

S.A.G.E.

SCOTT ADAMS GRAPHICS EDITOR

by Scott Adams

For ATARI 400, 800
and 1200 Systems

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SCOTT ADAMS GRAPHICS EDITOR USER'S MANUAL

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A Word From Scott Adams

Dear User,

Thanks for buying S.A.G.E. Adventure International feels that the Scott Adams Graphics Editor is truly a breakthrough program in terms of price and program content. We hope you enjoy using S.A.G.E. as much as we do.

Please note that out of all the jazzy copy-protection schemes available for the Atari, we used perhaps the most controversial method: our trust in you, the user. Not only is S.A.G.E. *not* copy-protected, we encourage you to make your own backup copy and describe how you may incorporate portions of S.A.G.E. into your own programs.

As explained on the package exterior, the following licensing arrangements are available should you elect to use S.A.G.E. within your own program:

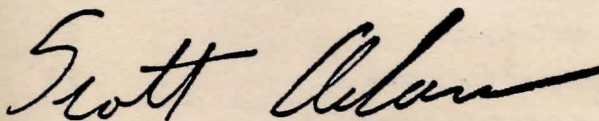
If S.A.G.E. is used in developing any graphics routine within a program intended for publication, the program must first be offered to Scott Adams, Inc. for publication under our standard software contract. If the program is not accepted for publication by Scott Adams, Inc. and is then published by another company, an annual fee of \$50 will be levied to license S.A.G.E. within the program. Additionally, the following credit line must appear both on the packaging and in the opening screen of the program: GRAPHICS CREATED WITH S.A.G.E. LICENSED FROM SCOTT ADAMS, INC.

Programs that are published by Scott Adams, Inc. using S.A.G.E. in any of its graphics routines will have the licensing fee waived and will receive our usual high royalty rate.

There are, of course, no obligating constraints regulating any programs intended for your own private use which utilize S.A.G.E.

Please, don't give copies of S.A.G.E. to your friends. If they like it, encourage them to buy a copy for themselves. Remember: We published S.A.G.E. in an unprotected format as a service to you.

Thank you, and again, we hope you enjoy S.A.G.E.

A handwritten signature in black ink, reading "Scott Adams". The signature is fluid and cursive, with a long horizontal stroke at the end.

Scott Adams
Adventure International

CHAPTER 1

INTRODUCTION

S.A.G.E. — The Scott Adams Graphics Editor

Nearly everyone loves to draw. And even if you haven't artistically touched pen or pencil since high school, the product you have just purchased is going to give you the opportunity to create graphics in style — and have a little fun in the process.

Scott Adams, creator of the popular Adventure Series, has developed an exciting tool for creating and storing do-it-yourself pictures with an ATARI Home Computer. We call it S.A.G.E. — Scott Adams Graphic Editor.

S.A.G.E. IS A GRAPHICS EDITOR, EH. WHAT'S THAT?

A graphics editor is exactly what it sounds like: Software which gives the user control over on-screen graphics: S.A.G.E. lets you 'draw' and color pictures with your ATARI using an ordinary joystick and special keyboard commands. The pictures can then be stored onto a tape or disk for later retrieval. And it's very easy to use — nearly every command is initiated by pressing a single key. Want to change a color? Just press C. How about saving a picture? Pressing S will do the job. And you create pictures with a simple ATARI joystick. How's that for ease of use?

S.A.G.E. is a lot more than making and storing pictures. For example, you may choose from a full range of editing commands that give you complete control over the creation of your picture. You can also select from a variety of "fill" patterns to detail your art, and create and save special color palettes, too. In fact, each picture can be given its own special color palette.

S.A.G.E. IS PERFECT FOR ADVENTURES

You say you write Adventure-type programs? Then you'll find S.A.G.E. perfect for adding top-quality, high-resolution graphics to your own Basic or machine-language programs. Scott developed S.A.G.E. specifically for his popular Scott Adams Graphic Adventure Series. Hundreds of screens of superb graphics were created for the ATARI S.A.G.A.'s using this program.

...AND PERFECT FOR "NON-ADVENTURES," TOO

S.A.G.E. can also be used to insert pictures into "non-Adventure" Basic or machine-language programs. In short, we think you'll find S.A.G.E.'s applications to be as varied as your own imagination.

NO PROGRAMMING EXPERIENCE? NO PROBLEM.

Even if you don't know a FOR NEXT loop from a GOTO statement, S.A.G.E. will have you electronically sketching like a pro in no time at all. All you need is a properly equipped ATARI 400, 600, 800 or 1200 Home Computer and this package. Chapter 2 describes the special memory and equipment requirements.

ABOUT THIS MANUAL

How many of us have vigorously fallen to the task of assembling a new 10-speed bicycle or model airplane, only to find too late that Whizdangle A should've been installed BEFORE Heliosprocket B? As someone who'd probably been through the situation himself said, "If all else fails, read the instructions."

You'll be happy to know that if you DON'T follow this manual to the letter, the worst that will probably happen is the loss of a little time. Or perhaps you'll accidentally exile a picture you've worked on for a couple of days into ionic oblivion. Nothing really serious, though.

On the other hand, time invested now in reading this manual and stepping through the examples will return much: familiarity with the program, confidence in your own abilities, and most importantly, competence.

So how about it? Good. See you in Chapter 2.

CHAPTER 2

THE BARE NECESSITIES:

REQUIRED HARDWARE, TAPE AND DISK LOADING INSTRUCTIONS AND MONITOR ADJUSTMENT

Before we plunge into the joys of electronic art, let's make sure that you have all the necessary equipment to operate your version of S.A.G.E. In addition to an ATARI 400, 600, 800 or 1200 Home Computer, you'll need the peripherals and accessories listed on the chart below. Check the column that applies to your system.

	HARDWARE REQUIRED	
	S.A.G.E. TAPE	S.A.G.E. DISK
Memory	48K	48K
Peripherals	ATARI Cassette Player	ATARI 810 Disk Drive
Basic Cart.	Yes	Yes
Joystick	One Required	One Required
Color Monitor Or TV	Yes	Yes

LOADING THE 48K DISK VERSION OF S.A.G.E.

The 5¼ inch disk version of S.A.G.E. comes with a version of ATARI DOS (Disk Operating System) 2.0S. This means that your S.A.G.E. disk can be used without any additional Disk Operating System.

Follow these instructions to load the disk version of S.A.G.E.

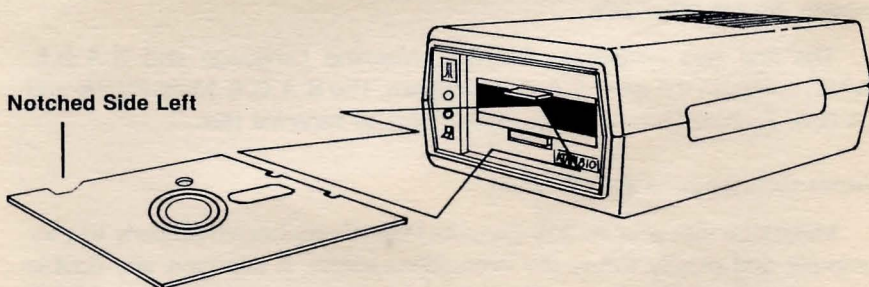


FIGURE 1

1. Insert your ATARI Basic Cartridge into the computer.
2. Turn on your disk drive.
3. Place the S.A.G.E. disk label side up, notched side to the left, into Drive 1 and close the drive door.

4. Turn on the computer. The power switch is located on the right side panel of the computer.
5. When the **READY** message appears carefully type:
RUN"DEEDITOR,BAS" Press **RETURN**

AFTER S.A.G.E. LOADS

There will be a short pause after **RETURN** is pressed. The screen will read:

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COPYRIGHT 1983 BY AI

File Name? (Press RETURN if No File Name)

Later, we'll explain how you can assign a special file name to a picture. This file name will allow you to save and reload a picture. For the moment, press **RETURN**. The screen will display the Screen Canvas — the upper half of your monitor or TV screen where your pictures will take shape.

LOADING THE 48K TAPE VERSION OF S.A.G.E.

The tape version of S.A.G.E. contains four separate programs which must be loaded into your ATARI's memory before they can be used. We'll be loading the first two shortly. The programs are:

- a) S.A.G.E. Machine Language
- b) S.A.G.E. BASIC
- c) S.A.G.E. Multi-Palette
- d) S.A.G.A. Sample Picture

Each of the four programs is recorded on both sides of your S.A.G.E. cassette. If you have a problem with loading the programs from one side of the cassette, try the other side.

The first two programs, S.A.G.E. Machine Language and S.A.G.E. BASIC, comprise the main S.A.G.E. program. The S.A.G.E. Multi-Palette and S.A.G.A. Sample Picture will be loaded later as separate files.

Proper Connections Are A Must

Make sure that your ATARI Cassette Player is connected properly to your computer and closely follow the instructions below. If you have any doubts about what plug goes where, check the manual that came with your ATARI Cassette Player. The manual will illustrate the correct cassette player-to-computer hook-up procedure.

- 1) Rewind the S.A.G.E. cassette if necessary and place it into the ATARI Cassette Player.
- 2) Insert your ATARI BASIC Cartridge into the port on top of your 400 or 800 Home Computer, or into the left side port on the ATARI 1200.

- 3) Press **PLAY** on the ATARI Cassette Player.
- 4) Press and hold **START** while turning on the computer.
- 5) Press **RETURN** on your computer.

The S.A.G.E. Machine Language program will load at this time. After it loads, the **READY** prompt will appear on your screen. When it does:

- 6) Type: **CLOAD**
- 7) Press **RETURN** on your computer.

The S.A.G.E. BASIC program will load at this time. The **READY** prompt will appear on your screen after the BASIC program has loaded. When it does:

- 8) Type: **RUN** and press **RETURN**.
- 9) Follow the directions under **AFTER S.A.G.E. LOADS** above.

Color Adjustment

Disk users: Skip ahead to **MONITOR ADJUSTMENT**, which follows this section, and follow the color adjustment instructions.

Tape users: A bit more expertise is required for you to set up a color adjustment situation. Make the best of what you have until you've read through **Chapter 6**, then return to **MONITOR ADJUSTMENT**, below.

MONITOR ADJUSTMENT

S.A.G.E. achieves a greater range of colors than is normally available by quickly flipping between two screens of colors. This unique toggling effect results in a slightly exaggerated degree of screen flicker. For this reason, proper color adjustment is crucial for a "flicker-free" picture and true colors.

THE TEST PALETTE

Disk users: A special Test Palette, similar to the color bars used by television technicians, is included on your S.A.G.E. disk. You can load the Test Palette by typing **TESTP** and pressing **RETURN**. After the Test Palette appears, follow the **ADJUSTING THE MONITOR CONTROLS** section below.

Tape users: You will have to create a Test Palette. Just follow the directions below.

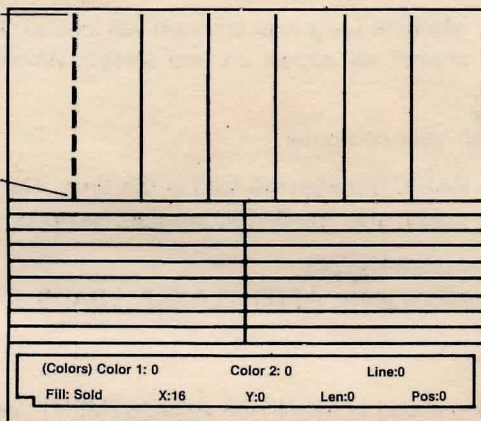
CREATING A TEST PALETTE

- 1) Recreate Figure 2 on your screen as shown below.
- 2) Use the Fill command to color each bar. From left to right the colors are white (Color 10), brown (Color 2), orange (Color 11), yellow (Color 0), blue (Color 4) and green (Color 1). Adjust your set using these color bars for reference.

C. Repeat steps A and B until you have 6 distinct bars.

A. Position cursor here.
Press N.

B. Move cursor to here.
Press L.



D. Use the Fill command to color each bar as listed.

FIGURE 2

ADJUSTING THE MONITOR CONTROLS

1) Adjust the Color Intensity control until the color bar is black and white. Turn the intensity control back slightly until the color first begins to appear.

2) Adjust the Tint control (or 'hue' on some sets) until the orange and yellow color bars are true. The white bar will have a slightly bluish tinge. This color is normal.

3) Adjust the Contrast and Brightness controls until as much flicker as possible has been eliminated. If necessary, go back and readjust the Tint control slightly.

4) Using the white and blue color bars for reference, adjust the Color Intensity control until any final flicker is removed.

5) Readjust the Brightness control to suit.

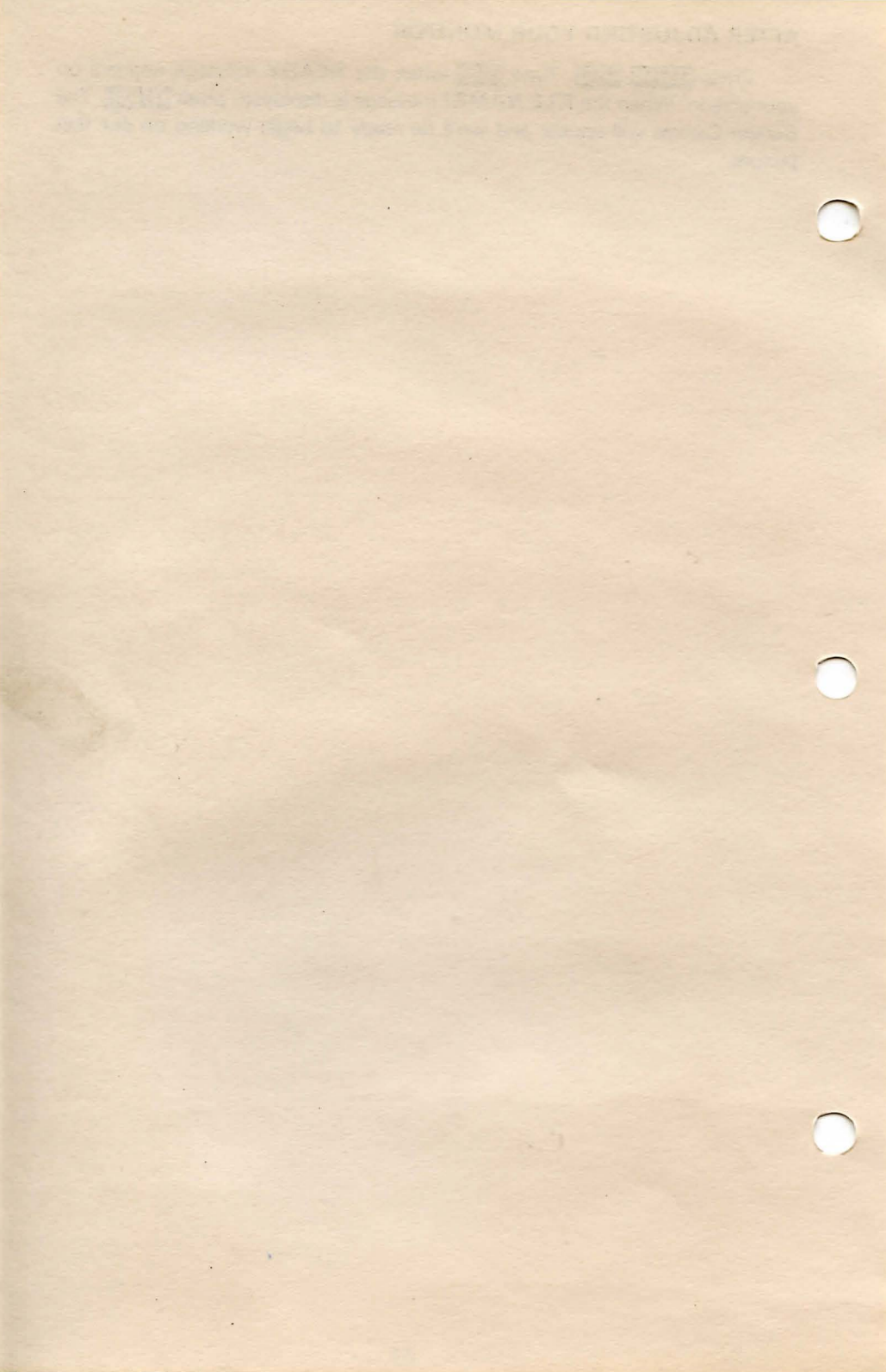
The screen colors should be true if you followed the color adjustment procedure properly. Don't expect intense, vivid colors, but you should see clear, distinct pastels. If you wish to sacrifice color intensity for flicker, increase the color intensity control to brighten the color range.

