

## ColorView for Windows

Version 0.97

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ColorView is a shareware product, it is not free. Shareware distribution gives users a chance to try software before buying it. If you try a Shareware program and continue using it, you are expected to register. With registration of ColorView version 0.97, you will receive a diskette with the latest version of the software and documentation. In addition, you will receive ColorView version 1.0 when it is released - free of charge.

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You are encouraged to pass a copy of ColorView along to your friends for evaluation. Please encourage them to register their copy if they find that they can use it. All registered users will receive a copy of the latest version of the ColorView system.

## REGISTRATION

Please use this form to register ColorView. The registration for ColorView version 0.97, entitles you to receive a free upgrade to ColorView version 1.0 when it is released. See Appendix A for a list of features planned for Version 1.0. With registration you will receive a disk containing both **ColorView '286** and **ColorView '386**.

### REGISTRATION FORM ColorView for Microsoft Windows v. 0.97

NAME: \_\_\_\_\_

STREET: \_\_\_\_\_

CITY: \_\_\_\_\_

STATE: \_\_\_\_\_ ZIP \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

ColorView license number.....	\$29.95	_____
New Jersey residents add 7% sales tax..	(\$2.10)	_____
US residents - Shipping and handling...	\$5.00	_____
Other - Shipping and Handling .....	\$8.00	_____

Total in US Funds drawn on a US Bank.. \$ \_\_\_\_\_

Circle Disk Size: 3 1/2"      5 1/4"

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## INTRODUCTION

**ColorView** is a program designed to view and manipulate color images in the Microsoft Windows™ environment. Some of the features slated for version 1.0 are not in this pre-release. Please see Appendix A for the complete list of features and formats supported in the version 1.0. Two versions of the software are available: **ColorView '286** and **ColorView '386**. The latter is optimized to make use of the Intel 80386 instructions to improve performance of JFIF conversions. Both versions support the same formats and provide the same features. The only difference is speed: **ColorView '386** is significantly faster than **ColorView '286**. Of course, **ColorView '386** requires a 80386 or better processor to run.

## HARDWARE & SOFTWARE REQUIREMENTS

The following hardware and software is supported by **ColorView** version 0.97:

Color display (any resolution):

- 8** bit, 256 color, palette based, or
- 15** bit 'true' (32768 colors) color, or
- 24** bit true color.

**VGA:** The software will run correctly on a 4 bit (standard VGA) display, but 16 colors will not be enough to render the image correctly on the screen.

CPU and memory:

**80286** or above for **ColorView '286**.

**80386-SX, 80386** or above system is required for **ColorView '386**.

**Memory:** As much as possible. Anything from 2 MBytes to infinity is recommended. In general, the more memory you have available in Windows, the bigger the image you can display (and the faster ColorView will run). Options are provided to utilize your hard disk as temporary storage if there is not enough physical/virtual memory.

Operating System:

MS-DOS, **Microsoft Windows 3.0** or **3.1**

## WHAT'S NEW IN COLORVIEW VERSION 0.97

ColorView version 0.97 is an upgrade to the previously released version 0.95 (version 0.96 was never released). These are the main additions and improvements from the previous release:

- o **Greatly improved memory management**

ColorView no longer requires large contiguous memory blocks for image storage. If necessary, ColorView can use your hard disk for temporary storage of image data. This relaxes the requirement for a large virtual memory (see the Conserve Memory option below). This will also resolve some of the problems reported while running under OS/2 v. 2.0. Images can now be processed with as little as 2 megabytes of physical RAM.

Diagnostics have been added to determine the memory requirements for each image before it is loaded. If a low memory condition is detected, then ColorView will take steps to reduce its memory requirements, and will provide hints on re-configuring your system if necessary.

A problem which caused memory to be retained after freeing an image has been corrected.

- o **Better Heckbert Quantizing algorithm**

ColorView 0.97 provides a much better Heckbert Quantizing algorithm. The chosen colors now match the original 24-bit image much closer, providing better quality output and making dithering unnecessary in many cases.

- o **Graphics formats**

Reading of 24-bit Windows Bitmaps (\*.BMP) files now works on 8-bit displays by using the chosen quantizing algorithm and dithering.

Full GIF '87a standard is now supported. GIF '89a files can also be read, but only features supported in GIF '87a will be processed.

- o **Improved screen management**

ColorView now contains a work-around of a common error in Windows video display device drivers that caused portions of a large image to be left blank.

Another common bug in display drivers caused some large images to generate an Application Error (UAE) when the image was being displayed in version 0.95. A work-around was implemented in version 0.97.

Additional diagnostics were added to properly detect graphics device drivers and their features.

