

# Video7

# Color Enhancer IIc

# Manual v1.0

Release Date: 10-29-6

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**Note: Pages 32 and 34 were blank and therefore omitted.**

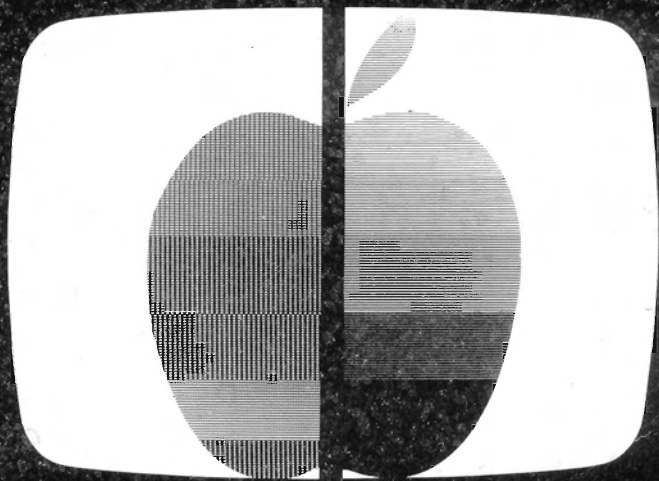
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*video of*™  
**Color**  
**Enhancer**™

User's manual  
for the Apple IIc



*Before Enhancer*      *After Enhancer*

## **NOTICE**

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interference to radio reception is suspected.

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## **RADIO AND TELEVISION INTERFERENCE**

The equipment described in this manual generates radio-frequency energy. If it is not installed properly it may cause interference with radio and television reception. The monitor you purchase must comply with the limits for Class B computing devices in accordance with the specifications in Subpart J, Part 15, of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation.

The cable connection between the computer and the monitor must be a shielded cable with the shield properly grounded. You can determine if your equipment is the cause of interference by turning it off. If the interference stops, it was probably caused by the computer or the monitor. To correct the problem try:

1. Turning the TV or radio antenna until the interference stops.
2. Moving the computer farther away from the TV or radio.
3. Moving the computer from one side of the TV or radio to the other.
4. Plugging the computer into an outlet that is on a different circuit breaker or fuse than the TV or radio.
5. Installing a rooftop antenna connected to your TV and radio with a coaxial cable.
6. Identifying the offending piece of hardware by selectively turning them off one at a time and checking for interference.

If necessary, you should consult your computer dealer for additional suggestions. You may find the booklet "How to Identify and Resolve Radio-TV Interference Problems" prepared by the Federal Communications Commission helpful. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Refer to Stock Number: 004-000-00345-4.

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## **INTRODUCTION: Color Enhancer Product Features**

Congratulations on your selection of the Color Enhancer for your Apple //c personal computer.

The Video-7 Color Enhancer is the most advanced RGB interface adapter available for your Apple //c computer. The Color Enhancer will improve your Apple //c's performance in several important areas by providing the following features:

- Gives the Apple //c the ability to work with a wider range of RGB monitors.
- Gives your Apple //c the ability to display the full range of 16 separate shades of gray on your standard NTSC monochrome monitor.
- Provides your Apple //c with additional graphics modes including Double Density High Resolution (e.g. 16 color 140 x 192 and 2 color 560 x 192).
- Compatible with existing Apple //c Software.
- Allows your Apple //c to display graphics and 80 column text anywhere on your RGB screen simultaneously.
- Software provided includes Double Density High Resolution Graphics Drivers for use in your Applesoft programs. Demonstration programs are included.
- Improves the video quality of the Apple //c by removing the extraneous colors that usually occur during color transitions on "composite" color monitors.
- You may choose the color of your text (in either 40 or 80 columns) by setting two switches on the Color Enhancer.
- Installation procedure takes seconds.

The Color Enhancer was designed to give you and your Apple //c years of dependable service. This manual will give you the necessary information about the installation, care and use of the Color Enhancer. Please follow the installation directions carefully. If you have any questions please feel free to give our Product Support department a call (see Appendix C).

## **RGB vs. NTSC (Or is One Monitor Better Than Two?)**

The Apple //c computer was designed to display information on a display device compatible with the NTSC (National Television Standards Committee) standard, such as a television set or "composite" monitor. The NTSC video output jack (sometimes referred to as an "RCA" type jack) is located at the center of the rear panel of the Apple //c exterior.

Although many Apple //c computers are connected to an NTSC color monitor or television set using the NTSC video jack, this set up cannot display the sharp, high quality graphics an RGB monitor can, nor does it have the ability to generate 80 column text with any clarity. Some Apple //c owners may use the Apple monochrome monitor to display 80 column text (e.g. for word processing) and a color monitor for software programs generating color graphics. The use of two monitors with one computer not only creates some confusion (such as physically switching cables between the two), it also takes up more desk space and creates a cabling mess.

The Color Enhancer will help you conserve your desk space (if not your sanity) by giving you the best of both worlds. You see, an RGB monitor is designed to give you superior graphics by separately controlling the Red, Green and Blue signals that make up your picture. The Color Enhancer was designed to take full advantage of an RGB monitor's capabilities to give you crisp 80 column text and vivid color graphic displays. This means that you can do the work of both the color monitor and monochrome monitor with one RGB monitor!

For Die-Hard Monochrome Fans: There are, no doubt, some of you who are not interested in spending more money to get an RGB monitor, but would still like to use only one monitor to display text and graphics. The "gray scale" feature of the Color Enhancer //c will not only let you display 80 column graphics on the NTSC monochrome monitor you presently own, but will let you display full double density high resolution graphics in 16 different shades of gray.

The Color Enhancer //c comes equipped with a separate connector for your RGB monitor, and an RCA (NTSC) video jack for your monochrome monitor.