IF IT STILL DOESN'T LOOK RIGHT

Bear in mind that the eye is the best and final judge. If the above procedure doesn't produce satisfactory results, adjust your monitor or television controls until the screen colors look good to you.

AFTER ADJUSTING YOUR MONITOR

Press **SYSTEM RESET**. Type **RUN** when the **READY** message appears on your screen. When the **FILE NAME?** message is displayed, press **RETURN**. The Screen Canvas will appear and we'll be ready to begin working on our first picture.



CHAPTER 3

THE COMMAND KEYS: A DETATCHABLE LISTING

User friendly. Ease of use. Accessibility. Each of these catch phrases describes a consumer-oriented approach to software. The first order of business in developing S.A.G.E. was one of creating a graphics editor that could be used by novice and pro alike. The next step was user friendliness — it had to be easy to operate.

We mentioned in the Introduction that most of S.A.G.E.'s editing fuctions are engaged with a single keypress. These special Command keys are listed in this manual in two forms: (1) An abridged, detachable chart version of this chapter featuring a brief description of each Command key, and (2) an expanded, glossary-style listing in **Chapter 12** that adds an expanded description to each Command key.

The abridged chart showing the Command keys and their respective functions is listed on the reverse side of this page. Look at it carefully before going on to the next chapter, and don't let the unfamiliar terms throw you — we'll be covering each of them shortly.

EDITING KEYS

A*	ALTER FILL type
B	Bye-bye Palette (erases palette)
C*	CHANGE Color/Fill information
D**	DELETE Commands from buffer
E	EDIT Mode (clears screen, resets pointer to beginning of buffer)
F*	FILL
G	GET Palette (saved to disk or tape)
H	HUNT (searches for specific commands in buffer)
I	IDENTIFY color cursor is positioned on
J	JUMP through buffer (backward or forward)
L*	LINE (draw to)
N*	NEW line (plot first point)
O**	Load file ONTO current picture
P	PALETTE edit
Q*	QUICK clear
R	REMEMBER current palette to tape or disk
S	SAVE picture onto disk
T	TEST mode (does not store entries into buffer)
U*	Fill UNTIL boundary encountered
V*	Changes Color 1 lines to Color 2 in buffer
W*	WAIT X seconds, then continue
X	EXit edit mode and Draw to end
Z**	Set Color 1 = 15, Color 2 = 9, then executes V
I**	Straighten horizontal/vertical lines
SPACE BAR	Steps through buffer from current position (Edit Mode only)
#	Dumps S.A.G.E. object code to Cassette tape
?	Disk Directory when asked file name
	** Move Command. Moves entire picture on screen
	* Commands are saved in buffer (except T mode) **
	Changes commands already in buffer

CHAPTER 4

LET'S DRAW SOMETHING!

The preliminaries are almost behind us. This chapter will give some background on how S.A.G.E. operates and describe the fundamentals you need to start creating a picture.

CHECK YOUR MONITOR

The monitor screen on your ATARI should resemble Figure 2 below if you correctly followed the instructions in Chapter 2. If you haven't loaded S.A.G.E. yet, or the screen doesn't look like Figure 2, go back to Chapter 2, re-read the instructions and correct the problem.

While you're at it, hook up a joystick to Port 1. Port 1 is located on the front bottom edge of ATARI 400 and 800 computers. The ATARI 1200 joystick port can be found on the left side of that system.

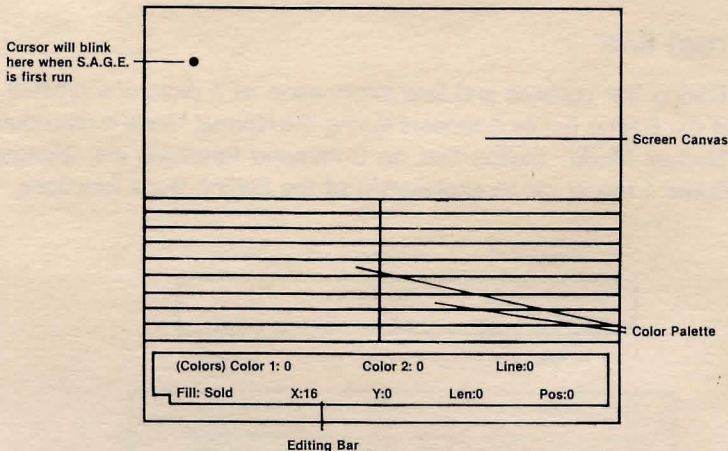


FIGURE 3

SCREEN DIVISION

What your screen now shows is the heart and soul of S.A.G.E. You'll notice that the screen is split into three distinctive zones or areas. From the top of the screen down, the zones are:

- (1) The open, blank area that occupies the top half of the screen. This is where you will create your pictures. We'll refer to this area as the Screen Canvas.
- (2) The double blocks of color bars that comprise the primary Color Palette.
- (3) The Editing Bar, which displays important information such as cursor position, colors used, and Color Fill type.

PROFESSOR SAGE SEZ:

If you hit **BREAK** by accident, type
GOTO START to continue!



SCREEN CANVAS

Remember "connect-the-dot" coloring books? S.A.G.E. operates in a similar fashion. You plot points on the Screen Canvas and then connect them using a special line-drawing command. Once your drawing is complete, it can be enhanced with any of the available colors and fill patterns, including solid, diamond, vertical, horizontal and checkerboard.

COLOR PALETTE

The Color Palette you see on the screen is actually a visual reference, and is akin to an artist's hand-held palette. Instead of dipping a paintbrush into paint, though, a movable screen cursor is positioned over the object to be colored and a special Command key is pressed.

The on-screen colors correspond to a set of numbers between 0 and 15. By typing a number when asked, S.A.G.E. executes the color you've selected.

THE EDITING BAR

The Editing Bar updates and lists information as a picture is created. A facsimile of the Editing Bar as it appears during the Normal Mode is reproduced below. ("Normal Mode" means that no Command functions are engaged.) Refer to Figure 4 below for an explanation of the Editing Bar's functions.

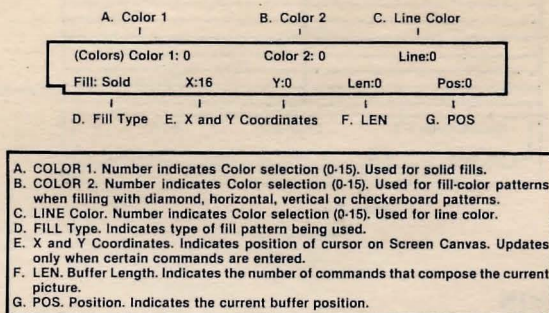


FIGURE 4

YELLOW, YELLOW EVERYWHERE

S.A.G.E.'s color registers always reset to Color 0 when the program is first used. This means that any colors you draw or fill will be yellow unless a color change has been entered.

As mentioned before, each color in the Color Palette is assigned a number between 0 and 15. This helps us locate and choose colors more easily. A

glance at the Editing Bar will show that COLOR 1, COLOR 2 and LINE have all reset to Color 0, yellow.

The subject of changing colors will be covered shortly. In the meantime, we'll be working with Color 0, yellow.

THE CURSOR AND THE X AND Y AXES (Relax, No Algebra Required)

Look at the upper portion of your screen. A small dot is flashing. This is the cursor, a movable reference that acts as your electronic pen tip. The cursor is quite small — only one pixel in size — but changes color to counterpoint itself as it is moved across different colored areas. Right now, it appears as a white dot flashing against a dark background of the Screen Canvas.

Got your joystick hooked up? If so, push the handle to the right: the cursor will respond by slowly moving towards screen right. Now pull the handle towards you — the cursor will move towards the bottom of the screen. Pressing the joystick trigger button and joystick handle at the same time will increase the cursor's speed.

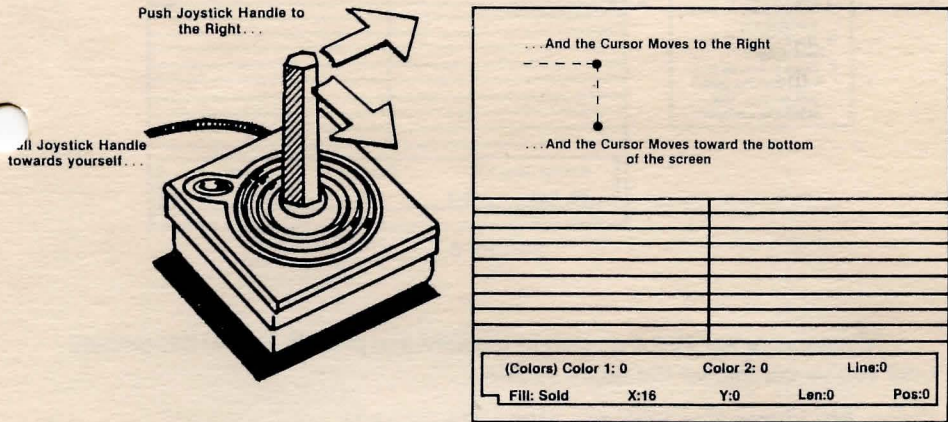
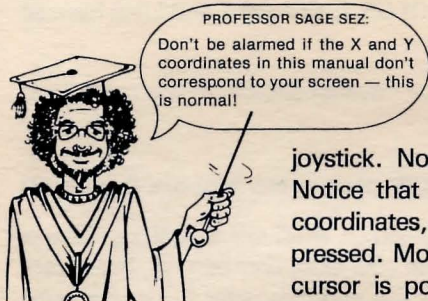


FIGURE 5

When the cursor moves horizontally, we say that it moves along the X axis. Vertical movement is along the Y axis. By referencing the cursor with X and Y coordinates, S.A.G.E. can "track" the cursor's position anywhere on the screen.

The X and Y positions are displayed in the second line of the Editing Bar, as two separate numbers. Note, too, that the X and Y coordinates are only updated when certain commands are pressed. Since no Commands keys have been pressed, the X and Y coordinates are still set to their original positions, even though the cursor was moved around the screen some.



DRAWING THE SQUARE

Let's get down to business. Pick a point somewhere near the center of the screen with the joystick. Now press **N** on your ATARI keyboard. Notice that the Editing Bar updates the X and Y coordinates, as well as LEN and POS, each time N is pressed. Move the joystick handle forward until the cursor is positioned about an inch above its last position. Press **L** now. You've just drawn your first line!

- A. Use the N command to plot your initial point here.
- B. Move the cursor to here and press L.
- C. Move cursor to here and press L.
- D. Move cursor to here and press L.
- E. Move cursor to here (your starting point) and press L. Our square is complete!

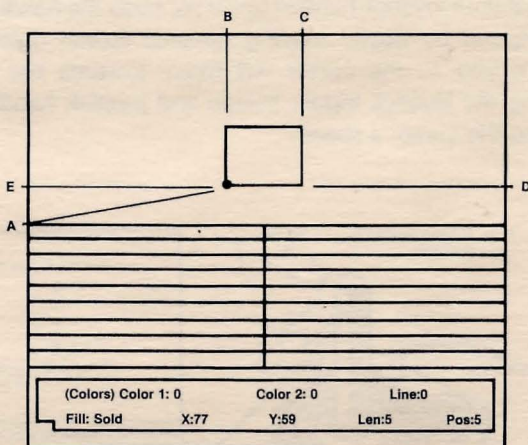


FIGURE 6

Move the cursor about an inch to the right and press **L**. Follow this pattern until you've completed the entire square.

Oops. My Line's Not Straight. What Happened?

Rest assured, nothing serious. If the cursor is not positioned precisely in a straight line from its last position, the line will 'correct' itself by jumping the number of pixels necessary to compensate. This occurs because your ATARI, as brilliant as it is, cannot draw a curve. To correct the problem, carefully type **D** and then **I** and press **RETURN**. (We'll explain this process later.) Use the joystick to reposition the cursor slightly and try again.

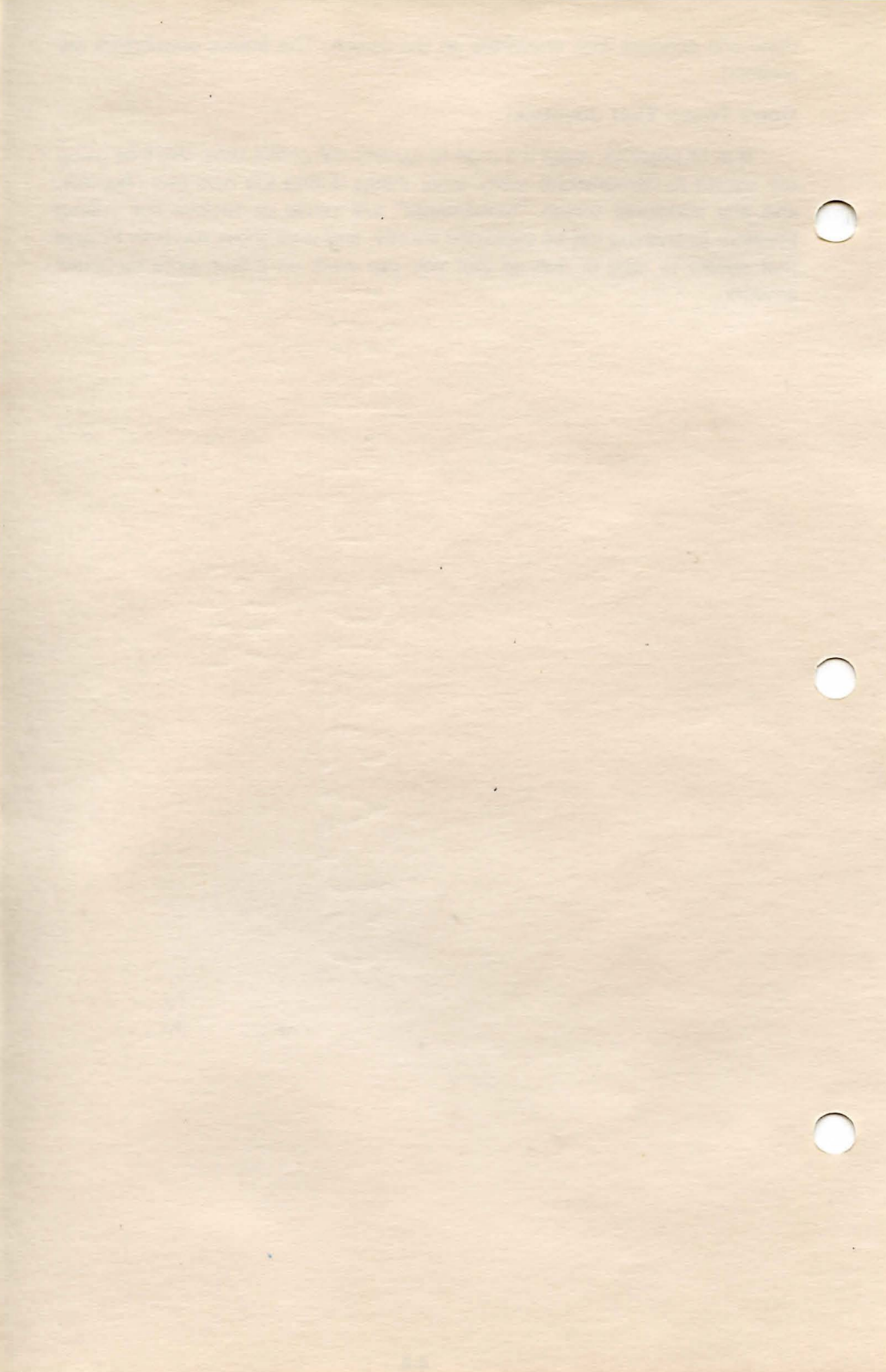
That's Better. Now, How Did S.A.G.E. Draw the Square?