A problem in the Stretch-Image option was corrected to properly preserve the original aspect ratio. The Stretch-Image option was re-written to avoid using additional memory, and to run faster in low memory conditions.

The Arrow keys, Page Up, Page Down, Ctrl-Left and Ctrl-Right, Home and

End keys can now be used to pan around the image. This works even when the scroll-bars are not visible.

Progress is now reported in percent, showing exactly how much more processing needs to take place at any point in time.

o ***Speed Improvements***

JPEG reading has been optimized for non-386 systems, improving speed by approximately 25% in ColorView '286.

The Heckbert Quant without dithering option is now much faster than in version 0.95.

Significant speed improvements have been made in saving 8 and 24 bit images in GIF and Windows BMP formats.

Overall system performance has been improved in low-memory conditions. See the "SETTING UP - Memory" section for some helpful hints.

o ***Command Line Arguments***

ColorView now accepts command line arguments to automatically load and process images. See the "User's Guide" for details.

o ***Other internal problems were corrected.***



## COLORVIEW FEATURES

This version of the software supports the following image formats:

Reading:

**JPEG** (JFIF subset) \*.JPG: 24 bit color, highly compressed images  
**GIF'87** (GIF'89 in v1.0) \*.GIF: LZW encoded 8 bit palette based images  
**Windows Bitmaps** \*.BMP: (RLE in v1.0) 4 bit, 8 bit and 24 bit color images

Writing:

**JPEG** (JFIF subset) in version 1.0  
**GIF'87**  
**Windows Bitmaps** (RLE in v1.0): 8 bit and 24 bit color images

### Some Commonly Asked Questions:

**Q:** Will ColorView '386 run on 80386 SX processor?

**A:** Yes

**Q:** Will ColorView '286 run on a 80386 processor?

**A:** Yes, but we recommend using ColorView '386 for better performance.

**Q:** Will ColorView run with only 2 MBytes of memory?

**A:** Version 0.97 has been extensively tested on a 2MByte computer. If you follow the recommendations in the "SETTING UP - Memory" section below, you should have no problems.

**Q:** Is there a DOS version of ColorView?

**A:** Not yet, but we are working on it.

**Q:** Does ColorView create temporary files?

**A:** Version 0.97 has the Conserve Memory option that will create temporary files on your hard disk. If you don't select this option, all temporary files are created by Windows when run in Enhanced 386 mode. Their size will depend on the image you are trying to load and the amount of physical RAM you have in your computer.

**Q:** How fast is ColorView?

**A:** We've performed some extensive timing on three types of machines. You can see the results in the TIMINGS.WRI file included with this version.

**Q:** Why doesn't ColorView work with my graphics card?

**A:** Version 0.97 now does more sophisticated checks to determine the type of your graphics card, and its capabilities. If you still don't see correct colors, please let us know the type of the card and the version of the display driver you are using.

## SETTING UP - Memory

24-bit color images are notorious for taking up large amounts of memory. For example, when decoded for display, a 640 x 480 24 bit JPEG file will take up almost 1Mbyte of memory. The discussion that follows will provide some hints on how to best configure your computer and Microsoft Windows to take advantage of the available physical RAM, and how to fine-tune the performance to handle large images.

### Hint - **Follow ColorView suggestions when low on memory:**

If ColorView determines that you don't have enough memory to load a particular image, it will go through the following steps, and will continue with loading the image if possible:

1. ColorView will attempt to compact the Windows memory to eliminate fragmentation.
2. If you are requesting a Heckbert Quant, ColorView will try to reduce the amount of memory needed for this operation by choosing different operating parameters. ColorView will notify you when this adjustment has occurred.
3. If steps 1 and 2 failed, ColorView will ask you if you want to use the Conserve Memory option, and it will continue loading the image if you say 'Yes'.
4. If all steps above failed, ColorView will display an error message with suggestions on how you can fine-tune your particular system based on your current configuration. If this happens, please read the rest of this section for more detailed information.

### Swap file vs. ColorView temporary files:

For ColorView, the important factor is how much physical memory (RAM) is installed on your computer. If ColorView has to use the Windows' swap file (see below for more information on swap files) to load an image, the performance will degrade dramatically. This is due to the fact that the Windows' Virtual Memory Least Recently Used algorithm is not good at predicting which memory pages will be needed in situations where memory access is almost random.

### Hint - **use Conserve Memory when low on physical RAM:**

If you see that your computer is constantly swapping to disk (you see your disk light going on and off constantly while reading an image) you can improve your system performance by choosing the *Conserve Memory* option. This will tell ColorView to handle swapping to disk, and ColorView will make much more intelligent decisions on which pages can be discarded to disk, and which should be retained.