The RGB video connector used on the Color Enhancer is a 9 pin ("DB-9" or "9 pin D-Shell") interface which is the standard RGB connection found on the most popular RGB monitors. If you do not have this type of connection on your RGB monitor cable please read Appendix C. If you are going to use your Color Enhancer with an NTSC monochrome monitor you can connect your monitor cable to the RCA video jack on the Color Enhancer instead of to the RCA jack on the Apple //c itself.

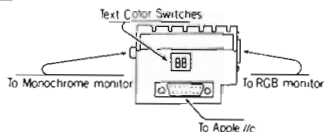
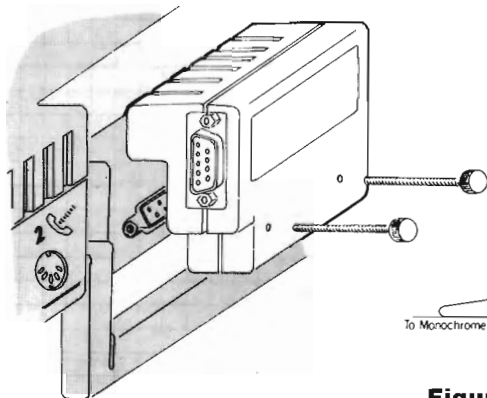


## COLOR ENHANCER INSTALLATION

Your Color Enhancer package should include the Enhancer Interface Adapter, a Demonstration Diskette and this manual. If you believe that you may be missing anything please contact your dealer.

Carefully follow these steps to install the Color Enhancer:

1. Make sure that the Apple //c power has been turned off. The small green light located at the top right corner of the Keyboard will be off.
2. At this time you may want to set the Enhancer text color switch to your preferred color. See Figure 2, as well as the section on Slide Switch Settings.
3. Connect the Enhancer to the port on the back panel of the Apple //c as shown in Figure 1.
4. Connect your RGB monitor cable to the Enhancer's DB-9 connector. (If you are using an NTSC monitor, attach the monitor's cable to the RCA video output jack on the Enhancer).



**Figure 2.**

**Figure 1.**

Installing the Color Enhancer to the Rear Panel of the Apple //c and attaching the Monitor Cable.

## **SLIDE SWITCH SETTINGS ON THE COLOR ENHANCER**

Located on the Color Enhancer are two slide switches. These switches give you control over your text color and are either in the "up" position (ON) or in the "down" position (OFF). The Color Enhancer is capable of displaying text in White, Amber, Aqua or Green. You may experiment with these switches to determine which text color best suits your needs.

### **COLOR ENHANCER //c VIDEO MODES**

40 Column Text, or 80 Column Text.

LORES with 16 colors and option of mixing 40 or 80 Column Text.

HIRES with 6 colors and option of mixing 40 or 80 Column Text.

Black and White HIRES (280 x 192).

MERES (80 x 48) with 16 colors and option of mixing 80 column text in the bottom four screen lines. (Also referred to as Double Density LORES).

Double Density HIRES (Monochrome: 560 x 192) in Black and White with option of mixing 80 column text in the bottom four screen lines.

Double Density HIRES (Color: 140 x 192) in 16 colors with option of mixing 80-column text.

MIX MODE: Double Density Monochrome and Double Density Color (140 x 192) anywhere on the screen.

MIX MODE with 80 column text in bottom four lines.

## COMPATIBILITY NOTES

**80 Column Text Display:** When generating 80 column text with a standard NTSC color television/monitor or low resolution RGB monitor the 80 column text will appear blurry or fuzzy due to the low resolution of the monitor.

**Double Density Drivers:** There are several software packages which utilize double density graphics of some sort or another. When you run some of these software packages with your Color Enhancer you may have graphic images which seem a little off color or even smeared. In most cases, the reason for this is that these graphic images were originally programmed, or drawn, using an NTSC type composite monitor. The images may look fine on the composite monitor but when transported to the higher resolution monitor, the detail, now more clearly defined, will reveal some discrepancies in colors which border one another. The unfortunate thing is, this problem cannot be corrected unless you wish to redraw the graphics screens themselves.

**Black and White HIRES (280 x 192):** Before the advent of an Apple 80 column standard, many programs which required the use of upper and lower case characters and more than 40 columns across the screen to display text had their own special character sets programmed in. Many of these character sets were written using the Apple standard Black and White HIRES (280 x 192) and do not take into account higher resolution screen displays. When programs of this type are used with the Enhancer you may experience "bleeding" or "fuzziness" around the border of these characters on your screen.

**A Remedy for Bleeding:** You may be able to solve these "color bleeding" problems by "pre-booting" the graphics mode your software needs BEFORE you run your software. The Demo Disk that came with the Enhancer has a menu selection called "Preboot Options" which will do this automatically for you by listing the various graphics modes and giving you the choice of which one to select. In most cases we have been able to remedy the color fringing and bleeding by this method, but because of the many programs which are written for the Apple computer that use various graphics tricks we cannot guarantee that you will have good results in every case.

## USING THE DEMO DISK AND DOUBLE DENSITY DRIVERS

The Demo Disk included with your Enhancer contains several useful examples as well as double density software drivers. The double density drivers are a powerful software tool which will allow you to manipulate the Apple's double density graphics.

Upon booting the demo disk your computer should display the following menu:

1. Business Demo
2. Word Processing
3. Art Show Case
4. Slide Show
5. Video Modes
6. Preboot Options
7. Quit

You should try running through each option of the Demo Disk to become fully acquainted with the Enhancer.

### DEMO DISK NOTES:

**Options 1 - 4:** These options display some of the capabilities of the Enhancer and Double Density Software Drivers. These programs are written in Applesoft BASIC and will give you some ideas concerning the use of the Double Density Drivers.

**Option 5:** The Video Modes option will display the various Video Modes available to you when using the Enhancer and the Double Density Drivers.