Simple. N is the command for starting a New Line. When the cursor was positioned and N pressed, a point was plotted internally, causing S.A.G.E. to "remember" that point. Re-positioning the cursor and pressing L drew a line from the first point to the second point. Using the N and L commands, you can

draw and connect lines anywhere on the screen. The artistic possibilities are endless!

Don't Touch That Joystick!

If at all possible, resist the urge to experiment at this time. We'll be using our square to demonstrate many other things during the next few chapters, and any additional screen "movements" will cause us to lose our editing position. Everything will be explained shortly, and we'll show you how to save that square to tape or disk so that you can work on a little extra curricular artwork.



CHAPTER 5

FILLS, COLORS AND MORE

We've seen that the N and L commands provide basic line drawing functions, but there's much more to S.A.G.E. than doing fancy "electronic pencil" impressions. You are about to discover a feature that would turn Rubens green with envy — the Color Fill.

DON'T LOSE THAT SQUARE

We'll be using the square to illustrate a few things in this and upcoming chapters, so don't turn off your computer just yet.

FILL 'ER UP

If the N and L commands constitute your electronic pencil, the Color Fill certainly fits a similar role as an electronic paintbrush. The Color Fill uses one or two colors that you select from the on-screen Color Palette. You may choose:

- 1) A Solid Fill (single color)
- or
- 2) A Two Color Fill (pattern)

We'll be taking a detailed look at two-color fills in **Chapter 7**. For now, our square is going to get a basic one-color, no-frill fill.

COLORS AND FILLS — WHAT'S THE DIFFERENCE?

Actually, very little. There are three color types available with S.A.G.E. — COLOR 1, which is used for solid fills or the main color in a Two-Color Fill; COLOR 2, which is the "pattern" color in any type of fill other than solid; and finally, LINE, which is, as you might guess, the color used for line drawing. When we refer to a "fill color," we're only referring to its application.

THE SOLID FILL

Any of the palette colors, except for Color 15, may be used as a Color Fill. Each palette color has a corresponding number. Take a look at the chart below.

S.A.G.E. STANDARD COLOR PALETTE	
* 0 YELLOW	* 9 BLACK
* 1 GREEN (lime)	* 10 WHITE (lt. purple)
2 BROWN	11 ORANGE
3 AVOCADO	12 MEDIUM BROWN
* 4 LIGHT BLUE	13 TAN (background)
5 PURPLE	14 MED. GREEN (bkgd)
6 MEDIUM BLUE	15 DARK RED (used only with U command for opaque fills)
* 7 ORANGE-RED	
8 MAROON	
* These colors have a minimum of flicker. Other colors vibrate in varying degrees, and can be used for special effects, e.g., red for flames.	

The chart above lists the colors you may use. Let's go with Medium Blue, Color #6 on the palette chart above, to re-color our square.

Follow these instructions:

1) You type: **C**

The Editing Bar says:

CHANGE COLORS:

(1)FILL, (2) = COLOR 2, (3) = LINE

2) You type: **I**

The Editing Bar says:

COLOR? (0-15)

3) You type: **C** and press **RETURN**

The Editing Bar says:

CHANGE COLORS:

(1)FILL, (2) = COLOR 2, (3) = LINE

4) You press: **RETURN**

The Editing Bar says:

FILL TYPE NOW: SOLD

0 = SOLD 1 = DIAM 2 = HORZ 3 = VERT 4 = CHEC

5) You type: **0**

The Editing Bar says:

(COLORS) COLOR 1:6 COLOR 2:0 LINE:0

FILL:SOLD X:77 Y:59 LEN:6 POS:6

After typing the last command (0), the cursor will blink at its last position on the Screen Canvas, which should be right about where you first used the N command.

MERE SECONDS AWAY ... THE BIG FILL

Take the joystick and position the cursor in the upper center of the square. (Remember: Pressing the red trigger button on the joystick and pushing the joystick handle at the same time will speed the cursor movement.) Now, take a deep breath and press F. The square will quickly fill with Color #6, Medium Blue.

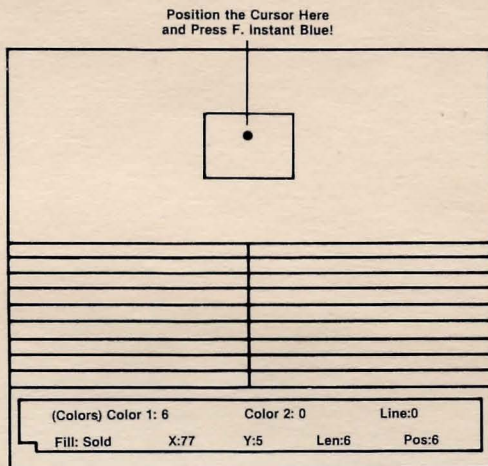
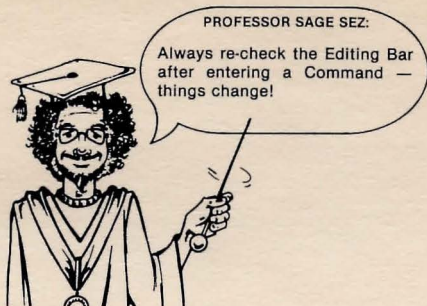


FIGURE 7

BACK TO THE EDITING BAR

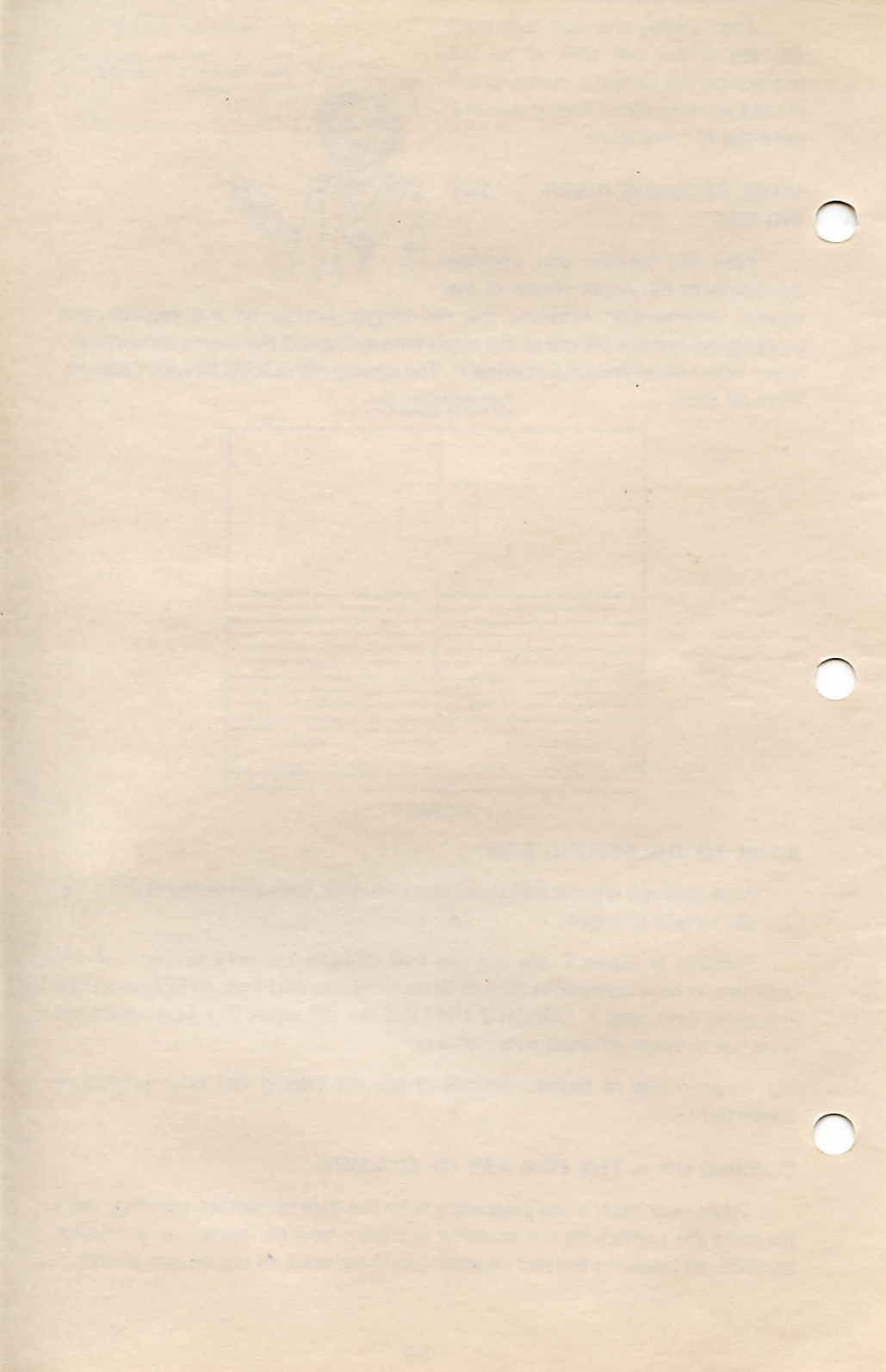
Now that our square no longer looks so drab, let's check the Editing Bar and see what's changed.

Looking at Figure 7, we can see that COLOR 1 is now 6, the X and Y coordinates have updated to 82 and 52 respectively, and that the LEN and POS indicators both read 7. COLOR 2 and LINE are still set at 0, yellow, since we have yet to enter different information.

A good rule of thumb: Always check the Editing Bar after entering a command.

COMING UP — THE FINE ART OF ERASING

While your heart is still palpitating from the thrill of "instant coloring," let's set aside the joystick for the moment and learn how to "erase" — a function touched on briefly in the last chapter. We'll get back to our square shortly.



CHAPTER 6

DELETE DELIGHT, THE BUFFER AND SAVING YOUR PICTURE

To Err Is Human, To Erase, Divine.

Well, we may have taken a *little* creative license with the original quotation, but erasing and changing your picture whenever necessary are as important as actually creating the picture itself. Our electronic eraser will be S.A.G.E.'s Delete command.

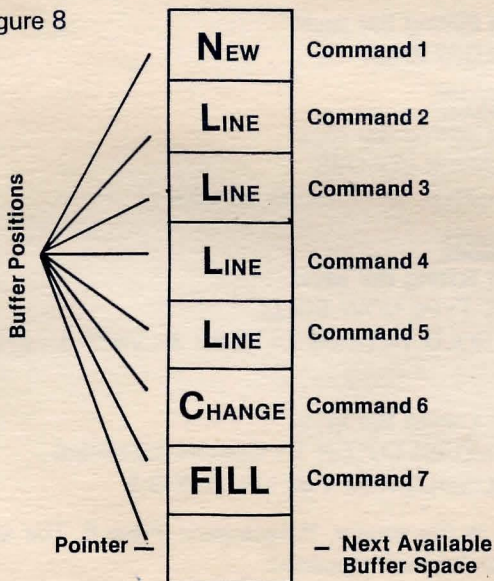
To best understand the Delete command, some background on what occurs as a picture is created would be helpful. Herewith, a short primer on the buffer.

THE BUFFER

The buffer in your ATARI may be thought of as a holding area for our picture information. As each command is entered, it is stored sequentially — much like cards in a card file. New instruction “cards” can be inserted or deleted as necessary.

Each picture can be composed of up to 1350 separate commands. This information can be found on the Editing Bar as LEN, for buffer LENGTH. For example, a LEN indicator reading of 567 means that the buffer is currently 567 separate commands from start to finish. POS is the current buffer position.

Figure 8



THE POINTER

Those who are well-versed in all things technical might define a pointer as a variable that references an individual piece of datum within a large body of data. For our purposes, let's think of the pointer as a little internal arrow that “points” at a command in S.A.G.E.'s buffer and says, “You're next!” We never actually see the pointer, but it's always hard at work referencing commands.

USING THE DELETE COMMAND

Perhaps, let's suppose, you've decided to change the blue fill in our square to green. Thanks to the Delete command, the instruction given to the computer to color the square blue can be canceled, and we can "refill" the square with green. Keep in mind that the picture and palette are composed of single lines of YOUR instructions concerning color, fill type, and other information.

Follow these instructions closely:

1) You type: **D**

The Editing Bar says:
WARNING!
WILL DELETE LAST INSTRUCTION DONE
HOW MANY INSTRUCTIONS?
(0 BACKWARDS)

2) You type: **= 2**
and press **RETURN**

The Editing Bar says:
(COLORS) COLOR 1:6 COLOR 2:0 LINE:0
FILL:SOLD X:82 Y:52 LEN:5 POS:5

3) You type: **C**

The Editing Bar says:
CHANGE COLORS:
(1) = FILL, (2) = COLOR (3) = LINE

4) You type: **1**

The Editing Bar says:
COLOR? (0-15)

5) You type: **1** and press **RETURN**

The Editing Bar says:
CHANGE COLORS:
(1) = FILL, (2) = COLOR, (3) = LINE

6) You type: **0** and press **RETURN**

The Editing Bar says:
FILL TYPE NOW:SOLD
0 = SOLD 1 = DIAM 2 = HORZ 3 = VERT 4 = CHEC

7) You type: **0**

The Editing Bar says:
(COLORS) COLOR 1:1 COLOR 2:0 LINE:0
FILL:SOLD X:82 Y:52 LEN:6 POS:6

8) Now position the cursor in the square, if necessary. Press **↓**. The square instantly fills with green. Here's what happened:

- 1) Typing **D** engaged the Delete Command.
- 2) Typing **2** made the pointer back up and "forget" the last two commands: Fill and color change.
- 3) Typing **C** engaged the "Change Color" mode.
- 4) Typing **I** selected Fill from the menu.
- 5) Typing **1** selected Color 1, Green, from the Palette.
- 6) Typing **0** selected the Solid Fill pattern.
- 7) Typing **0** advanced the Editing Bar and returned the cursor.
- 8) Typing **5** filled the square with green.

SAVING THE SQUARE (OR ANY OTHER PICTURE)

Any picture created with S.A.G.E. can be saved for later recall and future fun. To start the saving sequence, press S. The screen will show:

ORIGINAL NAME: D: PICTURE
WHAT NAME TO USE? (ENTER FOR SAME!)

Let's name our picture and save it to the S.A.G.E. program disk. It's sound practice to periodically save a picture you're working on; this may save you hours of tedious "reconstruction" if a problem develops.

Disk Users, type: D:SQUARE. You may preface the file name with D1:, D2:, D3:, or D4 to save to Drive 1, 2, 3 or 4 in that order. Example: To save our square to Drive 4, type: D4:SQUARE. Before you press RETURN, be sure your disk is in the correct drive. If disk and drive are in order, press RETURN. The picture will be stored onto your disk. If no name is assigned to a picture, it will be automatically saved as D:PICTURE.

Tape Users, type: C:. Before you press RETURN, be sure that your cassette is properly cued and REC and PLAY are pressed. If so, press RETURN. The picture will be stored onto your tape.

When creating other file names: You may enter any name up to 8 characters in length.

RECALLING A PICTURE

To recall a saved picture, press **SYSTEM RESET** and then type **RUN**. When the FILE NAME? prompt appears, type the name of the picture you wish to recall and press **RETURN**.

CHAPTER 7

TWO-COLOR FILLS

Although S.A.G.E. is not capable of reproducing shades and textures per se, these effects can be achieved with two-color fill patterns.

TWO-COLOR FILLS

A two-color fill combines two colors from the Color Palette, and fills an object in one of four patterns that you select: horizontal, vertical, diamond or checkered. Any color may be used from the palette, except for Color 15 which is reserved for special object outlines (discussed in **Chapter 8**).

SELECTING COLORS AND FILL TYPE

You can create a two-color fill by choosing: (a) two separate colors for the fill and (b) the type of pattern you wish to fill with. This procedure is very similar to the solid fill we used in **Chapter 5**.

THE SQUARE RETURNS

We are now going to Delete the current fill within our square and substitute a two-color diamond fill using Color 5, Purple, for the first color and Color 7, Orange-Red, for the second color. If the square is not on your screen, load it from your cassette tape or disk at this time, or redraw it from scratch following the directions in **Chapter 4**.

When the square is ready, closely follow the instructions below.

