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ED-A-SKETCH
Graphics Editor
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INTRODUCTION

ED-A-SKETCH is a graphics editor for the H89/Z89 computer, or H8 computer with H19 terminal. It is available in two versions, for the HDOS operating system with at least 32K of RAM, and for Heath or Magnolia ORG 0 CP/M with 40K of RAM. With the function key commands of ED-A-SKETCH, you can:

- Create pictures on the screen and save them on disk.
- Position the cursor at any point on the screen, and type regular or graphics characters in normal or inverse video.
- Draw vertical or horizontal lines using any character.
- Perform operations on any rectangular area of the screen: erase, fill with any character, invert video, pick up and move.
- Recover from mistakes with special OOPS key.
- Save full or partial screen pictures in eight formats, for use with BASIC, MBASIC, assembler, C/80, or TYPE command.

ED-A-SKETCH is a powerful and versatile program. Since it has so many features, there are a lot of commands to learn. To help you get started quickly, the next section goes step by step through a "hands-on" example of some of the basic ED-A-SKETCH operations. Following that, there is a Reference Manual which explains each command in detail. Finally, a Function Key Summary is provided for quick reference.

USING ED-A-SKETCH -- AN EXAMPLE

The ED-A-SKETCH disk contains several files: the ED-A-SKETCH program (SKETCH.ABS on HDOS or SKETCH.COM on CP/M) and some sample pictures created with ED-A-SKETCH. You should first put a write protect label on the original disk, to prevent accidental erasure. Then copy SKETCH.ABS (or SKETCH.COM) and the sample pictures to your system disk so you can create your own pictures. You should also perform the SET commands on your system disk as described in Section 1 below so that you can type the pictures out correctly.

To run ED-A-SKETCH, boot up your system disk. When the '>' prompt appears, type SKETCH and press RETURN. ED-A-SKETCH will load and start running. You will be asked if you wish to create a new file (i.e. start sketching on a blank screen) or read in a previously created file. For now, let's start with the ALPHABET file. Therefore, in response to this question, type ALPHABET, and press the RETURN key. ED-A-SKETCH will read in ALPHABET and display it on the screen.

In addition to the 24-line picture area, there is an information line at the bottom of the screen. This line tells you what the current input mode is, and where the cursor is on the screen. It also displays a chart showing each graphics symbol and the key which is used to type it.

Try moving the cursor around on the screen, using the four keys with arrows. You may find it helpful to hold down the REPEAT key when moving the cursor a long distance. The RETURN and TAB keys are also useful to position the cursor. In addition, the ESC key acts as a backwards TAB key.

> NOTE (CP/M users only): Most CP/M systems, including Heath and Magnolia releases at the time this is written, read characters from the keyboard in a way that is liable to miss occasional characters. This can cause unwanted letters to appear on the screen when the repeat key is used. On many terminals, this problem can be minimized by pressing the repeat key after depressing the key to be repeated.
>
> For the same reason, after initiating an operation which takes time to complete, such as insert or delete line or character, you should not press another key until the operation is completed. It is rumored that a future release of CP/M may read the keyboard under interupt, as HDOS does, so as to eliminate this problem.

Now position the cursor in the blank area below the alphabet, and try typing something on the screen. As you type, the characters are entered into the picture at the cursor position.

Press the BLUE key and note that the message on the information line changes from "Char" to "Graph". This means that the typing

keys shown in the chart on the information line will now type the equivalent graphics character. Try typing a few characters to see this. Pressing BLUE again returns to Char mode.

Press the "0" key on the keypad at the right of the keyboard. This key turns on the "inverse video" mode. Note that the characters in the chart on the information line are now in inverse video. Anything typed on the screen will be in inverse video as well. Pressing "0" again returns to normal video. Inverse video can be used in either Char or Graph mode.

Next you will try some of the "area operations" of ED-A-SKETCH. Position the cursor at the upper left hand corner of the block letter H. Press ENTER. An "X" temporarily marks the cursor position. Now move the cursor to the lower right hand corner of the block letter I.

The "X" and the cursor together specify an area, or rectangle, on the screen. The "X" is one corner of the rectangle, and the cursor is the diagonally opposite corner. There are many "area operations" you can perform, and they all start with pointing out a rectangle using ENTER to mark one corner and the cursor to mark another one.

Press the F5 key. This key performs the "invert video" operation on every character in the rectangle you just defined.

Since it is easy to wipe out a large chunk of your picture using area operations, ED-A-SKETCH provides a way to recover. The "." key (next to the ENTER key) is called the OOPS key. Press the OOPS key. It restores the contents of the screen to the state before the last operation.

Now you will perform another area operation. Just as you did before, position the cursor at the upper left of the H, strike ENTER, and position the cursor at the lower right of the I. Now press the RED key. This key "picks up" a copy of the contents of the rectangle, but does nothing visible.