### Enhanced mode vs. Standard mode

Windows' Standard mode is provided for compatibility with 80286 processor, and also for 80386 systems that do not have enough extended memory (memory over

1MByte) to allow Windows to create virtual memory.

Windows' 386 Enhanced mode provides complete virtual memory functionality by utilizing your hard disk for page-level blocking. Windows uses a swap file, permanent or temporary, to swap portions of memory out to disk. This technique provides greater amounts of memory to applications than the amount of physical RAM installed on your computer.

Hint - **Both Standard and Enhanced modes are OK if you use Conserve Memory:**

The difference between the two modes for ColorView is that more memory will be available in the Enhanced mode. Since the extra memory comes from the Windows Swapfile, we recommend that you use ColorView's virtual memory (Conserve Memory option) when low on physical RAM for performance reasons.

## **SETTING UP - Graphics Display**

ColorView is intended for palette-based or true-color displays. If you are using a standard VGA display, the quality of the output will be inadequate, since only 16 fixed colors are allowed under Windows.

ColorView will query the display driver to get the type and the resolution of your graphics card. If your driver is not properly configured, or if your graphics card does not support some of the features necessary for ColorView, ColorView will display a message alerting you to the situation.

When using 24-bit or 15-bit true-color graphics cards, ColorView will require less memory for image conversion and the conversion will run faster. This is due to the elimination of two steps: 8-bit color reduction (quantizing) and dithering. If you choose the **8 Bit Conversion** option, then the time and the memory to display an image will be the same for 8-bit and 15/24-bit cards.

## USER'S GUIDE

ColorView can be started alone, or with command-line arguments:

```
CVIEW386 [-D] [-H] [-F] [-M] [filename]
```

or 

```
CVIEW286 [-D] [-H] [-F] [-M] [filename]
```

The command line options are as follows:

- D** Use dithering when converting the image
- H** Use the Heckbert Quant to color-reduce the image (should not be used with -F)
- F** Use Fast Quant to color-reduce the image (should not be used with -H)
- M** Use the **Conserve Memory** option to minimize memory usage

**filename** specifies the image file to load. The extension determines the image type.

For example:

```
CVIEW386 -D -H C:\CVIEW\PALACE.JPG
```

will load file PALACE.JPG, and use the Heckbert Quant and Dithering to color-reduce it.

## MENU COMMANDS

**File Menu** - Options related to reading and writing images and other system functions.

File New

Removes any loaded image from memory and clears the viewer window.

File Open...

Displays a dialog box allowing you to select an image file to load. Version 0.97 recognizes the image format of the file by its extension.

File Save As...

Allows you to save an image in a different format. An image must be loaded (and converted into 8-bit format for GIF and BMP 8-bits save). The extension of the file name determines the image format to be saved.

File Save Image Options...

Provides a way to assign configuration options (from the Options pop-up menu) to the current image. When you try to load the same image in the future, you will be able to automatically configure the

viewer by loading the saved options. The saved configuration includes all four of the Enhance Color parameters (see below), the size and the position of ColorView window, etc.

File Exit

Exit ColorView, releasing all resources and memory allocated.

File About ColorView

ColorView Copyright and Registration messages.

**Edit** - Image manipulation functions.

Edit Cut  
Edit Copy  
Edit Paste  
Edit Delete

These options will become available in a future version of ColorView.

Edit Enhance Color - 256, 15 and 24 bit displays

Provides a way to color correct an image. Note that on 256 color displays, this is fast because only the palette needs to be updated. On 15 and 24 bit displays, any change affects every pixel in the image which causes slower performance. The Color Enhancement panel contains 4 slide controls described below. Each control can be adjusted using the mouse, or once it has focus, the arrow keys can be used for fine tuning. Closing the Color Enhancement panel will not restore the original colors. To restore the original colors, uncheck the *E*nhance Color menu option in the Edit menu.

**Color:**

range 0 to 360, normal at 180: changes the hue of the image.

**Saturation**

range 0 to 255, normal at 128: changes the amount of color in the image. A saturation of 0 means no color (a black & white image).

**Brightness:**

range 0 to 255, normal at 128: adjusts overall image brightness.

**Gamma Factor:**

range 0 to 1000, normal at 0: gamma-corrects the image. This provides a way to correct for the difference between perceived colors and their computer generated equivalents. This can be very useful to adjust scanned images, improving the sharpness and contrast of the raw scan. If the original has already been gamma-corrected, additional corrections might degrade the image quality.