**Option 6:** This option will load your selected graphics drivers into memory BEFORE you boot up software which may require these drivers. See the previous section concerning Double Density Drivers and Black and White HIRES.

**Option 8:** Pressing Option 8 will return you to the Applesoft prompt.

## V-COLOR DOUBLE DENSITY DRIVERS

**Notes for Programmers:** The following information is for those of you who are going to use the V-Color Double Density Drivers in your own Applesoft BASIC programs. The V-Color Double Density Drivers are provided for you on the Demo Disk that came with the Enhancer. These Drivers are implemented as a series of Applesoft BASIC ampersand (“&”) routines. The routines described below are implemented as machine language code segments located in both main and auxiliary memory. There are two ways to activate the V-Color Double Density Drivers:

1. From an Applesoft program use the statement:  
PRINT CHR\$(4);“BRUN HIRES”.
2. From the keyboard (at the Applesoft prompt) type:  
BRUN HIRES (then press RETURN).

**Note:** If you are interested in obtaining the V-Color Double Density Drivers in ProDos format then contact your dealer, or the Video-7 Sales Department and ask about the V-Color Graphics Toolkit. The Toolkit is a graphics utility package, supporting both DOS and PRODOS.

When the above command is executed, the “HIRES” code file is loaded into the system, and the new Double Density Drivers are installed into memory.

## V-COLOR GRAPHICS STATEMENTS: Applesoft Ampersand Routines

This is where we begin to have some fun with the V-Color Graphics Statements. The Ampersand (“&”) Routines described here can be used in your Applesoft BASIC programs in a variety of ways, but the easiest way to learn how to use them is to create your own programs. Each V-Color Graphics Ampersand (“&”) Routine will be described with an example program to explain its use. We suggest you try each of the example programs and experiment with them.

**First, A Few Words About Ampersand Routines:** The V-Color Graphics Statements are referred to as Ampersand Routines because each program statement begins with the "&" (or ampersand) character. There are several software packages available for the Apple that use the ampersand in their own programming routines. Using these programs with the V-Color Double Density Graphics software will cause all sorts of peculiar things to happen, so we wish to warn you about this now, before you call us to complain. It is better to use the V-Color Software by itself, without the aid of other programs which use ampersand routines. We cannot be responsible for any problems you may experience when you use two different programs which use Ampersand Routines at the same time.

The first command that must be given is the & GR command in order to initialize the desired video mode:

- & GR X (where X may range from -6 to 6)

*Purpose:* Enter Special Graphics Routines and Video Modes.

This is the initial entry point for the graphic routines. When this statement is executed, the current pen position is moved to location 0,0 (the top left corner of the screen), the pen color is set to white and the background or fill color is set to black. This statement must be followed by a mode specification from the following table (see Positive and Negative Notes below):

- & GR 0 Disconnect V-Color Graphics Drivers
- & GR 1 Monochrome Double Density HIRES (560 x 192)
- & GR 2 16 Color Double Density HIRES (140 x 192)
- & GR 3 Mix Mode (i.e. & GR 1 with & GR 2 on same screen)
- & GR 4 Not Supported
- & GR 5 Black and White HIRES (280 x 192)
- & GR 6 MERES (16 Color, 80 x 48)

*Program Example:* (Using the & GR statement)

	Explanation:
10 PRINT CHR\$(4); "BRUN HIRES"	Activate Graphics Drivers.
20 & GR 3	Use Mix Mode (& GR 3)
30 & GR 1	Use HIRES Monochrome 560 x 192
40 & GR 0	Disconnect V-Color Drivers.

**Note 1:** & GR 0 — If the mode specification is given as zero (& GR 0) the graphic routines are disconnected and the memory space allocated to them is returned to the system.

**Note 2:** Positive and Negative Mode Specifications — You may specify your graphics mode as either a positive number (1 through 3) or as a negative number (-1 through -3).

**Note 3:** Positive Modes – A positive mode specification causes the RGB Interface to display data according to the video mode given in the above table and to load the corresponding driver routine for that video mode. Mode 3 defaults to the drivers for mode 1.

**Note 4:** Negative Modes – A negative mode specification will load the driver for that particular video mode without changing the video state of the RGB Interface. This is particularly useful when dealing with video mode 3 which allows you to mix, anywhere on the screen, modes 1 and 2. Executing the command & GR 3 causes the RGB Interface to display data as in mode 3 and to load the driver for mode 1. Executing the command & GR -2 will activate the double density driver for mode 2 but not change the video mode. Any further commands will now be interpreted and transferred to the screen as in mode 2. To paint portions of the screen in mode 1 you must issue the & GR -1 or & GR 3 command before you perform any further plotting.

*Program Example: (& GR statement using Negative Modes)*

```
10 PRINT CHR$(4); "BRUN HIRES"  
20 & GR 3  
30 & BCOL = 0: & CLEAR  
40 & GR -1  
50 & BCOL = 0: & CLEAR  
60 & PLOT (100,50)  
70 & GR -2  
80 & PLOT (100,0)
```

*Explanation:*

Line 10: Activate the V-Color Graphics Drivers

Line 20: Set up screen to Mix Mode (& GR 3).

Line 30: Set Background Color to Black (0) and Clear Screen.

- Line 40: Use 560 x 192 Monochrome Graphics (& GR 1) without clearing the Mix Mode Screen.
- Line 50: Set Background Color to Black (0) and Clear Screen.
- Line 60: Plot a line to X = 100, Y = 50
- Line 70: Use 16 Color, 140 x 192, Graphics Mode without resetting the Mix Mode Screen.
- Line 80: Plot a line to X = 100, Y = 0

- & TEXT

*Purpose:* Reset screen to text mode

This command switches the display back to the text screen and also ensures that your operating system is properly reset. You should always execute this command prior to terminating a program which uses any of the graphic commands.

