; blue, green and red. The size of a pixel is measured in dots per inch (**dpi.**) The smaller the pixel, the more pixels can be placed in a horizontal row. The smaller the pixel the finer the resolution and therefore the sharper the display image.

A monitor with a resolution of 640x480 has 640pixels in each horizontal row and 480 horizontal rows. By multiplying those numbers, i.e. 640x480, you get 307,200,the total number of pixels the screen can display. Therefore an in image consisting of 320x200 pixels (64,000 pixels per image) is very coarse, while an image of 1280x1024 pixels (1,310,720 pixels per image) is very fine.

The maximum resolution of a monitor is determined by the size of the pixels (dpi), the horizontal scanning frequency and the width of the monitor. Assuming the same horizontal scanning frequency and the the same size of pixels, an image displayed on a 14 " monitor with a 640x480 resolution looks smoother and finer than when displayed on a 21" monitor with a 640x480 resolution because the **dpi** or dot density is higher on a 14" monitor. The formula for figuring the dots per inch of a monitor is to divide the maximum number of pixels in the horizontal direction by the horizontal screen dimension in inches i.e. 640/14 = 45.71 dpi.

Resolution does not describe the quality or sharpness of the image displayed by the monitor. It is only the capability, one limited by the signal from the video controller, to address a number of pixels. Therefore, resolution figures should not be used as a measure of image quality but of compatibility(whether the monitor will work with specific signals from the video controller.) The actual sharpness of an image is influenced by a combination of factors, including the electronics of the monitor, the CRT (Cathode Ray Tube), the mechanical construction of the monitor and even the size of the screen.

7.15 Scanning Frequencies

The **horizontal scanning frequency**, measured in KHz, determines the maximum amount of information that can be placed on one horizontal line during one scan of that line. For instance, a monitor with a horizontal scanning frequency of 31.5 KHz can place more information on a horizontal line than a monitor with a 15.75 KHz horizontal scanning frequency.

The **vertical scanning frequency**, measured in Hz, is referred to as the refresh rate. It determines how fast the monitor can scan from top to bottom of the screen to display the image. A monitor with a 60 Hz vertical scanning rate will refresh the entire screen sixty times per second.

Vertical and horizontal scanning frequencies are interdependent. If the resolution is to stay the same when the vertical scanning frequency is increased the horizontal scanning frequency must increase also. For instance: suppose you have a 640x480 monitor with a 60 Hz vertical scanning frequency and a 31.5 KHz horizontal scanning frequency. If the vertical scanning frequency is increased to 72 Hz then the horizontal scanning frequency must increase to approximately 36 KHz.

7.16 Scanning Images

A monitor can not display any video without a video controller (also known as a Graphics Card or a VGA Adapter.) A video controller stores the entire image in the form of pixels in its **RAM** (Random Access Memory) and then sends the information to the monitor. Although the video controller can store all the pixels, the monitor can display only one pixel at a time. Therefore the video controller must send each pixel to the monitor one at a time (serially.)

The video controller begins displaying the image by sending all the pixels for the first line to the monitor causing the guns (part of the monitor) to send a beam of electrons that sweep across the top row of the screen from left to right. After all the pixels for the first row have been sent and the electron beam reaches the right hand side of the screen the video controller sends a special signal, called the **horizontal sync** (synchronization) **pulse** to tell the gun to begin a new row. The beam is turned off, the gun moved a row down and to the left hand side of the screen and then swept across the screen again from left to right. (This is the same pattern we use when we read.)

This sweeping or scanning process continues until the gun reaches the bottom of the screen. The video controller the issues a **vertical sync pulse** to the monitor instructing it to start a new image on the first line. The electron beam is then turned off while the gun is aimed at the top of the screen again where it begins scanning the entire screen again. This process is referred to as **horizontal scanning** and **vertical scanning.** Scanning rates are measured in units of Hertz. One Hertz (Hz) is one cycle per second and one thousand Hertz is one thousand cycles per second or one kilo Hertz (KHz.)

Images are formed during the scanning process by turning the electron beams on and off as the gun sweeps across the screen. The beam is turned of where no image is to appear. When the beam is turned on it strikes the phosphor, causing it to glow. The glowing phosphor is seen as a spot of light on the front of the monitor;(the gun and the phosphor is behind the screen, on the inside of the monitor.) Since the phosphor glow fades quickly, the screen must be continuously scanned to sustain the image.

7.17 Sync Signals

Horizontal and vertical sync signals from the video controller tel the circuitry in the monitor when and where to aim the gun. *All the sync characteristics of the monitor must match the same characteristics in the video controller.*

Multiscanning or multisyncing monitors are preferred because they instantly tune in a wide range of video modes and resolutions as long as the scanning range of the video controller does not exceed the range of the monitor. Better super VGA controllers feature multiscanning.

7.18 Sync Signal Types

Analog sync signals may be **combined** (one signal for both horizontal and vertical syncs on one line) or **separate** (two signals, one for each of the two syncs.)