Press RETURN until the cursor is two lines below the alphabet, and press the WHITE key. This key puts down a copy of what you just picked up.

Now move the cursor to the upper left hand corner by pressing the HOME key. Press the DL key. This deletes the line which the cursor is positioned on. Keep pressing DL (slowly) until the alphabet is gone, leaving "HI" at the top of the screen. DL takes a moment to happen, so be careful not to get ahead of ED-A-SKETCH by pressing DL too many times. If you delete one line too many, the OOPS key will put it back, but this only works for the last line deleted.

Next you will save the picture. Press F4. ED-A-SKETCH will ask for a file name to save the picture on. It suggests using ALPHABET, but you want to leave the ALPHABET file alone, so provide a new file name by typing "HI", and press RETURN.

ED-A-SKETCH asks for the save format to use; just type RETURN again. The picture will now be written onto the disk.

After writing the file, ED-A-SKETCH asks if you want to keep editing that picture, or another picture. Answer "N" to both questions. ED-A-SKETCH will exit to system command level.

If you do a DIR command, you will see a file called HI. This is the picture you just created. To see it, type the command "TYPE HI". To revise your picture, run SKETCH again, and when it asks for a file to use, type the name "HI".

This concludes your introduction to ED-A-SKETCH. You should now be able to create, save, and revise pictures. To learn about the many other features of ED-A-SKETCH, continue on to read the Reference Manual. If you wish to create a picture using the features you have seen thus far, save the picture, and display it from a BASIC program, you may proceed directly to the Reference Manual section entitled "Displaying Pictures from BASIC Programs.

ED-A-SKETCH REFERENCE MANUAL

1. OPERATING NOTES

Depending on the way your terminal is configured by the switches on the circuit board, after you display a picture created by ED-A-SKETCH, lines output to your terminal which are longer than 80 characters may "pile up" in column 80 rather than continuing on the next line. This will rarely be noticed, since few lines of output are longer than 80 characters. If it is a problem, you may return to the automatic continuation mode as follows: press the OFF LINE key in, type the ESC and "v" (lower case) keys, and press the OFF LINE key again so that it pops up. In any event, the normal mode will be restored on the next power on or RESET.

If you are using the HDOS operating system, the following commands should be executed on any system disk which may be in use when the pictures are displayed, in order for pictures created with ED-A-SKETCH to display properly on the terminal:

```
SET TT: NOMLO
SET TT: WIDTH 255
```

SET.ABS must be on the system disk when these commands are executed. For more information about SET, see the HDOS Software Reference Manual.

2. RUNNING ED-A-SKETCH

ED-A-SKETCH is run by the command SKETCH. The program asks for the name of a picture file on which to find the initial picture. Typing ESC begins with a blank screen.

If a file contains a picture created by another program, chances are that ED-A-SKETCH will still be able to read it in. However, ED-A-SKETCH can only read pictures consisting of data which can be typed directly to the terminal. Pictures saved in BASIC or other, non-picture formats can not be read in.

To exit, press the F4 key and respond to the questions asked. A complete description of the exiting procedure is given in Section 9.

When ED-A-SKETCH is running, typing ctrl-C (hold down CTRL and type C) will terminate the program and return to system command level. This is an abort of the editing session. Nothing is saved, and the picture on the screen is lost.

3. CHARACTER MODES

This section describes the commands which set the modes for typing input from the keyboard. Input can be either in the normal or the graphics character set, and in normal or inverse video, for a total of four input modes. The lower left hand corner of the screen always displays the current input mode: either "Char" or "Graph", displayed in either normal or inverse video. The graphics characters in the key chart on the information line will also display in the current video mode, although the letters in the chart always display normally.

INVERSE VIDEO

The '0' on the keypad toggles the inverse video mode of the terminal. If inverse video is in effect, it will be turned off. If it is not in effect, it is turned on.

GRAPHICS The BLUE key toggles the graphics mode of the terminal. If regular character keyboard input is in effect, graphics character input mode is entered. If graphics character input is in effect, regular character input mode is entered.

DISPLAY LINE

The F3 key provides control over the display of the chart of graphics characters on line 25 of the screen. The chart is usually displayed, but may be turned off by pressing F3 followed by the OOPS key (the "." key next to ENTER). Pressing F3 by itself will display the chart again.

NOTE: Pressing F3 immediately after pressing ENTER does something else entirely. This is an advanced feature explained in Section 12; it is mentioned here because pressing ENTER, F3 accidentally may cause a confusing display.

4. POSITIONING THE CURSOR

TAB The tab key moves the cursor to the next tab stop to the right. Tab stops are fixed at every eight columns across the screen.