- & COL = X (Where X may be a variable or expression)

*Purpose:* Set foreground or pen color.

The & COL statement specifies the pen color to be used for drawing. The color number should be in the range 0 to 15, and specifies the following colors:

- |              |                |               |            |
|--------------|----------------|---------------|------------|
| 0. Black     | 4. Dark Green  | 8. Brown      | 12. Green  |
| 1. Magenta   | 5. Grey        | 9. Orange     | 13. Yellow |
| 2. Dark Blue | 6. Medium Blue | 10. Dark Gray | 14. Aqua   |
| 3. Purple    | 7. Light Blue  | 11. Pink      | 15. White  |

**Note 1:** These colors will be interpreted as shades of gray, ranging black (Color 0) to white (Color 15) if you are using the Enhancer with an NTSC monochrome monitor.

**Note 2:** The Foreground Color will default to white in all video modes.

*Example:* (The & COL statement)

```
10 PRINT CHR$(4); "BRUN HIRES"
15 & GR 2: & BCOL = 0: & CLEAR
20 & COL = 8
35 FOR X=0 to 40
40 & MOVE (X,X): & PLOT (X,40)
45 NEXT X
50 YEL = 13: & COL = YEL
55 FOR X=20 TO 60
60 & MOVE (X,X): & PLOT (X,60)
65 NEXT X
```



*Explanation:*

Line 10: Activate V-Color Graphics Drivers.  
Line 15: Set Screen to & GR 2 (16 Color HIRES, 140 x 192).  
Set Background Color to Black (0) and Clear Screen.  
Line 20: Set Foreground Color to Brown (8).  
Line 35: Set up a FOR-NEXT Loop for plotting a triangle.  
Line 40: MOVE to X,X and PLOT a line.  
Line 45: Loop back and do it again.  
Line 50: Use variable for Foreground Color (Yellow = 13)  
Set Foreground Color to Yellow  
Line 55: Set up a FOR-NEXT loop for plotting another triangle.  
Line 60: MOVE to X,X and PLOT a line.  
Line 65: Loop back and do it again.

- & BCOL = X (where X may be a variable or an expression)

*Purpose:* Set background or fill color.

This statement specifies the background or fill color. This statement may be used for the & CLEAR and & VFILL routines as well as for the background color when displaying characters or bit mapped shapes. The color specifications for & BCOL are identical to the specifications for the & COL statement.

*Example:* (The & BCOL statement)

10 PRINT CHR\$(4); "BRUN HIRES"	Explanation:
15 & GR 2	Activate Graphics Drivers.
20 & BCOL = 8	Set Screen to & GR 2.
25 & CLEAR	Use Brown for Background.
30 FOR X = 1 TO 5000: NEXT X	Clear Screen to Brown.
35 GN = 12	Wait a few seconds.
40 & BCOL = GN: & CLEAR	Use a variable for Green.
	Set Background to Green then
	Clear Screen.
45 FOR X = 1 to 5000: NEXT X	Wait a few seconds.
50 BLUE = 6	Use a variable for Blue.
55 & BCOL = BLUE: & CLEAR	Clear Screen to Blue.

**Note:** The Background Color will default to black in all video modes.

- **& CLEAR**

*Purpose:* Clear screen to current & BCOL color.

This statement clears the screen to the color specified by the last & BCOL statement, or to black if an & BCOL statement has not been given since the last & GR command. See the previous program example explaining the use of the & BCOL Command.

- **VFILL (X1,X2,Y1,Y2)** (Parameters may be either variables or expressions)

*Purpose:* To fill a portion of the screen to current & BCOL color.

This statement fills a specified block section of the screen to the color specified by the last & BCOL statement, or to black if a & BCOL statement has not been given since the last & GR command. Four parameters are needed to specify the screen bounds to be filled. The first pair of coordinates specify the first corner of your block, the second pair of coordinates will specify the opposing corner of your block. You may specify the values of each pair in any order.

*Example:* (The & VFILL statement)

	Explanation:
10 PRINT CHR\$(4); "BRUN HIRES"	Activate Graphics Drivers.
20 & GR 2:& BCOL = 8: & CLEAR	Set up Screen.
30 & BCOL = 6	Set Background Color to Blue.
40 & VFILL (0,40,0,40)	Fill a Blue Block
50 X1=80:X2=40:Y1=40:Y2=80	Use Variables for VFILL.
60 & BCOL = 13	Set Background to Yellow.
70 & VFILL (X1,X2,Y1,Y2)	Fill a Yellow Block.

- **& MOVE (X,Y)** (Where X and Y may be variables or expressions)

*Purpose:* Move current pen position to another coordinate.

You may use the & MOVE statement to position your pen to the pixel coordinate (X,Y) without drawing on the screen. & MOVE requires two parameters, the horizontal position (the number of pixels from the left border of the screen) and the vertical position (the number of pixels from the top border of the screen).

*Example:* (The & MOVE statement)

```
10 PRINT CHR$(4); "BRUN HIRES"  
20 & GR 2: & BCOL = 0: & CLEAR  
30 & MOVE (50,50)  
40 & DOT  
50 X = 75: Y = 75  
60 & MOVE (X,Y)  
70 & DOT
```

**Explanation:**  
Activate Graphics Drivers.  
Setup Screen.  
Move to X = 50, Y = 50  
Draw Dot on Screen at X, Y.  
Use Variables for & MOVE  
Move to X, Y  
Draw Dot on Screen at X, Y

● & DOT

*Purpose:* Draw a dot at pen position.

This command places a dot in the foreground color at the current pen position. No parameters are required for this command.