1) You type: **D**

The Editing Bar says:
WARNING!
WILL DELETE LAST INSTRUCTION DONE
HOW MANY INSTRUCTIONS?
(0 BACKWARDS)

2) You type: **2** and press **RETURN**

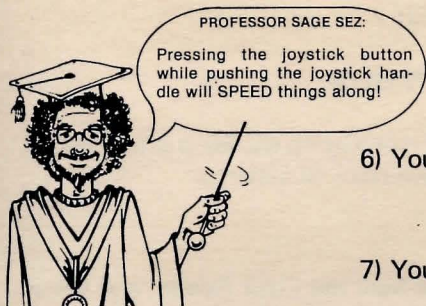
The Editing Bar says:
(COLORS) COLOR 1:1 COLOR 2:0 LINE:0
FILL:SOLD X:82 Y:52 LEN:5 POS:5

3) You type: **C**

The Editing Bar says:
CHANGE COLORS:
(1) = FILL, (2) = COLOR, (3) = LINE

4) You type: **1**

The Editing Bar says:
COLOR? (0-15)



5) You type: **5** and press **RETURN**

The Editing Bar says:

CHANGE COLORS:

(1) = FILL, (2) = COLOR, (3) = LINE

6) You type: **2** The Editing Bar says:

COLOR? (0-15)

7) You type: **7** and press **RETURN**

The Editing Bar says:

CHANGE COLORS:

(1) = FILL, (2) = COLOR, (3) = LINE

8) You press **RETURN**

The Editing Bar says:

FILL TYPE NOW:SOLD

0 = SOLD 1 = DIAM 2 = HORZ 3 = VERT 4 = CHEC

9) You type: **1**

The Editing Bar says:

(COLORS) COLOR 1:7 COLOR 2:5 LINE:0

FILL:DIAM X:82 Y:52 LEN:6 POS:6

After typing the last command (1), the cursor will blink at its last point on the Screen Canvas. As before, use the joystick to position the cursor in the upper middle portion of the square if the cursor is not already there. Press **1**. The square will quickly fill with a purple/orange-red diamond pattern.

Here's a breakdown of what each instruction did.

- 1) Typing **D** engaged the Delete Command.
- 2) Typing **2** caused S.A.G.E. to "back up" two steps and erase those commands; in this case, the instructions that colored the square Green.
- 3) Typing **C** engaged the "Change Color" mode.
- 4) Typing **1** selected (1) = FILL from the menu.
- 5) Typing **5** selected Color 5, Purple, from the palette.
- 6) Typing **2** selected (2) = COLOR from the menu. This allows selection of a second color.
- 7) Typing **7 RETURN** selected Color 7, Orange-Red, from the palette.
- 8) Typing **RETURN** a second time called up the FILL TYPE menu.
- 9) Typing **1** selected 1 = DIAM, the diamond fill pattern, from the FILL TYPE menu.
- 10) Typing **1** executed the Fill function and the square filled with our new colors and pattern.

BEYOND PURPLE/ORANGE-RED DIAMOND FILLS

Arriving at other fills and patterns is a simple matter of substitution. Replacing the 7 with an 11 during the Color 2 selection would fill the square

with a Purple/Orange-Red diamond fill when the F key was pressed. Replacing the 1 with a 4 during the Fill Type selection would change the pattern to a checkered one.

What would our square look like if we: (a) Entered a 2 for Color 1; (b) Entered a 10 for Color 2; and (c) Entered a 3 for the Pattern type? (Answer: Our square would be brown and white with a vertical pattern. If you answered correctly, go to the head of the class; if not, you should go back to **Chapter 5** and examine the Color Chart and re-read this section until you're comfortable with the concept of two-color fills.)

THE NUTS AND BOLTS OF THE FILL COMMAND

The Fill command was designed for speed and not "smartness." Therefore, in some instances, you may find that several Fill commands are required to completely color an unusually shaped object.

When executed, the Fill effect moves straight up from the cursor until another color is encountered. From this point it sweeps from left to right, reversing position and moving down one line each time it encounters another color. For the best and quickest results, position the cursor directly under the highest point of the object. This method is illustrated below.

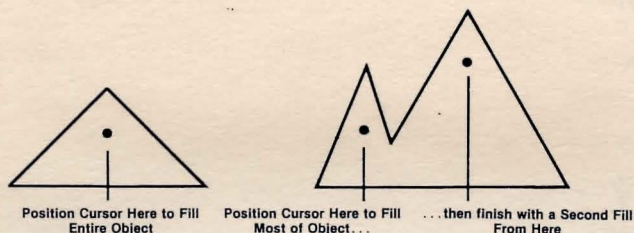


FIGURE 9

Take some time to practice with the Fill command at this time. Try creating some unusual patterns and objects on the screen using the N and L commands, and experiment by placing the cursor within different points in the objects and pressing **F**. Refer to THE SQUARE RETURNS section at the beginning of this chapter if you need some assistance in creating a two-color fill.

To clear the screen: Press **SYSTEM RESET**. Type **RUN** when the READY message appears. Press **RETURN** when the FILE NAME? message is displayed.



CHAPTER 8

THE U COMMAND AND COLOR 15

One of the quirks of the Fill command, you will remember, is that it is persnickity about filling over a second color. The mechanics of the Fill command dictate that the fill effect stops when another color is encountered. But we can use a special function, the U command, to fill right over any of the palette colors except for Color 15, a special color designed to contain the U command's runaway fill effect.



Let's try the U command in a test situation. Follow the instructions below closely.

- a) Press **SYSTEM RESET** on your ATARI. Type: **RUN** and then press **RETURN**. When the FILE NAME? prompt appears, press **RETURN**.
- b) Draw a square at the center of the Screen Canvas as you did in **Chapter 4**.
- c) Color and fill the square using the instructions below.

- 1) You type: **C**

The Editing Bar says:

CHANGE COLOR:

(1) = FILL, (2) = COLOR 2, (3) = LINE

- 2) You type: **I**

The Editing Bar says:

COLOR? (0-15)

- 3) You type: **4** and press **RETURN**

The Editing Bar says:

CHANGE COLOR:

(1) = FILL, (2) = COLOR, (3) = LINE

- 4) You type: **2**

The Editing Bar says:

COLOR? (0-15)

- 5) You type: **7** and press **RETURN**

The Editing Bar says:

CHANGE COLOR:

(1) = FILL, (2) = COLOR, (3) = LINE

- 6) You press: **RETURN**

The Editing Bar says:

FILL TYPE NOW: SOLD

0-SOLD 1-DIAM 2-HORZ 3-VERT 4-CHEC

7) You type: **I**

The Editing Bar says:

(COLORS) COLOR 1:4 COLOR 2:7 LINE :0

FILL:DIAM X:82 Y:57 LEN:6 POS:6

d) Position the cursor within the square and press **I**. The square will fill with the blue-green diamond pattern.

e) Position the cursor directly above the square. Press **I**. Move the cursor down and to the right and position it within the narrow strip that did not fill with the two-color diamond pattern. Press **I** once more.

The Screen Canvas should now be filled with the two-color diamond pattern. The square should be filled with the same pattern, but its yellow outline still discernible within the overall two-color diamond pattern.

TRACING WITH COLOR 15 AND LOCATING A MISSING CURSOR

We are now going to trace over the yellow borders of the square using the N and L commands and Color 15. This will replace the yellow borders with Color 15 (red); the existing blue-green diamond pattern can then be filled over once two new colors are selected and implemented. We'll be using the U command to fill the square instead of the F command.

Keep in mind that we're following this process for example's sake only. Normally, one would draw the square with Color 15 and skip the tracing entirely.

To engage Color 15, follow the instructions below.

1) You type: **C**

The Editing Bar says:

CHANGE COLOR:

(1) = FILL, (2)COLOR 2, (3) = LINE

2) You type: **3**

The Editing Bar says:

COLOR? (0-15)

3) You type: **15** and press **RETURN**

The Editing Bar says:

THIS IS AN OBJECT COLOR. OK?

Y/N

4) You type: **Y** and press **RETURN** twice.

The Editing Bar says:

(COLORS) COLOR 1:4 COLOR 2:7 LINE:15

FILL = DIAM X:109 Y:55 LEN:10 POS:10

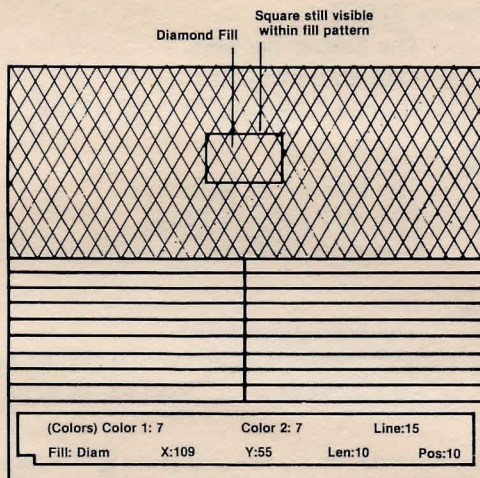


FIGURE 10

The cursor should now be blinking at some point on the Screen Canvas. You may experience some difficulty in locating the cursor when it's positioned over certain colors. If you've completely lost track of the cursor, move the joystick handle slightly — you should be able to spot the cursor when it moves.

Position the cursor over the lower left-hand corner of the square and press **N**. (See Figure 10 above.) Move the cursor to the top of the square where the lines intersect and press **L**. Continue to trace the perimeter of the square using the L command until its entire yellow border has been replaced with red.

The Screen Canvas should now show a red-bordered square with a blue-green, diamond-pattern interior. We are now going to fill the square with a different color pattern using the U command. First, follow the color-changing instructions below.

1) You type: **C**

The Editing Bar says:

CHANGE COLORS:

(1) = FILL, (2) = COLOR 2, (3) = LINE

2) You type: **I**

The Editing Bar says:

COLOR? (0-15)

3) You type: **0** and press **RETURN**

The Editing Bar says:

CHANGE COLORS:

(1) = FILL, (2) = COLOR 2, (3) = LINE

4) You type: **2**

The Editing Bar says:

COLOR? (0-15)

5) You type: **F** and press **RETURN**

The Editing Bar says:

CHANGE COLORS:

(1) = FILL, (2) COLOR 2, (3) = LINE

6) You press: **RETURN**

The Editing Bar says:

FILL TYPE NOW: DIAM

0 = SOLD 1 = DIAM 2 = HORZ 3 = VERT 4 = CHC

7) You press: **RETURN**

The Editing Bar says:

(COLORS) COLOR 1:0 COLOR 2:1 LINE:15

FILL = DIAM X:77 Y:64 LEN:16 POS:16

Position the cursor inside the square and press **F**. The square will fill with our new two-color fill, yellow-green.

THE Z COMMAND — CHANGING BLACK LINES TO RED

With a couple of keypresses you can change all Color 15 lines in a picture to Color 9 lines. The Z command will let you change red Color 15 lines to black Color 9 lines, after the U command has been used.

This is how the Z command works. When Z is pressed, Color 15 is placed into the Color 1 register and Color 9, black, is stored in the Color 2 register. A V command is then automatically executed. When E and X are pressed (E and X will be covered in **Chapter 10**), the screen is wiped and redrawn, replacing Color 15 with Color 9.

Press **Z** and then **E** and **X**, and watch what happens to the square. The yellow lines are replaced with black ones.

THE V COMMAND

The V command is similar to the Z command except that you may choose the line color to be changed. To use the V command, press **V**, and enter the two colors in the following order:

Color 1 is the color you wish to change.

Color 2 is the color you wish to add.

Here's how you would change the black border of the square to purple using the V command.

1) You type: **V**

The Editing Bar says:

CHANGE COLORS:

(1) = FILL, (2) = COLOR 2, (3) = LINE

2) You type: **1**

The Editing Bar says:
COLOR? (0-15)

3) You type: **9** and press **RETURN**

The Editing Bar says:
CHANGE COLORS:
(1) = FILL, (2) = COLOR 2, (3) = LINE

4) You type: **2**

The Editing Bar says:
COLOR? (0-15)

5) You type: **5** and press **RETURN**

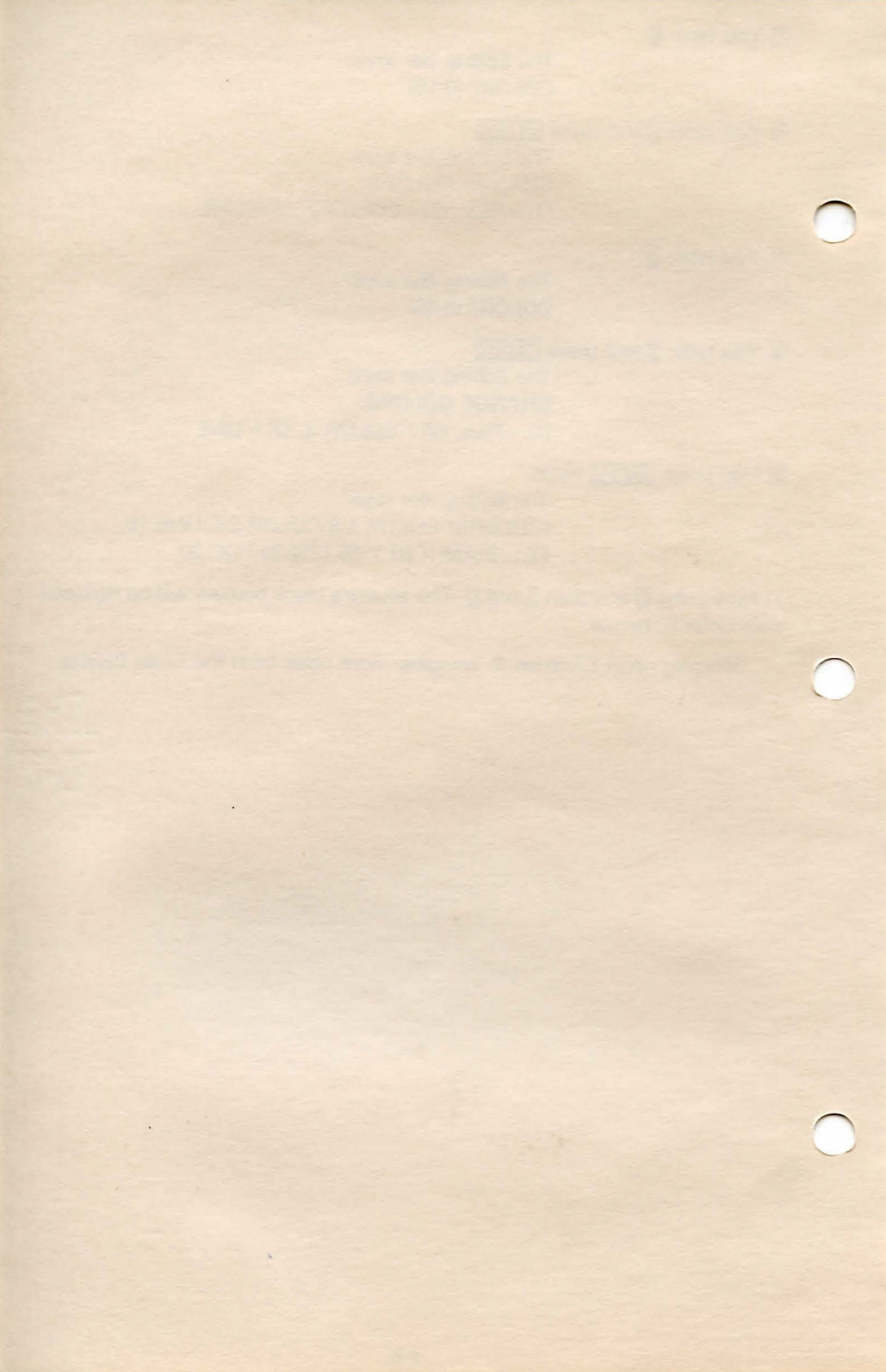
The Editing Bar says:
CHANGE COLORS:
(1) = FILL, (2) = COLOR 2, (3) = LINE

6) You press **RETURN** twice

The Editing Bar says:
(COLORS) COLOR 1:9 COLOR 2:5 LINE:15
FILL:DIAM X:83 Y:56 LEN:20 POS:20

7) Now press **V** and then **3** and **X**. The square's black borders will be replaced with Color 5, purple.