**Options** - Functions to control decoding and processing of an image.

Options Dither Image

When performing a 24 bit to 8 bit conversion, this option tells

ColorView to use dithering to smooth out quantization errors. In most cases dithering will significantly improve color reproduction for displays that support less than 15 bits of color. In some cases, the image might become a little less sharp. ColorView uses Floyd-Steinberg dithering.



- Options      8 Bit Conversion  
This option is only available on 15 and 24 bit cards. On any other display system it is automatically selected (and disabled). If this option is selected, ColorView will convert any 24 bit image into a 256 color palette based image, even if your card can handle more than 256 colors. This can be used to generate GIF or 8 bit BMP files. In most cases, a 256 color image will be inferior to a 15 or a 24 bit color image.
- Options      Fast Quant:  
Selects the Millennium Technologies Fast Quantization algorithm for reducing 24 bit images to 256 colors. This is a one-pass color reduction method. Although the results are not as high quality as with the Heckbert Quant (below), Fast Quant requires no additional memory and does not require an extra pass to render the image. This is useful for a quick pre-view of an image. For the fastest possible decode time, choose Fast Quant and no dithering.
- Options Heckbert Quant  
Selects Paul Heckbert's Quantization Algorithm. This algorithm uses RGB space sub-division to find the most important colors in the image. The Heckbert Quant requires more memory to run, and an extra pass over the image to figure out the color distribution. Our highly optimized implementation of the Heckbert Quant, makes it the algorithm of choice when coupled with the *Dither Image* option above.
- Options      Conserve Memory  
Useful under low-memory conditions, this option tells ColorView to use temporary files instead of Windows' memory for image processing. Because hard disks are generally slower than RAM, performance will be slower when this option is checked. The temporary files are created in the directory specified by the TEMP environment variable, or in the root directory if TEMP is undefined. When enabled, ColorView will need (on average) 500K of Windows memory (more depending on the image size) to run properly.  
  
If you are still having memory problems with this option selected, try using Fast Quant instead of the Heckbert Quant.
- Options      Save Viewer Options  
This saves the currently selected viewer options (everything in the Options pop-up menu) into the CVIEW.INI file. These settings are automatically loaded the next time you start ColorView, establishing your default image loading options.

- Display** - Display options select how the image appears on the screen.
- Display      Show Scroll Bars  
Enable horizontal and vertical scroll bars. This allows you to scroll to any portion of the image if the image is bigger than the window it is displayed in. Scroll bars are disabled in the Stretch Image Mode (below).
- Display      Full Window  
Display the image by overlaying the caption and the menu of the ColorView window. This is just a display option: the menu is still available, and if you click in the right region you can bring the menu on top of the image to make a selection.
- Display      Stretch Image  
Resizes the displayed image to fit into the ColorView window. Only the display is changed. The memory image remains at the original size.
- Display      Keep Aspect Ratio  
Used this option with the Stretch Image option (above). This allows you to relax the requirement to preserve the original height to width ratio. If unselected, the image will be stretched to completely fill the viewer window, even if this distorts the image.
- Display      Auto-Size Window  
This option will re-size the ColorView window to exactly fit the displayed image. If the image is bigger than the screen, the ColorView window will resize to the maximum possible size.
- Display      Full Palette  
Windows reserves 20 colors from the system palette for its own use. Normally, these colors cannot be changed by an application, limiting the number of colors available to 236. If this option is selected, ColorView will use the entire system palette minus 2 colors (white and black) reserved for Windows. Windows will use the palette of the active application, so when ColorView is active, other applications might not display the correct colors. Just click on the other application to activate it and to force Windows to redisplay it properly. This also works when running multiple copies of ColorView: just click on the one you want to see, and its palette will become the system palette.

## **APPENDIX A - ColorView Version 1.0**

ColorView Version 1.0 will be an improved and expanded version 0.97. The following list of additions and modifications are planned:

- Full support for reading **GIF'89** files.
- Reading and writing Windows **BMP** RLE files
- Saving any file in **JFIF** format
- Speed improvements on reading **JFIF** files
- Clipboard operations on any portion of the image
- Partial Save option allowing a portion of the image to be saved in any of the supported formats.
- Support for 'batch-mode' processing of images (e.g. unsupervised conversions)
- Fixes to bugs reported in version 0.97. Please send us any comments and bug reports at the address at the top of this document.

NOTE: If you register now for ColorView version 0.97, you will not only receive the current version, but also version 1.0 (free of charge) when it becomes available.

In addition, a DOS-based ColorView is in the works, providing support for Super VGA color cards, EMS memory and mouse operations.

## **APPENDIX B - Trademarks and Acknowledgements**

ColorView is based in part on the work of the Independent JPEG Group.  
The Independent JPEG Group disclaims all warranty and/or liability claims.

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