*Example:* (The & DOT statement)

```
10 PRINT CHR$(4); "BRUN HIRES"  
20 & GR 2: & BCOL=0: & CLEAR  
30 FOR X = 20 TO 85 STEP 5  
  
40 & MOVE (X,20)  
50 & DOT  
60 NEXT X
```

**Explanation:**  
Activate Graphics Drivers.  
Setup Screen.  
Use loop to set up  
Coordinates.  
Move to X, Y location.  
Draw Dot at location X, Y.  
Get Next X Coordinate.

● & PLOT (X,Y) (Where X and Y may be variables or expressions)

*Purpose:* Draw line from pen position to new X,Y coordinates.

The & PLOT statement may be used to draw a line in the foreground color from the current pen position to the X,Y coordinates specified.

*Example:* (The & PLOT statement)

```
10 PRINT CHR$(4); "BRUN HIRES"  
20 & GR2: & BCOL=0: & CLEAR  
30 & MOVE (0,0)  
40 & COL = 6  
50 & PLOT (100,0)  
60 & COL = 13  
70 & PLOT (50,50)  
80 & COL = 8  
90 & PLOT (0,0)
```

**Explanation:**  
Activate Graphics Drivers.  
Setup Screen.  
Move to X = 0, Y = 0.  
Use Blue for Foreground.  
Draw 1st side of Triangle.  
Use Yellow for Foreground.  
Draw 2nd side of Triangle.  
Use Brown for Foreground.  
Complete the Triangle.

- & SCRN (X) (Where X may be an integer or real variable)

*Purpose:* Return current pen color to the variable X.

This command returns a value to the variable X which represents the color at the current pen position. One parameter is required to accept the returned pen color value. The pen color will correspond to one of the 16 possible foreground colors.

*Example:* (The & SCRN statement)

```
10 PRINT CHR$(4); "BRUN HIRES"
20 & GR 2: & BCOL=0: & CLEAR
30 FG=0
40 & COL = 6
50 & DOT
60 & SCRN (FG)

70 FOR X = 1 TO 5000:NEXT X
80 & TEXT: HOME
90 PRINT "& COL = ";FG
```

Explanation:

```
Activate Graphics Drivers.
Setup Screen.
Clear Variable FG.
Set Foreground Color to Blue.
Draw a Dot on the Screen.
Pass Foreground Color to
Variable FG
Wait a few Seconds.
Reset Display to Text.
Display the value of the current
Foreground Color (FG)
```

## V-COLOR DISK ACCESS STATEMENTS

The Disk Access Statements allow for storage and retrieval of double density graphics files generated using the double density drivers.

- & SAVE FILENAME\$ (May use String Variable or Literal Filename)

*Purpose:* Save double density picture to disk

This statement saves the double density graphic area in main and auxiliary memory to a specified disk file. The disk file name may be specified as a literal or in a string variable. Slot, drive and volume parameters may be specified as described in the Apple DOS User Guide. The file will appear to be a binary file in the disk directory, but is not stored in the standard binary format and can only be loaded using the & LOAD statement described on the next page.

*Example:* (The & SAVE Statement)

```
10 PRINT CHR$(4); "BRUN HIRES"
```

```
20 & GR 2: & BCOL=0: & CLEAR
```

```
30 & MOVE (0,0)
```

```
40 & COL = 6: & PLOT (100,0)
```

```
50 & COL = 13: & PLOT (50,50)
```

```
60 & COL = 15: & PLOT (0,0)
```

```
70 & SAVE "TRIANGLE ONE"
```

```
80 FN$ = "TRIANGLE TWO"
```

```
90 & SAVE FN$
```

**Explanation:**

Activate V-Color Graphics Drivers.

Setup Screen.

Create a Triangle.

Plot 1st side.

Plot 2nd side.

Plot 3rd side.

Save the Triangle Screen.

Use String Variable for

Filename.

Save the Triangle Screen

**Note 1:** Before you run this example be sure to have enough room on your diskette for both of these disk files.

**Note 2:** See the & PLOT statement.

- & LOAD FILENAME\$ (May use String Variable or Literal Filename)

*Purpose:* Load a double density picture from disk

This statement loads a file from disk which has been saved using the & SAVE statement. The disk file name may be specified as a literal or in a string variable. Slot, drive and volume parameters may be specified as described in the Apple DOS User Guide.

*Example:* (The & LOAD Statement)

```
10 PRINT CHR$(4); "BRUN HIRES"
```

```
20 & GR 2: & BCOL = 0: & CLEAR
```

```
30 & LOAD "TRIANGLE ONE"
```

```
40 FOR X = 1 TO 5000: NEXT X
```

```
50 & CLEAR
```

```
60 FN$ = "TRIANGLE TWO"
```

```
70 & LOAD FN$
```

**Explanation:**

Activate Graphics Drivers.

Setup Screen.

Load Triangle Picture.

Wait a few Seconds.

Clear Screen

Use String Variable Filename.

Load Triangle Picture.

**Note:** Before you try this example you will need to run the previous & SAVE example.

## V-COLOR GRAPHIC TEXT AND SHAPE STATEMENTS

The V-Color Double Density Drivers contain statements to place text as well as predefined shapes anywhere on the screen.

- & GPRNT

*Purpose:* Direct text output to graphics screen.

This statement will allow you to print text to the graphics screen in Double Density.graphics. & GPRNT will disable the standard text output and enable a special graphics text package which replaces text on the graphics screen using its own character font. The default character font is very similar to that which is used for standard text output by the Apple, and will be the font used to print text to the graphics screen until a statement to restore standard Apple video output is issued. All characters are printed in a matrix of 7 horizontal and 8 vertical pixels (the same as the standard text screen) and all characters are displayed downwards and to the right of the current pen position. After each character is written, the pen position is moved to the right seven pixels. (NOTE: While it is active & GPRNT disconnects the Disk Operating System.)