Coming up in **Chapter 9**: wringing more color from the Color Palette.



CHAPTER 9

THE S.A.G.E. COLOR PALETTE

Chapters 5 and 7 touched on the process of selecting Fill and Line colors using the on-screen Color Palette as a visual reference. Up to this point, what you saw was definitely what you got.

This chapter outlines an alternative approach to color selection. Variations can be made on the primary Color Palette by tapping into S.A.G.E.'s New Palette function. In so doing, dramatic color changes can be produced — all with a simple push or pull on your joystick. Once a new palette is created, it can be stored to tape or disk for later use.

Each picture that is saved to tape or disk has its palette saved along with it. This means that each picture can easily have its own special palette if you wish.

CREATING A NEW PALETTE

Creating a new palette is a simple process of entering the P mode and typing a value for the color register. The joystick is then used to sweep through the different colors and degrees of brightness until you find something that you like.

SELECTING A COLOR REGISTER

S.A.G.E. has eight color registers available. Once a color register is selected, you may choose both the luminance (brightness) and color type by pressing the joystick handle in the correct direction. You'll quickly discover that the New Palette creation process is largely a matter of looking at what you've produced on the screen and determining if it's usable.

Here's how to begin:

- 1) Press **P** on your keyboard. The screen will say:

REGISTER? (0-9)

The available registers are: 0, 1, 2, 3, 6, 7, 8, and 9. Registers 4 and 5 are not used.

- 2) Press any number between 0 and 9 (except 4 or 5) to select a color register. The screen will read:

REGISTER: XX COLOR: XX LM: XX
STICK = CHANGE, BUTTON = USE, KEY = ABORT

- 3) By pressing the joystick handle either left, right, up or down, the Color Palette will reflect different colors and degrees of luminance. Altering one color

register will change 4 different primary colors. Each primary color is composed of two color registers for a total of $4 \times 4 = 16$ primary colors.

The joystick positions are illustrated in Figure 11 below.

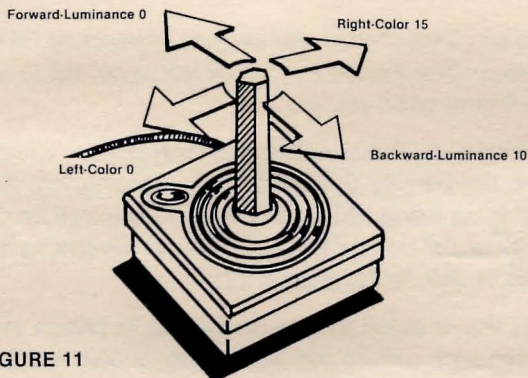


FIGURE 11

The Editing Bar numerically displays the color and luminance information as you move the joystick. You may wish to note these figures for future reference.

RETURNING TO THE NORMAL MODE

Press any key on your ATARI to return to the Normal Mode. Press the red trigger button on your joystick to retain (but not save) a palette temporarily.

SAVING A PALETTE

When you've discovered a pleasing color combination, type **Q**. You may then give the palette a name. The name should begin with PAL and end with a number. Examples: PAL5, PALETTE1, etc. Press **RETURN** after the New Palette name has been entered.

Palettes are automatically stored along with your picture for later use. To save a New Palette (and picture), ready your disk or tape and press **S** (Save).

ERASING A NEW PALETTE

A New Palette can be erased from the screen by pressing **B**. Press **E** and **X** to restore it to the screen.

Remember: Creating a palette is largely a matter of taste and what looks good to YOU!

THE MULTI-PALETTE

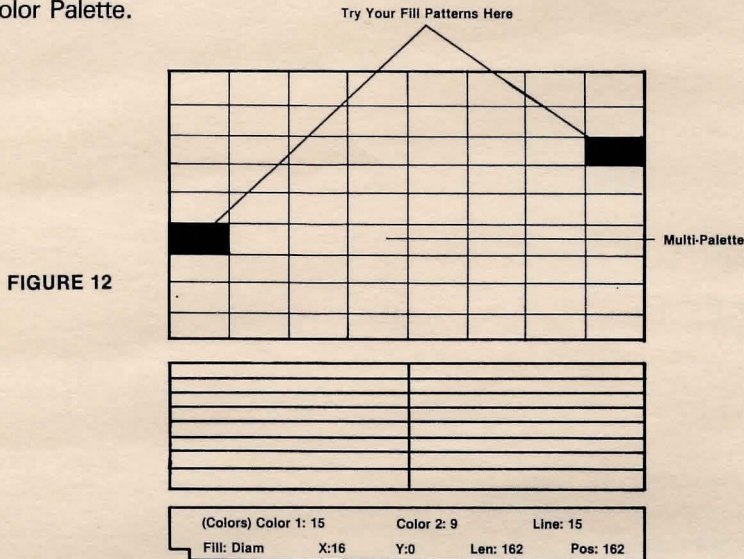
Some of the fill patterns created with S.A.G.E. produce a flickering effect, a by-product of the rapid shifting between two screens of colors. Flicker may be desirable at times — flames or running water can look particularly impressive when composed correctly, for example. But at other times, a

conspicuously flickering color can detract from the overall effect of your picture.

A helpful aid is the Multi-Palette, an on-screen chart that lets you check existing color combinations before using them in a picture. Do-it-yourselfers can test additional color combinations in either of two special 'holes' that have been left in the Multi-Palette.

MAKING THE BIG ONE INTO LITTLE ONES

The Multi-Palette is an assemblage of 72 small rectangles. Each rectangle is filled with a different two-color fill pattern. This "fill-color billboard" illustrates most of S.A.G.E.'s available non-flickering color combinations for the standard Color Palette.



USING THE MULTI-PALETTE

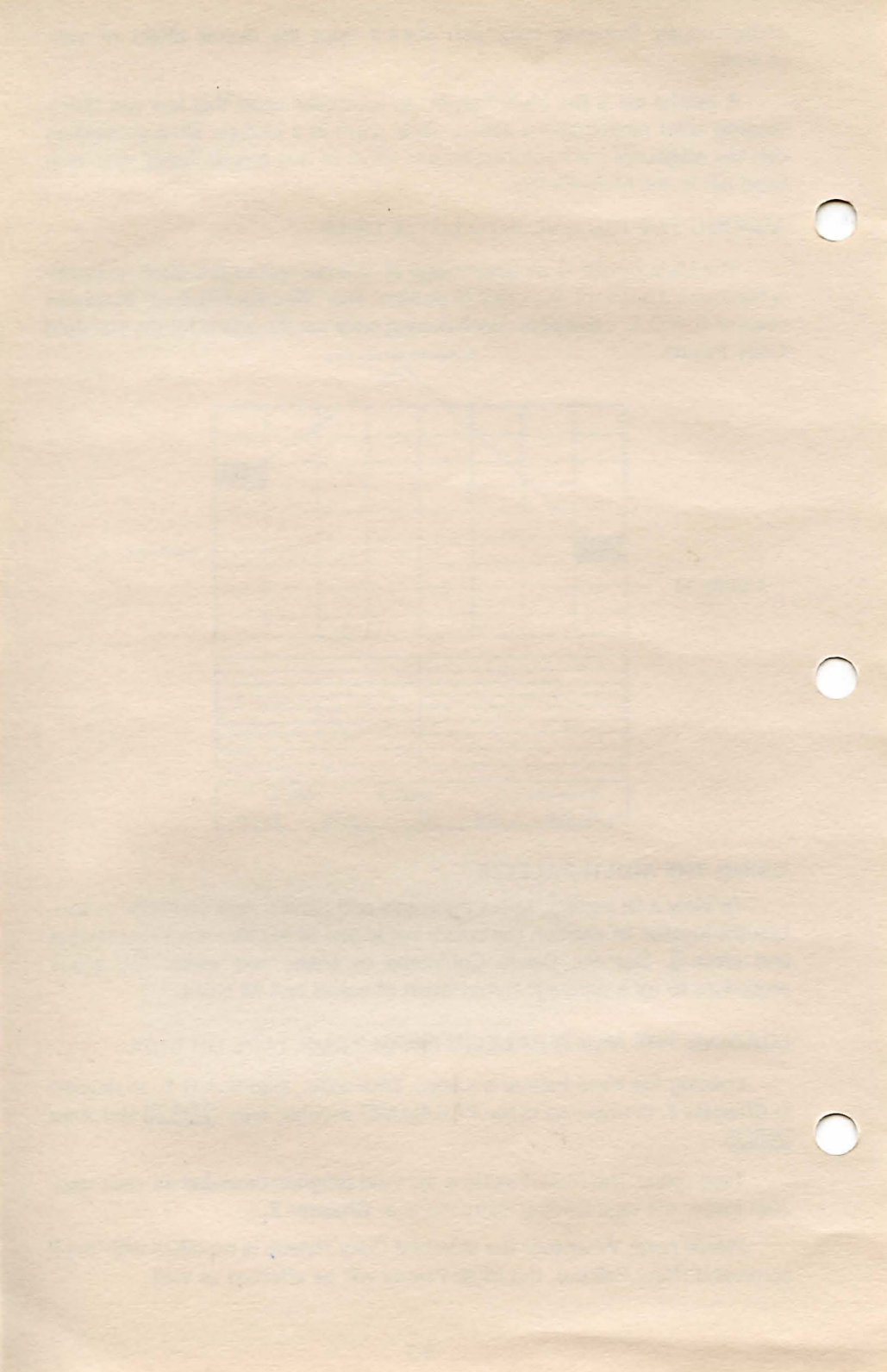
To view a fill pattern, select the colors and pattern type you wish to test. Use the joystick to position the cursor inside one of the two empty rectangles and press **F**. Use the Delete Command to erase, and repeat the above procedure to try a different combination of colors and fill types.

LOADING THE MULTI-PALETTE FROM YOUR TAPE OR DISK

Loading the Multi-Palette is a snap. Disk users, load S.A.G.E. as detailed in **Chapter 2**. In response to the FILE NAME? prompt, type: **PALETTE** and press **RETURN**.

Tape users: The Multi-Palette is the third program recorded on your tape. Just follow the tape loading instructions in **Chapter 2**.

Please note: Whenever the standard Color Palette is modified with the P command (New Palette), the Multi-Palette will be affected as well.



PUTTING THE EDITOR IN GRAPHICS EDITOR

Even Mr. Rubens would probably be stymied if he couldn't change an ill-directed line or a color that didn't work out. Altering a previously entered command — editing — is an integral part of S.A.G.E., and ties the Delete Command in with two very important functions: Edit and Hunt.

EDITING AND THE BUFFER

Editing with S.A.G.E. is a simple matter of locating and manipulating the commands stored in the buffer. Each command has a buffer position, and by locating that position, the command can be altered or deleted with the Delete Command.

BACK TO THE SQUARE

Let's return to our sturdy purple/orange-red square for the moment. If the square is not on the screen, load it at this time. By checking POS on the Editing Bar, we see that 7 commands were used to create the square. The commands are:

- 1) Plotting the initial point (N)
- 2) Drawing the left side
- 3) Drawing the top
- 4) Drawing the right side
- 5) Drawing the bottom
- 6) Color change
- 7) Using the two-color fill

YOUR EDITING TOOLS

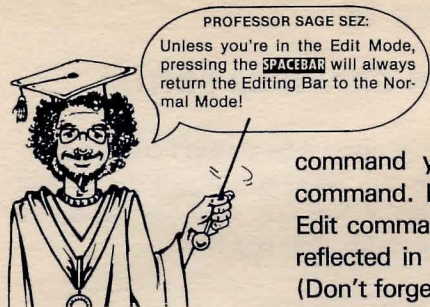
There are three keys that will help you arrive at a previously entered command for editing once **[E]** (Edit) is pressed:

(1) The **SPACEBAR** which, when pressed, steps through the buffer (using the pointer) one command at a time.

(2) Hunt (**[H]**), which offers a menu of special commands that will help you locate a specific command by that command's function, e.g. Fill, Color, New Line, and so on.

(3) Jump (**[J]**), which positions the pointer either forward or backward in the buffer.

Once the command to be changed is reached, the Delete command comes into play. Delete (**[D]**) works in chorus with either Edit (**[E]**) or Hunt (**[H]**). First we find the command; then we cancel that command and substitute a new command. Let's take a closer look.



SPACEBAR

Pressing the spacebar lets you step through the instructions in the buffer until you reach the command you wish to change with the Delete command. Each time the spacebar is pressed, the Edit command will advance one instruction. This is reflected in the POS indicator on the Editing Bar. (Don't forget: Each instruction that is used to create a picture is stored in the buffer.)

Let's tinker with the square, and extend its bottom line by an inch or so.

(1) Press **F2** to place S.A.G.E. into the Edit mode. This clears the screen and returns the internal pointer to the first instruction in your drawing. The square will disappear from your screen, and the POS indicator on the Editing Bar will return to zero. Press the **SPACEBAR** twice to view the first line.

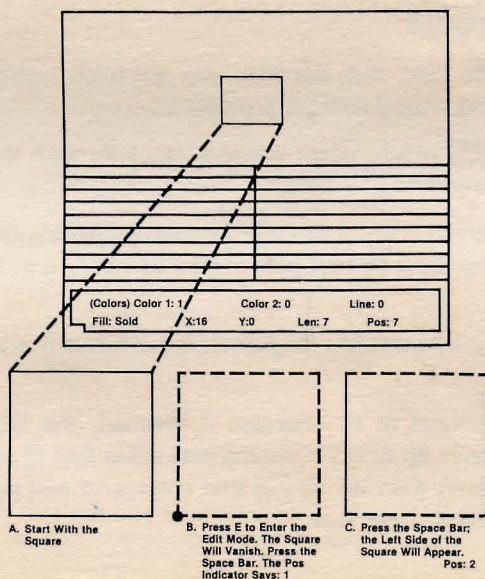
(2) Press the SPACEBAR to step through the commands one by one until Instruction 5 (the instruction that drew the square's bottom) is reached. You will see the square "assemble" with each press of the spacebar. Watch the POS indicator on the Editing Bar; when it reaches 5, stop pressing the spacebar.

(3) Press **D** (Delete) and then type **- 1** and **RETURN**. Instruction 5 will be erased.

(4) Reposition the cursor at the new point to which you wish to extend the line. Press **F1**. The new line will be drawn.

(5) Press **F3** to move the pointer to the end of the buffer (in this case, Instruction 7) and the new line will be inserted and executed. The revamped picture will appear.

FIGURE 13



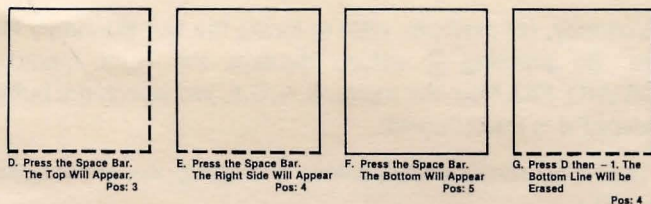
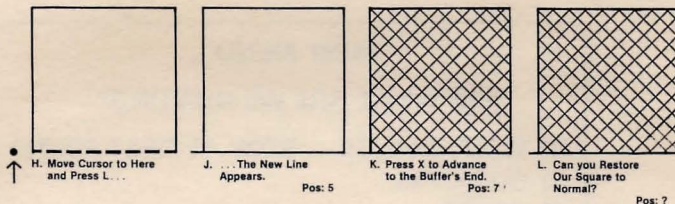


FIGURE 13

(Cont.)



DELETE COMMAND

To recap our example above, the Edit command advanced the picture to the instruction to be changed, and the Delete command canceled the instruction.

Delete can erase forward as well as backward. In the example above, a -1 was entered. This erased the LAST instruction executed. If a -2 were to be entered, the last TWO instructions would be erased. A -5 would've erased everything to the beginning of our square. Entering a positive number, 1, would've erased the last instruction executed. In this case, Instruction 5 would have been erased since we are positioned at Instruction 5. Entering a 2 would delete Instructions 5 and 6. Delete always starts with the last instruction executed.

AND NOW — A LITTLE RECONSTRUCTIVE SURGERY

Go back now and "correct" the extended line you just added to the square's bottom. When you have finished restoring the square to normalcy, press to save the square onto your tape or disk.