Composite Sync

A method that combines the horizontal and vertical sync on one input line.

RGB Separate Sync

Separate sync sends the horizontal and vertical sync positioning signals from the video controller to the monitor on their own separate line;They typically use 5 BNC connectors.

RGB Sync on Green

A method that combines the horizontal and vertical sync on one video input lines; normally green in color monitors.

7.19 WAVE File

A Microsoft standard file format for storing waveform audio data. WAVE files have a .Wav filename extension.

Part V

Applications

Applications

REELtime is designed as a tool for creating video clips that can be used in multimedia presentations, or edited in programs like Animator Pro and PhotoStyler. What used to take hours by grabbing single frames and converting to the correct file format can now be done in a matter of seconds with REELtime. Using a presentation package like ImageQ from ImageNorth, you can add audio to the clip during your presentation.

Editing your REELtime clips

After you have saved your video clip to an FLC file, you can take the clip into Autodesk Animator Pro to edit it. Under Animator Pro you can discard frames, adjust colors and add animated objects, backgrounds or text to the clip.

If you save the video clip to TGA files, you can use any of several image processing packages to edit the frames and finally assemble the frames into an FLC file using Animator Pro. Using combinations of programs like Aldus PhotoStyler and Gallery Effects, you can apply stunning effects to your clips such as a clear sky changing to stormy weather, or a water–colored person coming to life over a series of frames.

Using REELtime clips in a presentation

After you have saved a video clip to an FLC file you can use the file as part of a multimedia presentation. Using a presentation package such as ImageQ or HSC InterActive, the FLC file can be simply inserted into a script along with still images, live video, or audio files to create an exciting show on the PC. The FLC file could also be converted to an AVI file in Microsoft's Video for Windows package, allowing the audio to be synchronized to the video clip.

Index

A

A Quick Start–up Guide, 5
  Hardware Requirements, 7
  Loading REELtime, 7
  REELtime Quick Start–up, 8

A Step–by–Step Instruction Guide, 29

A Video Tutorial, 49

About REELtime, 17

Applications, 59

AVI, 53

B

Brightness, 53

C

Cancel, 23

Capabilities, 9
  The Capture Menu, 21–24
  The File Menu, 13
  The Options Menu, 27–28

Capture Dialog Box, 22
  Cancel, 23
  File Name, 22
  File Types, 22
  Frame Rate, 22
  Number of Frames, 23
  Set, 23
  Start, 23
  Starting Frame Number, 23

Capture Menu, 21–24
  Large Frame, 21
  Small Frame, 21

Color Optimized Palette, 27

Compression, 53

Contrast, 53

D

DVI, 53

E

Exit, 17

F

File Menu, 13–18
  About REELtime, 17
  Exit, 17
  Open, 16–18
  Preferences, 13–18

File Name, 22

File Types, 22

Flicker, 53

Frame Rate, 22

G

Grayscale Palette, 27

H

How to Capture Video, 45–48
  Color, 45
  Grayscale, 45

How to Open a Video File, 39–42
  File Name Box, 39
  If you Cant Find the Files, 40
  Open Image Dialog Box, 39
  Operating the Play Dialog Box, 40

I

Info Dialog Box, 17
  Average Frame Size, 17
  File Size, 17
  Filename, 17
  Number of Frames, 17
  Path, 17
  Resolution, 17

Introduction, 1

L

Large Frame, 21

List Files of Type, 16

M

Manual Organization, 4

MCI, 54

Monitors, 54
- Grayscale, 54
- Interlaced, 54
- Multiscan, 54
- Non–interlaced, 54
- Sizes, 55

N

Number of Frames, 23

O

Open, 16
- Info Dialog Box, 17
- List Files of Type, 16
- Play Control Dialog Box, 16
- Speed Control, 17

Options Menu, 27
- Color Optimized Palette, 27
- Grayscale Palette, 27

P

Palette, 55

Pixel, 55

Play Control Dialog Box, 16
- Speed Control, 17

Preferences, 13–18
- Acquisition Window, 14
- Color Adjust, 14
- Picture Adjust, 14
- Scroll Bars, 13
- Video Input, 15
- Video Rate, 15
- Video Source Name, 15

R

REELtime Digital Video Processing Software, 3–4

Resolution, 55

S

Scanning Frequencies, 56
- Horizontal Scanning, 56
- Vertical Scanning, 56

Scanning Images, 57

Scroll Bars, 13

Set, 23

Setting–up Preferences, 33–36
- Adjusting the Acquisition Window, 35
- Adjusting the Colors, 34
- Adjusting the Picture Quality, 34
- Adjusting the Scroll Bar, 34
- Ending the Preferences Session, 36
- Enter a Video Source Name, 36
- Select the Vido Input, 35
- Select the Vido Rate, 36

Small Frame, 21

Start, 23

Starting Frame No., 23

Sync Signals, 57
- Types, 58
  - Composite Sync, 58
  - PGB Sync on Green, 58
  - RGB Separate Sync, 58

V

Video Tutorial, 53–58

W

WAVE File, 58