*Example:* (The & GPRNT Statement)

```
10 PRINT CHR$(4); "BRUN HIRES"  
20 & GR 2: & BCOL = 2: & CLEAR  
30 & COL = 13  
40 & MOVE (30,96)  
50 & GPRNT  
60 PRINT "Enhancer"
```

Explanation:

```
Activate Drivers.  
Setup Screen.  
Use Yellow for Set Foreground.  
Move to the center of Screen.  
Direct Text to Graphics Screen.  
Print Text to Graphics Screen.
```

**Note 1:** Using Line Feed and Carriage Return Characters - Line feed characters cause the current cursor coordinate to be moved down the screen by 8 pixels, (the equivalent of the character row size on the text screen). If the downward movement results in an attempt to move off the bottom of the screen, the cursor wraps around to the top of the screen. The carriage control character moves the cursor position horizontally to the left edge of the screen and vertically

downward as described for the linefeed character. This is the exact equivalent of a carriage return in text mode.

**Note 2:** Using Control Characters - While using & GPRNT, control characters are ignored, except the Carriage Return (Control M, or ASCII Code 13) and the Line Feed (ASCII Code 10), unless you use the statement & CPRNT 1. See & CPRNT.

- & CPRNT X (Where X may be 0 or 1)

*Purpose:* To print control characters while using & GPRNT.

If you wish to use control characters while printing text to the screen you may do so by using the & CPRNT statement. The & CPRNT command governs the control character trap in the graphic print routines, and allows the user to output control characters. The routine requires one parameter, either a One or a Zero.

& CPRNT 1 : Enable the ability to output control characters.

& CPRNT 0 : Disable the output of control characters. This is the default mode.

**Note:** It is the responsibility of the user to ensure that there are suitable characters defined for use by the & CPRNT statement before using & CPRNT. The default font has definitions for all control characters, however, when using a specially defined font (see & NCHARS) you should be aware of those control characters you wish to use.

- & TPRNT

*Purpose:* Restore normal text output to screen.

The & TPRNT statement will restore the print hook to normal when text is no longer to be sent to the graphics screen. It has no effect if the & GPRNT command is not active. The & TEXT command contains an implicit & TPRNT call.

- & NCHARS FONT\$ (May use String Variable or Literal Filename)

*Purpose:* Change the character font being used on graphics screen

The & NCHARS statement may be used to change the current graphics screen character font to a custom "user defined" font. The & NCHARS statement requires one parameter which specifies the disk file containing the new font. When the V-Color Double Density drivers are loaded the default character font is automatically loaded (see & GPRNT). This default font may be changed using the & NCHARS statement.

*Example:* (The & NCHARS Statement)

	Explanation:
10 PRINT CHR\$(4); "BRUN HIRES"	Activate Graphics Drivers.
20 & GR 2: & BCOL = 0: & CLEAR	Setup Screen.
30 & NCHARS "ROMAN.FONT"	Load Character Font.
40 & COL 6	Set Foreground to Blue.
50 & GPRNT	Get Ready to Print Something.
60 PRINT "Enhancer"	Print Something.

**Note:** The & NCHARS statement will set both Foreground and Background to the Color Value 0. You must, therefore, reset either the Foreground color or Background color after you issue the & NCHARS statement.

- & SCHARS

*Purpose:* Reset the current font to system standard font.

The & SCHARS statement resets the font you are currently using on your graphics screen to the V-Color Double Density Driver default font. There are no parameters.

- & DRAW (ba,br,cd,rd,bw,bh) (Parameters may be variable or expressions)

*Purpose:* Draw a predefined shape on the screen.

The & DRAW statement performs a bit map transfer to the screen of a specified portion of a block of memory. The shape is placed below and to the right of the current cursor position, which is not changed by this command. Each bit set to a "one" in the source block is put on the screen using the current foreground color and each "zero" bit uses the current background color. Six parameters are required for this procedure.



**Parameter 1:** Block Address - The first parameter is an address pointer to the first element of the source block in memory.

**Parameter 2:** Bytes per Row - The second parameter specifies the number of bytes in each row of the source block.

**Parameter 3:** Column Bit Displacement - The third parameter specifies the number of bits to skip in each source row before beginning the transfer.

**Parameter 4:** Row Displacement - The fourth parameter specifies the number of source rows to skip before beginning the transfer process.

**Parameter 5:** Width of Block - The fifth parameter specifies the bit width of the block portion to be transferred to the screen.

**Parameter 6:** Height of Block - The sixth parameter specifies the total number of rows of the block portion to be transferred to the screen.

*For example, the statement:*

```
& DRAW (768, 3, 0, 0, 24, 8): REM DRAW SHAPE ON SCREEN
```

would specify that the bit array starting at memory locations 768 (\$0300 hexadecimal) is to be used as a block source, that each row is 3 bytes long, that the drawing should commence at the start of the array and that the area to be drawn is 24 bits wide and 8 rows in height.

**Note:** The following information, concerning the use of the & DRAW statement and Shape Block Generation, is technical in nature and requires that you know 6502 assembly language. It is not necessary to know this information before you use the Enhancer. For those of you who attempt to read it and decide to call the Video-7 Product Support Department to explain it to them, please don't. We are not in the business of teaching 6502 assembly language programming.