HUNT

The Hunt function, though simple in execution, is one of the most important editing functions of S.A.G.E.

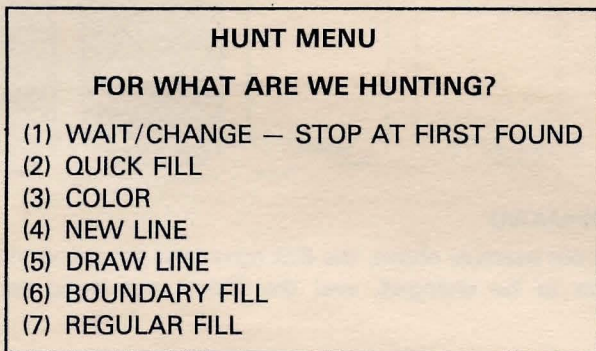
The Hunt function may be thought of as a "short-cut sniffer." As mentioned at the beginning of this chapter, engaging Hunt taps into a menu that lists commands according to their function. Searching for a command by function can save you time when working with complex pictures which often contain hundreds of separate commands.

USING THE HUNT FUNCTION

The search itself is a simple process. First, press to display the menu of command types, and then enter the number of the menu item to be located.

You may, for example, wish to locate the first Boundary Fill placed into a picture. By pressing **F** (which displays the Hunt menu) and then **B**, BOUNDARY FILL from the menu, S.A.G.E. will search the buffer until the first Boundary Fill is encountered.

The HUNT menu is listed below, and will appear in the Editing Bar when **F** is pressed.



Each menu item above refers to one of the specialized drawing, coloring or filling functions of S.A.G.E., except for (1), WAIT/CHANGE, which is a time delay you can place into your picture at pre-determined intervals. (WAIT is explained in detail in **Chapter 10** under its own separate category.)

For example, to locate and change the first Regular Fill used in our square, press **F**, REGULAR FILL. S.A.G.E. will search the buffer until the first Regular Fill is located.

During the search, the square would be drawn *up to the point where the regular fill was found*. If you were to press the spacebar at this point, the fill would execute. Therefore, to change the Regular Fill command:

Press the **SPACEBAR**, as above, and use the Delete key (**DEL**) and **←** to back up one instruction and substitute a new color using the C (Change color) command.

Whenever using HUNT, the pointer will be moved to the instruction immediately prior to one you wish to locate. If you press a wrong key during the procedure, you can begin again by pressing **F**.

You'll find more information on HUNT in **Chapter 11**.

JUMP COMMAND — A REAL TIME-SAVER

Any time you are looking for a particular instruction in the buffer, pressing **J** (Jump) will greatly expedite the search. The Jump command jumps the pointer forward in the buffer when a positive number is entered or backward if a negative number (a number prefaced with a — sign) is entered.

To use the Jump command, press **J**, then type the number of commands you wish to skip through. After you've entered the positive or negative number, press **RETURN**. The Jump command will skip over the number of commands entered.

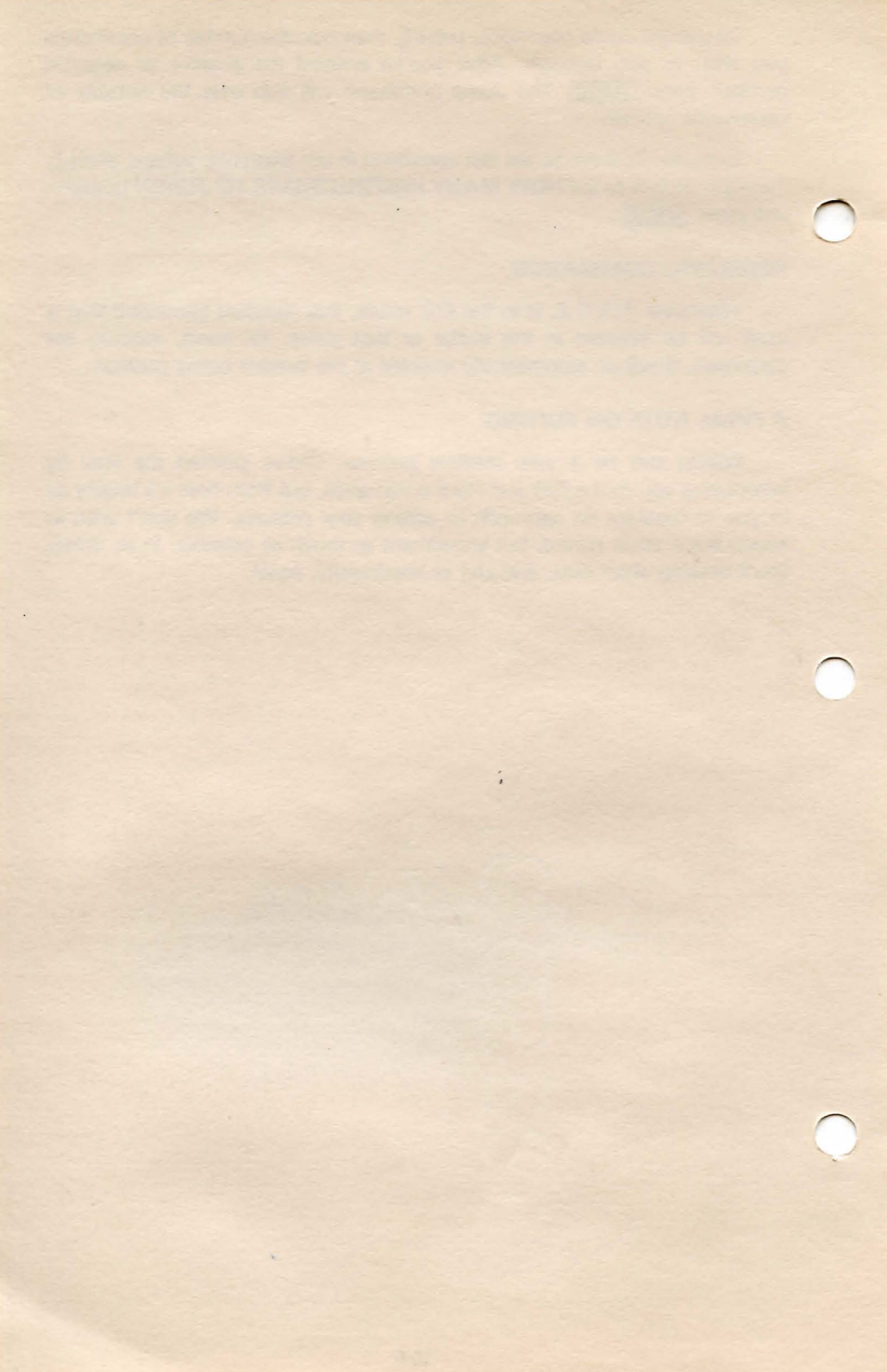
Example: To jump to the last command in our two-color square, press **J**. Type **7** in answer to the **HOW MANY INSTRUCTIONS TO JUMP?** question and press **RETURN**.

INSERTING COMMANDS

Whenever S.A.G.E. is in the Edit mode, any standard command that is used will be inserted in the buffer at that point. To insert, execute the command. It will be automatically inserted at the current buffer position.

A FINAL NOTE ON EDITING

Editing can be a very creative process. We've pointed the way by introducing you to the Edit and Hunt commands, but from here it's largely up to you to organize an approach to editing your pictures. We don't wish to sound like a stuck record, but experiment as much as possible: In so doing, you'll develop short cuts, and just as importantly, style!



CHAPTER 11

A LOOK (AND MORE) AT A FINISHED PICTURE

After ten chapters of working with multi-colored squares, you will probably enjoy seeing a picture which requires a little more ambition of its creator. Let's take a look at an example from the Scott Adams Graphic Adventure Series (S.A.G.A.) that is stored on your S.A.G.E. tape or disk.

LOADING THE S.A.G.A. PICTURE

Disk users: Press **SYSTEM RESET**. Type **RUN** and press **RETURN** when the **READY** prompt appears. Type **SHIP : *** and press **RETURN** when asked for the File Name.

Tape users: The S.A.G.A. picture immediately follows the Multi-Palette on your cassette. To load, cue the cassette to the fourth program on the tape and follow the program loading instructions from **Chapter 2**. When asked for the File Name, type **C: NAME** and press **RETURN**. The picture will appear on your screen shortly.

ABOUT THE S.A.G.A. PICTURE

The other-worldly panorama on your screen is excerpted from S.A.G.A. #6, *Strange Odyssey*, and dramatically illustrates what a little time and talent can produce. You can see by the buffer length indicator (LEN) indicator on the Editing Bar that 432 separate commands were used to create this picture.

TOYING WITH PERFECTION

The S.A.G.A. space-ship scene is safely stored on your program tape or disk, so we can try a few alterations on Scott's picture without fear of permanent damage to the stored picture. This "tampering session" will serve as a review of sorts and provide an opportunity for you to see the Edit, Hunt and Jump functions at work on a large-scale picture. We'll also show you how to insert time delays into pictures for special effects, using the heretofore unmentioned Wait function.

THE EDIT COMMAND ET AL REVISITED

The Screen Canvas should now display the space-ship picture if you've correctly followed the loading instructions. If so, we're ready to begin.

You type: **E**

The Screen Canvas displays:

An empty screen with the cursor flashing. The POS indicator has reset from 432 to 0.

You press the **SPACEBAR** 10 times

The Screen Canvas displays:

Several black lines against a light background. The POS indicator will read 10.

Pressing the spacebar 10 times advanced the pointer 10 commands into the picture, and demonstrates how each command is executed, one at a time, when the Edit mode is engaged.

The first spacebar press advanced the pointer to the first command in the buffer: an instruction to change the Color Fill type from yellow (the default color) to white.

The second spacebar press initiated the Color Fill which changed the Screen Canvas background from black to white. The subsequent commands executed with each press of the spacebar are N and L line-drawing commands, the beginnings of the space ship itself.

THE JUMP COMMAND

It would be time consuming to advance to the end of the buffer by continually pressing the spacebar. The Jump command will help you avoid unnecessary wear and tear on your thumb.

Let's "jump" a little way into the buffer and see what happens.

You type: **J**

The Editing Bar says:

JUMP HOW MANY CMDS?

(0 = BACKWARDS)

You type: **50** and press **RETURN**

The Screen Canvas displays: The completed space ship and the beginnings of some additional objects

Typing 50 advanced the pointer 50 commands into the 432-command buffer, to the point that's now visible on the Screen Canvas. The POS indicator shows that we have moved 60 commands into the 432-command picture.

CHANGING THE RINGS' COLOR

It's time to set aside our brief sightseeing tour with the Jump command and take an active hand in changing a part of the existing picture. The planet that hangs over the skyline to the right has blue-purple, diamond-pattern rings. We are going to change them to a solid red.

The first step in changing the rings' color is locating the instructions in the buffer that determined the Fill colors and pattern. We can locate these instructions quickly with the Hunt command.

FINDING A COLOR CHANGE USING HUNT

Chapter 9 pointed out that the Hunt command narrows down the search for specific instructions by searching for a particular type of instruction. We can locate the rings' color-change instruction with a "color-change" search. Here's how:

You type: **H**

The Editing Bar says:
FOR WHAT ARE WE HUNTING?
(1)WAIT/CHANGE — STOP AT FIRST FOUND
(2)QUICK FILL
(3)COLOR
(4)NEW LINE
(5)DRAW LINE
(6)BOUNDARY FILL
(7)REGULAR FILL

You type: **3**

The Editing Bar says:
HOW MANY 1 = STOP AT FIRST FOUND

We selected 3, COLOR, from the Hunt menu since we're searching for a color change. A "guesstimate" would normally be entered here, since the precise number of color changes to skip are not known. However, the number that will advance the pointer to the color change we're looking for is 17. The Color Hunt will skip past the first 16 color change instructions in the buffer, and stop at Position (POS) 423 — the instruction immediately prior to the actual 17th color change instruction, 424.

You type: **17** and press **RETURN**.

The Screen Canvas displays:
The picture assembling one step at a time. The Editing Bar will appear when the 17th Color Change is found and the POS indicator will read 423. (This will take about a minute.)

The pointer should now be positioned at the instruction immediately before the one we wish to change if 17 was the correct number of color changes we needed to skip.

We can find out if the upcoming instructions are the ones that determine the color and fill type of the planet's rings with a simple test: executing the next few instructions and watching the results on the screen.

You press: the **SPACEBAR** three times.

The Screen Canvas shows:
No change with the first press (which is the instruction that tells the program what color the rings

will be) and the appearance of the ring's color fill with the next two **SPACEBAR** presses.

The POS indicator should now read 426. So, the total number of instructions necessary to fill the rings with the blue-purple diamond fill is three. The next step is to delete those three instructions and to substitute our new instructions.

You type: **D**

The Editing Bar says:
WARNING!
WILL DELETE LAST INSTRUCTION DONE
HOW MANY INSTRUCTIONS?
(0 = BACKWARDS)

You type: **- 3** and press **RETURN**

The Editing Bar says:
(COLORS) COLOR 1:9 COLOR 2:10 LINE:10
FILL:DIAM X:16 Y:0 LEN:429 POS:423

By entering the -3 in the Delete mode, the old instructions have been erased and the pointer is reset to POS 423 — the point in the buffer where the new instructions can be entered.

You type: **C**

The Editing Bar says:
CHANGE COLORS:
(1) = FILL, (2) = COLOR, (3) = LINE

You type: **1**

The Editing Bar says: ;
COLOR? (1-15)

You type: **7** and then press **RETURN**

The Editing Bar says:
CHANGE COLORS:
(1) = FILL, (2) = COLOR, (3) = LINE

You press: **RETURN**

The Editing Bar says:
FILL TYPE NOW: DIAM
0 = SOLD 1 = DIAM 2 = HORZ 3 = VERT 4 = CHEC

You type: **0**

The Editing Bar says:
(COLORS) COLOR 1:7 COLOR 2:10 LINE:10
FILL: SOLD X:16 Y:0 LEN:430 POS:424

Take the joystick and position the cursor in the upper part of the rings. Press **7**. The upper section of the rings will fill with red. Position the cursor slightly under where the red fill ended and press **7** once again. The rings should

now be filled with solid red. If the rings are not completely filled with red, reposition the cursor as necessary and press **F** again until the coloring effect is complete.

THE WAIT COMMAND

The Wait command controls a time delay you can place into the buffer. This delay counts off a pre-determined interval of 1 to 31 seconds before the pointer advances to the next instruction. We can, for example, place a 10-second Wait into the buffer directly before the command that fills the planet's rings with red. By inserting the 10-second delay at this point, the instruction to color the planet's rings will not execute until 10 seconds have elapsed.



INSERTING A WAIT INSTRUCTION

First, use the Jump command to return to POS 423. If the POS indicator reads 426, type **J** and enter a **3 RETURN** to the **JUMP HOW MANY INSTRUCTIONS?** message. If the POS indicator reads other than 426, enter the correct number to return to position 423.

You type: **W**

The Editing Bar says:
HOW LONG? (1-31)

You type: **10** and press **RETURN**

The Editing Bar says:
(COLORS) COLOR 1:9 COLOR 2:10 LINE:10
FILL:SOLD X:121 Y:11 LEN:433 POS:424

You type: **F** and **X**

The Screen Displays:
The picture being quickly redrawn from the beginning.

The Wait instruction placed into the buffer at position 423 will create a 10-second pause before instruction 424 (and subsequent instructions) are executed. The interval of the pause may be changed by returning to POS 423 and entering a new number.

TAKING IT FROM HERE

Since the operative word is "experimentation," it is suggested that you spend some as much time as possible practicing with the S.A.G.A. picture. Try changing some additional colors; add a few more Wait instructions; take a stab at erasing the space ship. If the picture begins to look more messy than dressy, you can reload the picture from your tape or disk for a "fresh" start.

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CHAPTER 12

THE COMMAND KEYS EXPANDED

This chapter is an expanded version of **Chapter 3**. Here, you will find the Command keys alphabetically listed along with a capsulized description of their functions. Refer to the chapter listed at the end of each description for additional information.

There are several special editing and control functions listed which were not covered in the preceding chapters. Read through each Command description carefully.

S.A.G.E. COMMAND KEYS

A — Change Fill type. Similar to the C function except changes Fill type only and not color. Select either (0) SOLID, (1) DIAMOND, (2) HORIZONTAL, (3) VERTICAL, (4) CHECKER. Please Note: The A command places no information into the buffer until the next fill or U command is entered. **Chapter 5**.

B — Palette Erase. Slowly erases on-screen palette. Use Palette Erase when you wish to view the picture without the palette. **Chapter 9**.

C — Change Color and Fill type. Presents option of changing (1) FILL, (2) COLOR 2, and (3) LINE. Entering this information will lead to the **FILL TYPE** option. **Chapter 5**.

D — Delete commands from buffer. Type a positive number to Delete forward, a negative number to Delete backward. The Delete command always deletes the last command entered, so a -1 is the same as a +1. **Chapter 6**.

E — Edit Mode. Clears screen, reset buffer pointer to 0 (zero). Press the **SPACE BAR** to step through each instruction. Pressing X jumps pointer to end of buffer and executes all instructions. **Chapter 10**.

F — Fill. Fills until another color is encountered. Several fill commands may be required before and object is completely colored. The fill effect moves straight up from the cursor position until it encounters a different color. From there, the fill effect moves left and right, reversing position and moving down one line each time it encounters another color. For best results, position the cursor directly under the highest point in an object before pressing **F**. **Chapters 5 and 7**.

G — Palette File Name. Use this to retrieve a palette that was saved to tape or disk. Screen will say: **PALETTE FILE NAME? ENTER FILE NAME**. You may type any name up to 8 characters in length. Use D:(name) to load from disk; C: for loading from tape. Press RETURN when you've typed the name. **Chapter 9**.

H — Hunt command. An editing function that allows speedy searches for the Fill, Color and Line commands that make up a picture. Functions searched for include:

- 1) Wait/Change — Stop at First Found
- 2) Quick Fill
- 3) Color
- 4) New Line
- 5) Draw Line
- 6) Boundary Fill
- 7) Regular Fill

To search for an instruction in buffer, press the appropriate number. **Chapter 9.**

I — Identify Color Cursor is On. If you're not sure of a color, position the cursor over the color in question and press **I**. The primary color will be identified by number at the lower left corner of the Editing Bar.

J — Jump Command. Editing function that allows user to quickly jump forward or backward through commands in the buffer. To use, press **J** and then type the number of commands you wish to skip through. A positive number skips forward, a negative number, backward. Entering **0** will cancel the jump. **Chapter 10.**

L — Draw Line (draw to). Draws a line from one point to another. To use, place cursor at desired position on screen and press **L**. Used in tandem with the N command. **Chapter 4.**

N — New Line (plot). To use, place cursor at desired position on screen and press **N**. **Chapter 4.**

O — Load File Into Current Picture. This will place a picture (file) onto the one currently on the screen. Tape users: Make sure that your file is cued and ready. Disk users: Make sure your disk is installed properly in the drive. The screen will say: **OBJECT NAME (RETURN = ABORT)** Type the name of the file to be loaded and press **RETURN**. The two pictures are NOT combined in the buffer, only on the screen; this means that you cannot save combined pictures to tape or disk. Pressing **E X** will erase the previous picture.

P — Palette Edit. Allows altering of the color register and luminance. Use with joystick. Save new palette using R command. **Chapter 9.**

R — Remember Palette. Used after creating a new palette with P command to save it to tape or disk. The current palette is always saved along with your picture. **Chapter 9.**

S — Save Picture. Press **S**. The screen will display: **ORIGINAL NAME: D:PICTURE WHAT NAME TO USE? (RETURN FOR SAME!)** Type up to eight characters and press **RETURN**. **Chapter 6.**

T — Test Mode. Allows user to experiment with picture without storing commands in buffer. Press **T** again to revert to Normal Mode.

U — Fill Until Color 15 Boundary is Met. This command was originally designed to allow objects to be created and stored in separate files, and then loaded individually into a picture using the O command. To fill an area that contains more than one color, outline the area with Color 15, then use the U command to fill (as with F above). When the picture is complete, use either the Z or V command to remove Color 15 lines. **Chapter 8.**

V — Changes All Previous Lines in Color 1 to Color 2. Used to speedily change one line color to another. **Chapter 8.**

W — Wait X seconds. The Wait command is a time delay that counts off an interval of 1 to 31 seconds before it executes the next instruction. Putting a time delay into your pictures at certain points can make the overall effect more dynamic. Example: You might have a landscape of a house with a chimney sitting on a hill. By placing a Wait command immediately before the command that draws the smoke, you can cause the smoke to appear from the chimney after the rest of the picture has appeared. **Chapter 11.**

X — EXit — draw To End of Buffer. Executes all commands in the buffer, and exits the Edit mode. **Chapter 10.**

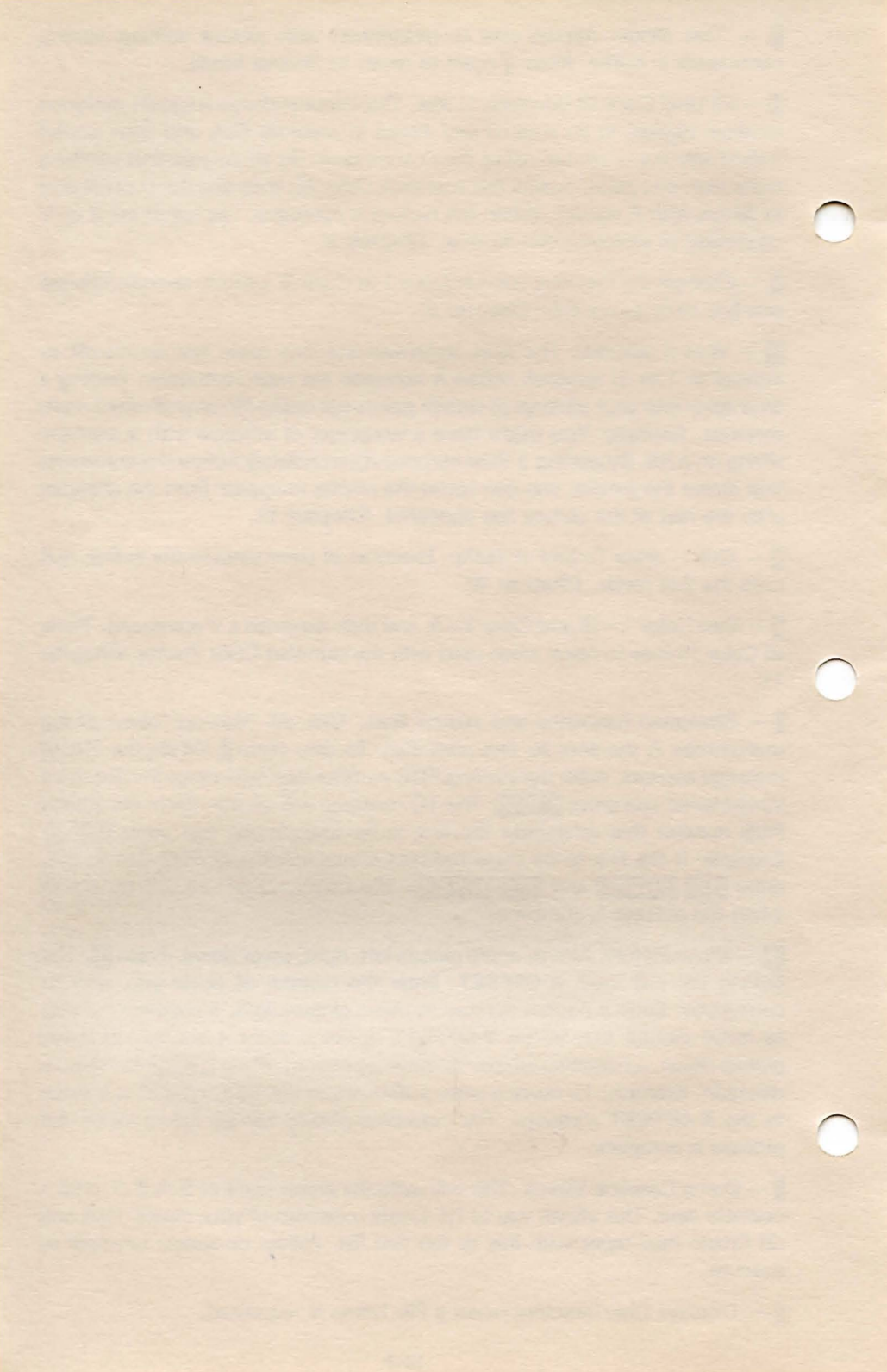
Z — Sets Color 1 = 15 and Color 2 = 9, and then executes a V command. Turns all Color 15 lines to black when used with the standard Color Palette. **Chapter 11.**

[— Straighten horizontal and vertical lines. This will "firm up" some of the unevenness in the lines by one pixel size. To use, press **[**. When the FROM message appears, enter the starting POS number that references the line to be straightened and press **RETURN**. The TO message will appear. Enter the ending POS number that references the line to be straightened and press **RETURN**. Example: If the line to be corrected was drawn starting at POS 234 to 241, enter **234 (RETURN)** and **241 (RETURN)**. The corrected picture will be drawn when the process is complete.

X — Move Picture. Moves entire picture left, right, up or down. Press **X**. The Editing Bar will read: **X-OFFSET**. Enter the number of pixels you wish to correct by. Enter a positive number to move picture right, a negative number to move picture left. When **Y-OFFSET** appears, enter a positive to move picture down, a negative number to move picture up. Press **RETURN** to "skip" a direction. Example: To move a picture 20 pixels to the right, type 20 in answer to the **X-OFFSET** message. The corrected picture will be drawn when the process is complete.

— Dump Cassette Master. This will write the object code of S.A.G.E. onto a cassette tape. This allows you to (1) Create a backup of your master tape and (2) Create new tapes with this as the first file. Follow on-screen prompts to execute.

? — Displays Disk Directory when a File Name is requested.



CHAPTER 13

TAKING IT FROM HERE

Whether you're doing a little on-screen doodling or pursuing a serious programming endeavor, we hope the discovery process of creating graphics with S.A.G.E. and your ATARI Home Computer has been an enjoyable one.

You will find that the longer you work with S.A.G.E., the easier the "operation rhythm" will become. First-time users who often take a minute or more to enter the information to perform a two-color Fill may expect, with a little practice, to find themselves leaping through the same procedure in a few seconds' time.

Here are a couple of tips to consider:

PUT IT ON PAPER FIRST

Just as an architect blueprints a new house before a single nail is driven, it is likewise a good idea to plan your next masterpiece on paper. Sketching out an idea gives you the freedom to change things around before too much time is spent entering commands.

YOU CAN'T SAVE TOO MUCH

It's a sober fact that power surges and outages are the bane of computer users everywhere. Don't fall victim to one of these indiscriminate killers! Get into the habit of saving a picture in progress as often as time permits. If you save your picture every 10 minutes, you'll only be out that much time should an accident occur.

TECHNICAL SECTION FOR ADVANCED USERS

Finally, ATARI users with a good working knowledge of BASIC and/or machine language will find the technical information listed in the appendices helpful. You will find complete information on how to interface S.A.G.E. with both BASIC and machine-language programs, and additional facts on how S.A.G.E.'s commands are set up.

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APPENDIX A

CREATING A BACKUP DISK

Prudence dictates that a minimum of one extra copy of your original S.A.G.E. disk be mastered and safely stored away. The importance of having a backup copy cannot be overemphasized. Dust, magnetic fields, heat, physical wear, and the family dog: Disk hazards abound everywhere.

FORMATTING A DISK

Before S.A.G.E. can be copied, you'll need to format a blank disk. The formatting process will place an electronic filing system onto the blank disk so that S.A.G.E. can be written onto the disk. Follow the formatting instructions below closely.

- 1) Your ATARI should be "ready to go": The BASIC cartridge installed, and the video monitor and disk drive(s) turned on.
- 2) Insert the S.A.G.E. disk into Drive 1 and turn on your ATARI.
- 3) When the **READY** prompt appears, type **DOS** and press **RETURN**. The DOS Menu will appear as shown below.

DISK OPERATING SYSTEM II VERSION 2.0S
COPYRIGHT 1980 ATARI

- | | |
|--------------------|---------------------|
| A. DISK DIRECTORY | I. FORMAT DISK |
| B. RUN CARTRIDGE | J. DUPLICATE DISK |
| C. COPY FILE | K. BINARY SAVE |
| D. DELETE FILE(S) | L. BINARY LOAD |
| E. RENAME FILE | M. RUN AT ADDRESS |
| F. LOCK FILE | N. CREATE MEM. SAVE |
| G. UNLOCK FILE | O. DUPLICATE FILE |
| H. WRITE DOS FILES | |

- 4) Remove your S.A.G.E. disk from Drive 1 and insert your blank disk.
- 5) Type **I**. The screen will show: **WHICH DRIVE TO FORMAT?** Type **I**.
- 6) The screen will show: **TYPE Y TO FORMAT DISK 1.** Type **I**.
- 7) The blank disk will be formatted at this time. When the formatting process is complete, the screen will say: **SELECT ITEM OR RETURN TO MENU.**

DUPLICATING A DISK

Now that the formatting is complete, we can copy S.A.G.E. onto the formatted disk. Here's the procedure:

- 1) Follow Steps 1 though 3 under **FORMATTING A DISK** above.
- 2) Remove the formatted disk from Drive 1 and insert the S.A.G.E. disk.
- 3) Type **J** for "**J. DUPLICATE DISK**" from the DOS Menu. Press **RETURN**. The screen will read: **DUPLICATE DISK SOURCE, DEST DRIVES?**
- 4) One-drive system owners: Type **1,1** then press **RETURN**. Two-drive system owners: Type **1,2**, and press **RETURN**.
- 5) The screen should now display: **INSERT SOURCE DISK**. Make sure that the S.A.G.E. disk is properly inserted into the drive and the drive door is secure. Press **RETURN**.
- 6) The screen will read: **INSERT DESTINATION DISK AND PRESS RETURN**. Replace the S.A.G.E. disk with your formatted disk and press **RETURN**.
- 7) One-drive system owners: "Swap" the formatted disk and the S.A.G.E. disk according to the screen prompts. Two-drive system owners: The ATARI DOS will automatically create a backup without any disk exchange. The backup process usually takes about 8 minutes.

When the DOS Menu reappears, the backup process will be complete. Don't forget: Store your original S.A.G.E. disk safely away.

APPENDIX B

CREATING A DUPLICATE TAPE

Making an extra copy of your S.A.G.E. tape is simply a matter of loading the program into your computer and dumping it back out onto an extra cassette. Follow the instructions below.

1) Load either the tape or disk version of S.A.G.E. into your ATARI's memory. This includes both the machine-language and BASIC programs. Use the loading instructions in Chapter 2 for reference, if necessary.

2) Load the Multi-Palette. If you're loading from tape, the Multi-Palette follows the BASIC program. If you're loading from disk, the file name is: **PALET**.

3) Place a blank cassette into your Cassette Player. Rewind if necessary.

4) The screen should show the Multi-Palette and Editing Bar. If so, press: **Y**. The Editing Bar will say: **READY TO WRITE TO CASSETTE?** Press **Y** for Yes.

5) Immediately press the PLAY and RECORD keys at the same time on your Cassette Player.

6) Press **RETURN** on your ATARI.

The machine-language program, the first program recorded on the tape, will load onto your tape at this time. You will hear a high-pitched sound as the data load. After the program has loaded, the sound will stop and the cursor will begin to blink on the Screen Canvas.

7) Press **BREAK** on your ATARI. The Editing Bar will say: **STOPPED AT LINE XXX**. Type: **CSAVE**. Press **RETURN** twice.

The BASIC program, which is the second program recorded on the tape, will load onto your tape at this time. After it loads, the **READY** prompt will appear. When it does, type: **GOTO START** Press **RETURN**. The Editing Bar will revert to its normal mode (as illustrated in Figure 4 of this manual). When it does:

8) Press **S**

9) In answer to **WHAT NAME TO USE?** message, type: **C:NAME**. Press **RETURN** twice.