The Demo Disk contains a binary file shape named "plane". When BLOADED, this file will reside in memory starting at address \$0300 (decimal 768). You may examine the contents of this shape by performing the following:

RUN APLANE	Run Applesoft program to display the plane
PRESS A KEY	Program ends on a key press
LIST	List program when its done.
CALL -151	Enter the Apple monitor
300.317	Dump locations 300 through 317 to screen
3DOG	Return to Applesoft

The program listing should be:

10 PRINT CHR\$(4); "BRUN HIRES"	Load Drivers
20 PRINT CHR\$(4); "BLOAD PLANE,A\$300"	Load Shape
30 & GR2	140 x 192 graphics
40 & DRAW(768,2,0,0,13,12)	Draw shape
50 GET A\$	Wait for key press
60 & TEXT: & GR 0	Disconnect Drivers
70 HOME: END	Clear screen and end

The 300 through 317 core dump should be:

300- 22	00	02	00	02	00	07	00
308- 27	20	2F	A0	2F	A0	3F	E0
310- 3F	E0	7F	F0	FF	F8	30	60

The shape and shape table were generated as follows:

1. The shape was first defined on paper:

```

      X      X
        X
        X
          XXX
      X  XXX  X
      X XXXXX X
      X XXXXX X
      XXXXXXXXX
      XXXXXXXXX
      XXXXXXXXXXXX
      XXXXXXXXXXXXXX
      XX      XX
  
```

2. The shape was then coded:

	BITS	BITS	BITS	BITS	Hex
	3210	3210	3210	3210	
Row 0	0010	0010	0000	0000	22 00
Row 1	0000	0010	0000	0000	02 00
Row 2	0000	0010	0000	0000	02 00
Row 3	0000	0111	0000	0000	07 00
Row 4	0010	0111	0010	0000	27 20
Row 5	0010	1111	1010	0000	2F A0
Row 6	0010	1111	1010	0000	2F E0
Row 7	0011	1111	1110	0000	3F E0
Row 8	0011	1111	1110	0000	3F E0
Row 9	0111	1111	1111	0000	7F F0
Row 10	1111	1111	1111	1000	FF F8
Row 11	0011	0000	1100	0000	30 60

To enter and save the shape table perform the following:

CALL -151

300:22 0 2 0 2 0 7 0 27 20 2F A0 2F A0 3F E0

3F E0 7F F0 FF F8 30 60

3D0B

BSAVE PLANE, A\$300,L\$20

## V-COLOR GRAPHICS TOOLKIT

Video-7 also offers a set of utility software programs, written in Applesoft BASIC, which were written to take advantage of the V-Color Double Density Drivers and may be modified for your particular needs. Listed below is a brief description of what is included in the V-Color Graphics Toolkit:

- **Printer Dump:** A program designed to output your graphics screen to your Apple Dot Matrix Printer.
- **Key Draw:** A superb drawing program you can use to create intricate double density graphics pictures. As its name implies, Key Draw uses the keyboard to draw with, so you don't need to buy a mouse to make a picture.
- **V-Color Shape Maker:** Design small shapes (or pictures) to use in your drawings with the Shape Maker. You can use these shapes over and over again by simply adding them to your drawing from RAM.
- **V-Color Mouse Draw:** A simple to use drawing program which uses the standard Apple Mouse to draw with. This program was included to help you see how to interface the Apple Mouse to your own Applesoft programs.
- **V-Color Character Generator (PRODOS only):** Tired of the standard Apple Character Set? Now you can design your own with the V-Color Character Generator.
- **Program Source Code:** You can list out the Applesoft BASIC programs included on the V-Color diskette and use, alter, or copy them for your private use.
- **PRODOS Support:** The V-Color Graphics Toolkit is supplied to you in both the DOS 3.3 and PRODOS formats.

You may obtain more information by asking your dealer about the V-Color Toolkit, or by giving the Video-7 Sales Department a call.

Two separate Assembly Language and Double Density Driver tools are available for both serious hobbyists and developers from Video-7. Included with the disks are sample programs provided on disk, with solid documentation. For information call the Video-7 Product Support Department.

## APPENDIX A

### Character Cell Format

Each character cell is stored as a seven-by-eight bit array. This cell array is "bit-mapped" onto the screen. All bits containing a "one" are plotted as dots with the foreground color and all bits containing a "zero" are plotted in the background color. Each character array is stored as eight bytes, one byte for each row of seven dots. Only the low order seven bits are displayed; the high order bit is ignored.

Within the array, the least significant bit of each byte is the left most dot displayed. The eight bytes (character block) making up one character are stored consecutively, with the top row first. The data bytes must be arranged as successive character blocks, of eight bytes each, corresponding to the ascending order of the 128 ASCII characters. The total font file containing the new character set must, therefore contain 1024 bytes.

For example the letter "Y" would have to be coded as follows:

	- - - - BITS - - - -							
	0	1	2	3	4	5	6	
Row 0 →	1	0	0	0	1	0	0	← BYTE 0 → 1000100
Row 1 →	0	1	0	1	0	0	0	← BYTE 1 → 0101000
Row 2 →	0	1	0	1	0	0	0	← BYTE 2 → 0101000
Row 3 →	0	0	1	0	0	0	0	← BYTE 3 → 0010000
Row 4 →	0	0	1	0	0	0	0	← BYTE 4 → 0010000
Row 5 →	0	0	1	0	0	0	0	← BYTE 5 → 0010000
Row 6 →	0	0	1	0	0	0	0	← BYTE 6 → 0010000
Row 7 →	0	0	0	0	0	0	0	← BYTE 7 → 0000000

Format of a Character Cell for the Letter "Y"

The letter "Y" is displayed as a character block to the screen as a series of "ON" and "OFF" bits. If "XX" represents a single bit that is "ON" the character block of the letter "Y" would be displayed like this to the screen:

```
XX          XX
  XX      XX
   XX    XX
    XX
     XX
     XX
     XX
     XX
```

## APPENDIX B

### SELECTING AN RGB MONITOR: (General Information)

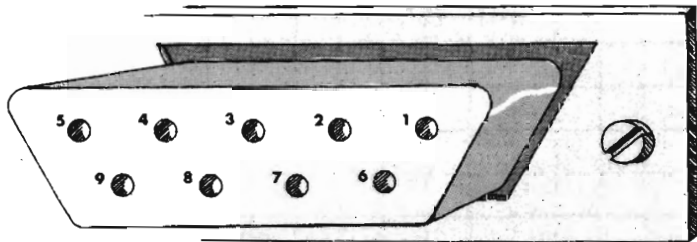
There are many types of RGB monitors available to the Color Enhancer user. However, along with this variety of monitors comes a variety of prices and quality. The cliché "You get what you pay for" seems to apply here. Or, more simply, the better quality monitors will cost you more money. Here are a few guidelines to follow when purchasing a good quality RGB monitor.