The Multi-Palette will now be saved onto your tape.

RECEIVED

RECEIVED

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APPENDIX C

PROGRAM COMMANDS: TECHNICAL INFORMATION

1) All of S.A.G.E.'s commands are three bytes long. They may be broken down as follows

Byte 0

Bit's Name

3 Most Significant Bits = CMD # 0-7

5 Least Significant Bits = B0

Name

Byte 1 = B1 (Normally X)

Byte 2 = B2 (Normally Y)

2) CMDS (0-7)

0 — End of Buffer

1 — Wait B0 seconds if B0 = 0

If B0=0 Then Do V Command

Change all Color 1 lines to Color 2

Z — Quick Clear entire screen

B0, B1, B2 not used

4 — New Line B1=X, B2=Y

5 — Draw Line to Here B1=X, B2=Y

3 — Set Color

B0 = Line Color

B1 = Fill Color 1

B2 = Fill Color 2

6 — Fill Boundary

B0 = Fill Type

B1 = X to Start

B2 = Y to Start

7 — Fill

B0 = Fill Type

B1 = X to Start

B2 = Y to Start

FILL TYPE (Color Patterns)

0 - SOLID

1 - DIAMOND

2 - HORIZONTAL LINES

3 - VERTICAL LINES

4 - CHECKERBOARD

APPENDIX D

USING S.A.G.E. IN YOUR PROGRAMS

I. MACHINE LANGUAGE (Disk Only)

S.A.G.E. can be interfaced with your own machine-language programs. You will need the ATARI Assembler Cartridge (available from your ATARI dealer), and a blank, formatted disk onto which you can store the assembled files.

Please note that this procedure is for advanced users who are comfortable with machine language.

1) Insert the ATARI Assembly Cartridge into your computer. Place the S.A.G.E. disk into the drive and turn on the system. The screen will read: **EDIT**.

2) Type: **ENTER#D:GEDITO.ASM** Press **RETURN**. The screen will read: **EDIT**.

3) Place the blank, formatted disk into your drive. Type: **ASM, #D:GEDITO.OBJ** Press **RETURN**.

4) Repeat Steps 2 and 3 above to load all of the modules listed below. In Step 3, you will drop the ASM suffix and append with OBJ.

GEDIT 1. ASM - Artificial Instruction Set

GEDIT 2. ASM - Jump Table

GEDIT 3. ASM - Screen and Interrupts

GEDIT 4. ASM - Main Graphic Routine

5) To load each of the assembled files into memory, type: **LOAD#D:GEDITO.ASM**. Press **RETURN**. Substitute 1, 2, 3, or 4 for 0 in the LOAD statement for each module.

The assembler files above compose the machine-language part of the program and the screen memory. They are stored in the ATARI Assembler Cartridge format.

Program resides from:

5BA3 to 6E93

Screen resides from:

7000 to 9FFF

See GEDIT 3. ASM (above) for screen setups

TECHNICAL INFORMATION ON SCREENS

What you see on your screen is achieved by flickering between two screens every vertical blank. The two screens are in BASIC 7½ Mode or

ANTIC 14 Mode. Each screen uses 12 lines on the display and 4K of memory for a total of 8K. A text window is set up to interface with BASIC's Graphic 7 screen, leaving only four lines of text. The remaining four lines are used to display the Primary Palette.

The source can be modified, at your discretion, to allow twelve lines of picture and twelve lines of text.

The text normally resides from 9F60 - 9FFF.

The palette resides in screens 9000 - 95FF and 9600 - 9BFF.

II. BASIC

Let's assume that you've written a program called Acme Coupon Manager. ACM is a text program, but you want to insert a flashy title screen at the program's beginning to break up the monotony of all that text. Here's how you would set it up:

1) Draw your title screen using S.A.G.E.

2) Save the title screen to tape or disk. Disk users: Type **D:TITLE** and press **RETURN**. Tape users: Type **C:TITLE** and press **RETURN**.

3) Load the S.A.G.E. machine-language file from your tape on disk. On the disk version, it's AUTORUN.SYS and loads automatically when the program is first run. On the tape version, it's the first program recorded on the tape.

4) Disk users: When the **READY** prompt appears, type: **LOAD "D:PROG.BAS"** and press **RETURN**. Tape users: Carefully type in PROGRAM 1 listed below.

5) PROGRAM 1, below, may be entered as a subroutine in your own program (our theoretical Acme Coupon Manager). Therefore, you may change the program numbering to fit your own program.

6) Disk users, change Line 40 to: 40 OPEN #1,4,0,"D:TITLE" Tape users, change Line 40 to: 40 OPEN #1,4,0,"C:TITLE"

7) Change Line 450 to RETURN. This assumes that you used a GOSUB to enter PROGRAM 1. If a GOTO statement was used, use another GOTO to return to your program.

8) Type **RUN** and press **RETURN**.

9) Disk users: Make sure the disk you saved your title screen to is in Drive 1. Tape users: The cassette onto which your picture was saved should be ready. After **RUN** is typed in Step 8 above, a "beep" will sound; press PLAY on your cassette player. The picture will load into your program and appear on the screen.

PROGRAM 1

```
5 REM (C) 1983 SCOTT ADAMS INC.
6 REM CLEAR SCREEN (ESC,CRTL-CLEAR)
7 ? "3"
8 REM CHECK IF MACHINE LANGUAGE IS
9 REM IN MEMORY.
10 IF PEEK(25856)<>162 THEN ? "MACHINE LANGUA
GE PROGRAM NOT LOADED":END
20 DIM BUFFER$(4050),NAME$(15)
30 REM BUFFER$ IS OUR VARIABLE NAME
31 REM BUT YOU CAN USE YOUR OWN.
40 OPEN #1,4,0,"C:NAME"
50 GET #1,L:GET #1,K
60 SIZE=K*256+L
70 REM SIZE IS THE SIZE OF THE
71 REM PICTURE TO LOAD. NEXT WE
72 REM TRANSFER THE PRIMARY PALETTE
73 REM THAT IS IN OUR PICTURE.
80 FOR K=0 TO 9
90 GET #1,L
100 POKE 25862+K,L
110 NEXT K
120 REM WE USE A HIGH SPEED READ FOR
130 REM THE REST OF THE PICTURE.
140 K=USR(24784,ADR(BUFFER$),SIZE,7)
150 IF K>3 THEN PRINT "I/O ERROR":STOP
160 BUFFER$(SIZE+1)=""
170 CLOSE #1
180 IF ASC(BUFFER$(SIZE,SIZE))<>0 THEN PRINT "
BAD FILE":STOP
190 REM ONCE A PICTURE IS IN THE
191 REM BUFFER WE CAN DRAW IT.PUT THE
192 REM FOLLOWING AT THE START OF YOUR
193 REM PROGRAM.
194 REM OPEN UP A GRAPHICS 7 SCREEN.
200 G=23472
210 GRAPHICS 7:I=USR(25859)
220 REM SET HIMEM TO BOTTOM OF MACHINE
221 REM LANGUAGE PROGRAM.
230 I=G-14
240 POKE 741,I-INT(I/256)*256
250 POKE 742,INT(I/256)
260 REM DO THE FOLLOWING TO SETUP THE
261 REM PICTURE.
270 J=ADR(BUFFER$)
280 POKE 6+3,J-INT(J/256)*256
```

```

290 POKE 6+4,INT(J/256)
300 J=J-1+SIZE
310 POKE 6+5,J-INT(J/256)*256
320 POKE 6+6,INT(J/256)
330 REM NOW DRAW IT!!
340 I=USR(G)
400 ? " "
410 ? " PRESS RETURN TO CONTINUE"
420 ? " "
422 DIM A$(5)
425 INPUT A$
426 REM THIS PUTS THE SCREEN BACK
427 REM INTO GRAPHICS MODE 0
440 POKE 54286,0:POKE 546,PEEK(26025):POKE 54
7,PEEK(26026):POKE 54286,192:GRAPHICS 0

```

You will note that there is ample room for text at the bottom of the screen — four line's worth. You may clear this area for your own text (example: JOHN JOHNSON PRESENTS — ACME COUPON MANAGER) by placing PRINT statements at the appropriate point in your program. DO NOT use a Graphics 0 command once you are in Graphics 7 above to clear the graphics screen. Instead, re-execute program lines 160 through 250 above.

You may use the above procedure to enter pictures at any point in your program. After each picture appears, the screen will read: PRESS RETURN TO CONTINUE. Press **RETURN** to continue execution of your program.

APPENDIX E

THE COLOR GENERATOR

Once the standard Color Palette has been modified, you will want to find out which textures and patterns do and do not flicker.

The Color Generator lists values for Color 1, Color 2, and Fill type, and places a test bar on the screen that can demonstrate all possible combinations of patterns and textures. You may then inspect the test bar for flicker as well as for aesthetic value.

LOADING THE COLOR GENERATOR - Disk Users

1. Insert the S.A.G.E. disk into Drive 1 and press **SYSTEM RESET**.
2. When the screen says, READY, type: **LOAD"D:EDITOR.BAS"** and press **RETURN**.
3. When the screen says, READY, type: **ENTER"D:COLORS.LST",M** and press **RETURN**.
4. When the screen says, READY, type: **RUN** and press **RETURN**.
5. The **FILE NAME?** message will appear. When it does, press **RETURN**.
6. When the Screen Canvas appears, use the **G** command to get the Palette you wish to test.
7. Press **BREAK**. The screen will say: **STOPPED AT LINE XXX**.
7. Type: **GOTO 8000** and press **RETURN**.

Your screen should now resemble Figure 14 below. The horizontal test bar is at the top of the screen; at the bottom are three numbers spaced several inches apart. From left to right, the numbers represent:

1. Color 1
2. Color 2
3. Fill Type

VIEWING A TEST COLOR OR FILL TYPE

To examine the various color and Fill combinations, just press **RETURN**. Each time **RETURN** is pressed the test bar steps through a color or pattern change, beginning with patterns first, and then Color 2 and then Color 1. When you find a pleasing combination, make a note of the three numbers listed at the bottom of the screen. The numbers may be entered later when you use your new-found color scheme in a picture.


```

71 REM PICTURE TO LOAD. NEXT WE
72 REM TRANSFER THE PRIMARY PALETTE
73 REM THAT IS IN OUR PICTURE.
80 FOR K=0 TO 9
90 GET #1,L
100 POKE 25862+K,L
110 NEXT K
120 REM WE USE A HIGH SPEED READ FOR
130 REM THE REST OF THE PICTURE.
140 K=USR(24784,ADR(BUFR$),SIZE,7)
150 IF K>3 THEN PRINT "I/O ERROR":STOP
160 BUFR$(SIZE+1)=" "
170 CLOSE #1
180 IF ASC(BUFR$(SIZE,SIZE))<>0 THEN PRINT "
BAD FILE":STOP
190 DIM BIN(8):BIN(7)=224:BIN(6)=192:BIN(5)=1
60:BIN(4)=128:BIN(3)=96:BIN(2)=64:BIN(1)=32:BIN(0)=0
192 DIM FILL$(20):FILL$="SOLDDIAMHORZVERTCHEK
"
193 ? "}:? "LISTING COMMANDS FOR ";NAME$
195 COUNTER=0
197 LPRINT "COMMAND LIST FOR ";NAME$
198 LPRINT "*****"
199 LPRINT " "
200 FOR F=1 TO LEN(BUFR$)-1 STEP 3
210 B0=ASC(BUFR$(F,F))
220 B1=ASC(BUFR$(F+1,F+1))
230 B2=ASC(BUFR$(F+2,F+2))
240 FOR G=7 TO 0 STEP -1:IF B0-BIN(G)>=0 THEN
  CMD=G:B0=B0-BIN(G):GOTO 280
270 NEXT G
280 LINE=(CMD*10)+1000
290 COUNTER=COUNTER+1
292 POSITION 5,10:?"PRINTING LINE #";COUNTER
295 LPRINT "COMMAND #";CMD:GOSUB LINE
300 B0=0:B1=0:B2=0:NEXT F
999 END
1000 LPRINT "END OF BUFFER"
1009 RETURN
1010 IF B0>0 THEN 1015
1012 LPRINT "EXECUTE 'V' COMMAND.":GOTO 1019
1015 LPRINT "WAIT ";B0;" SECOND(S)"
1019 RETURN
1020 LPRINT "QUICK CLEAR THE SCREEN"
1029 RETURN

```

```

1030 LPRINT "SET COLOR: LINE COLOR=";B0;" ,FIL
L COLOR 1=";B1;" ,FILL COLOR 2=";B2
1039 RETURN
1040 LPRINT "NEW LINE BEGINNING AT ";X;" ,";Y
1049 RETURN
1050 LPRINT "DRAW LINE TO: ";B1;" ,";B2
1059 RETURN
1060 LPRINT "FILL TO BOUNDRY. FILL TYPE=";FIL
L$(B0*4+1,B0*4+4);". X POS=";B1;" , Y POS=";B2
1069 RETURN
1070 LPRINT "REGULAR FILL. FILL TYPE=";FILL$(
B0*4+1,B0*4+4);". X POS=";B1;" , Y POS=";B2
1079 RETURN

```

3. After you've carefully typed the above program and checked it for errors, type **RUN** and press **RETURN**.

4. Follow the instructions from Step 5 above under LOADING THE COLOR GENERATOR — DISK USERS. All of the information up to this section applies to tape users as well.

APPENDIX F

LISTING PICTURE COMMANDS (Disk Users Only)

The list of commands used to create your picture can be printed. This will provide a hard-copy backup in case your original disk is damaged or lost.

USING THE PICTURE LISTING FEATURE

To use the Picture Listing feature, type **RUN"D:PRINT.BAS"** and press **RETURN** when the READY prompt is visible. The screen will display:

WHAT IS YOUR PICTURE'S NAME?
(EX: D:PICTURE, D2:ROOM PIC)

Make sure your printer is properly connected and that the paper is at the top of the form. If so, type the name of the picture you previously saved and wish to list. Press **RETURN**. The screen will display:

PRINTING AT LINE XXX

"XXX" is, of course, a variable number, and it will increment as the picture commands list out on your printer.

THE PRINTED COMMANDS

Each command will be printed in a format similar to the examples below:

COMMAND #3

SET COLOR: LINE COLOR = 10, FILL COLOR 1 = 0, FILL COLOR 2 = 0

COMMAND #4

NEW LINE BEGINNING AT 0,0

COMMAND #5

DRAW LINE TO: 81,95

Refer to **Appendix C, PROGRAM COMMANDS: TECHNICAL INFORMATION** for more information.

AFTER LISTING A PICTURE

Turn off your printer. Press **SYSTEM RESET** and type **RUN** (and press **RETURN**) to return to the Screen Canvas.

LISTING PICTURE COMMANDS

May 1964 Draft

The following listing of commands is intended to be a complete listing of the commands which are available to the user of the system.

COMMANDS THE PICTURE LISTING FEATURES

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APPENDIX G

THE S.A.G.E. COLOR PALETTE — A DETATCHABLE REFERENCE

0 YELLOW		9 BLACK									
1 GREEN (Lime)		10 WHITE (Light Purple)									
2 BROWN		11 ORANGE									
3 AVOCADO		12 MEDIUM BROWN									
4 LIGHT BLUE		BLANK									
5 PURPLE		13 TAN (Background)									
6 MEDIUM BLUE		14 MEDIUM GREEN (Background)									
7 ORANGE-RED		BLANK									
8 MAROON		15 DARK RED									
<table border="1"> <tr> <td>(Colors)</td> <td>Color 1: 0</td> <td>Color 2: 0</td> <td>Line:0</td> </tr> <tr> <td>Fill: Solid</td> <td>X:16</td> <td>Y:0</td> <td>Len:0 Pos:0</td> </tr> </table>				(Colors)	Color 1: 0	Color 2: 0	Line:0	Fill: Solid	X:16	Y:0	Len:0 Pos:0
(Colors)	Color 1: 0	Color 2: 0	Line:0								
Fill: Solid	X:16	Y:0	Len:0 Pos:0								

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A Note to Index users: Information contained in Chapter 12 is not indexed. Please refer to Chapter 12 directly for a detailed summary of each of the S.A.G.E commands.

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