1. Do your homework. Check all of the available RGB monitor brands in your price range. Find the one that has the most capability for the money. Read product reviews in the leading software or hardware magazines to find out more about the monitors' features.
2. Your eyes don't lie: Look at the monitor before you buy it. Ask your dealer to give you a demonstration of the monitor using various types of software which you may want to use yourself. Look at the monitor display 80 column text, HIRE graphics and anything else you can find.
3. Check the Cable Compatibility: Remember that the Color Enhancer is made to work with an "IBM" standard RGB monitor and uses a DB-9 cable connector. Even though the DB-9 cable connector is used on more RGB monitors than any other type of connector, the monitor you are interested in may not have a DB-9 pin connector on its cable. If this is the case you should ask your dealer about the availability of a compatible DB-9 cable for the monitor. In most cases, if a cable is not readily available, a cable can be specially made to interface the Color Enhancer to your monitor (ask your dealer about this), but it may cost extra to do this. You can defray this cost by checking before you buy.
4. RGB/Composite Television Combination Monitors: Many people are purchasing monitors that provide both RGB capability and composite color television interfaces in the same unit. Generally these monitors have many outstanding qualities, but, before you buy, check its RGB capabilities using the criteria you would use to check a dedicated RGB monitor. We have found that some of these units have a good quality "composite" TV picture, but a poor quality RGB picture.
5. Thinking of calling our Product Support Department? We are not in a position to recommend any monitor brands since we realize that each person has their own tastes. We can, however, send you a list of current RGB monitor manufacturers, as well as help you with your technical support questions, but we cannot select a monitor for you.

## APPENDIX C

### Color Enhancer Cable Compatibility and Pinout Information

As mentioned previously, Video-7 supplies the Color Enhancer with a 9 pin (DB-9) RGB cable connector. If your monitor does not have the DB-9 connector readily available from your monitor manufacturer your local dealer may be able to assist you in either obtaining one, or having a cable specially made for your needs. To further assist you, we include the Color Enhancer "Pin Out" information below.



DB-9 female (front view) from Video-7 Color Enhancer

- |           |              |                           |
|-----------|--------------|---------------------------|
| 1. Ground | 4. Green     | 7. Not Used               |
| 2. Ground | 5. Blue      | 8. Horizontal Sync (Pos.) |
| 3. Red    | 6. Intensity | 9. Vertical Sync. (Pos.)  |

## **RED, GREEN, BLUE AND INTENSITY:**

You may notice that there are actually four distinct “RGB” outputs. They are Red, Green, Blue and Intensity. There are some monitors which do not have a separate digital Intensity output. Most of these monitors may still work without making use of the separate Intensity signal, but they will only be capable of displaying 8 distinct colors, not 16. The Intensity signal is needed to enable an RGB monitor to display 16 colors.

## **VIDEO-7 PRODUCT SUPPORT:**

Our Product Support department will be glad to help you with questions you may have concerning any of the Video-7 product line. Please feel free to call us.

## **RETURN MATERIAL AUTHORIZATION:**

If you have a product you believe is defective, or in need of repair, please call our Product Support department and receive a Return Material Authorization (RMA) number BEFORE you decide to ship it to us. If your product is still under Warranty we will require that you send a copy of your sales slip with the product. Obtaining the RMA number before you ship it to us serves several useful purposes. It helps us keep track of your product a lot easier, and keeps our Receiving/ Shipping and Service/Repair departments from going crazy. Thanks.



## **VIDEO-7 INCORPORATED LIMITED WARRANTY**

VIDEO-7 INCORPORATED ("Video-7") warrants this product against defects in material and workmanship for a period of one year from the date of purchase. During the warranty period, Video-7 will repair or, at its option, replace this product at no charge.

In order to obtain warranty performance, contact our Product Support Department for a Return Material Authorization (RMA) number, return the product with the RMA written legibly on the exterior of the package, transportation charges prepaid, to Video-7. Attach a copy of proof of date of retail purchase (such as a bill of sale) and a description of the problem.

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## A Word From Apple Computer, Inc.

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## VIDEO-7

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# WARRANTY REGISTRATION READER RESPONSE CARD

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*Please take a few minutes to fill out the questions below to register your Video-7 Warranty. Thank you.*

---

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

PRODUCT PURCHASED \_\_\_\_\_

DATE PURCHASED \_\_\_\_\_ AGE \_\_\_\_\_ SEX \_\_\_\_\_

HOW DID YOU HEAR OF THIS PRODUCT?

- Salesperson  Friend  
 Magazine (if so, which magazine?) \_\_\_\_\_  
 Review Article (if so, which magazine?) \_\_\_\_\_

TYPE OF STORE PURCHASED IN?

- Specialty/Computer Store  Toy Store  
 Electronics  Catalog Showroom  
 Department  Discount Store

WHERE WILL THIS PRODUCT BE USED?

- Home  School  
 Office  Other: \_\_\_\_\_

WHAT DOES YOUR COMPUTER WORK STATION INCLUDE:

Computer \_\_\_\_\_

Monitor \_\_\_\_\_ Peripherals \_\_\_\_\_

Other \_\_\_\_\_

DID YOU FIND ANY PROBLEMS WITH THIS

- PRODUCT?  SOFTWARE?  MANUAL?
- 
- 

HAVE YOU PURCHASED VIDEO-7 PRODUCTS IN THE PAST?

- Yes  No

If so, what? \_\_\_\_\_

COMMENTS/SUGGESTIONS: \_\_\_\_\_

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