BACKTAB The ESC key is a backwards tab, moving the cursor to the next tab stop to the left of the current cursor position.

RETURN The RETURN key moves the cursor to the left edge of the next line down. If the cursor is on the bottom line of the screen, the cursor is moved to the left edge of that line.

DELETE The DELETE key moves the cursor one position to the left and erases the character that was in that position. If the cursor is on the left edge of the screen, this key has no effect.

BACKSPACE The BACKSPACE key is almost identical to the DELETE key, with one exception. DELETE erases the character to the left of the cursor, while BACKSPACE places a blank in the character position. For most purposes, the distinction does not matter. (See Section 12 for more details.)

UP The up arrow moves the cursor up one position. If the cursor is already at the top of the screen, this key has no effect.

DOWN The down arrow moves the cursor down one position. If the cursor is already at the bottom of the screen, this key has no effect.

RIGHT The right arrow moves the cursor one position to the right. If the cursor is already at the right edge of the screen, this key has no effect.

LEFT The left arrow moves the cursor one position to the left. If the cursor is already at the left edge of the screen, this key has no effect.

HOME The home key moves the cursor to the upper left corner of the screen.

Holding down the SHIFT key and pressing one of the four "arrow" cursor positioning keys will move the cursor all the way to the edge of the screen in the indicated direction.

5. DEFINING AREAS

Many ED-A-SKETCH function key operations, such as ERASE, FILL, INVERT and SAVE, have one effect when the key is struck by itself, but can also be used to operate on any rectangular area of the screen when used in conjunction with the DEFINE AREA operation.

This section describes how to define an area. The individual function key operations are described in subsequent sections.

An area is any rectangular portion of the screen. An area can be one character position, the entire screen, one or more full lines, or any rectangle one or more character positions high and one or more positions wide.

An area operation is performed by first designating the area, and then pressing the key or keys which invoke the desired operation.

To begin designating an area, the ENTER key is pressed. An X

will appear on the screen to mark the cursor position. The X is not entered into the picture, and will disappear when the function is completed. Following the ENTER key, there are three ways to designate the area:

Cursor — The cursor may be moved to any position on the screen. The area designated is the rectangle whose diagonally opposite corners are the original cursor position (marked by the X) and the current cursor position. For example, to designate a rectangle three lines high and five characters wide, press ENTER, move the cursor down (or up) two lines and right (or left) four positions.

While the cursor is being positioned, the information line will display the size of the current designated area. Any printing key typed during this operation will be entered into the picture, just as during normal operation (except a number typed immediately after ENTER; see below).

Number — Typing a number immediately after ENTER causes the subsequent function to be executed that number of times. Thus, if the function is a character function (IC, DC) the defined area is that number of character positions starting with the cursor position. Other functions (IL, ERASE, etc.) will operate on that number of lines starting with the current cursor line.

ENTER — Pressing ENTER a second time switches from rectangle mode to lines mode. The cursor may be positioned as for defining a rectangle, but the area defined consists of all the lines from the original cursor line (marked by the X) up to and including the current cursor line. The horizontal position of the cursor and the X are ignored in this mode. The information line displays the number of lines in the current designated area.

Once the desired area has been designated, pressing one of the function keys will apply that function to the area.

EXAMPLE: The following sequence will erase a rectangle five lines high and ten characters wide, beginning at the current cursor position:

1. Press ENTER to define the upper left hand corner of the rectangle.

2. Using the down arrow and right arrow keys, move the cursor four positions down and nine positions to the right. This defines the lower right corner of the rectangle.

3. Press ERASE. This performs the ERASE function on the designated rectangle.

6. INSERT AND DELETE FUNCTIONS

INSERT CHARACTER

The IC key inserts one empty space at the cursor position and move all characters to the right of the cursor one position to the right.

When a rectangle is defined, IC causes a block of the defined area's size to be inserted by shifting characters to the right on the lines containing the area. The inserted area is erased.

DELETE CHARACTER

The DC key deletes one character at the cursor position and moves all characters to the right of the cursor one position to the left. An empty space is inserted at the right edge of the line.

When a rectangle is defined, DC deletes all characters in the defined area and moves the characters to the right of the defined area over to the left edge of the area. The area which is vacated at the right side of the screen is erased.

INSERT LINE

The IL key inserts one empty line at the cursor position and moves all lines below the cursor down one line.

When an area is defined, IL inserts a rectangle in the defined area by moving down the characters which are in and below the area. The inserted rectangle is erased.

DELETE LINE

The DL key deletes one line at the cursor position and move all lines below the cursor up one row. The bottom line of the screen is erased.

When an area is defined, DL deletes all characters in the defined area and moves the characters below the defined area up to the top edge of the area. The area vacated at the bottom of the screen is erased.

Characters deleted by any of these functions are lost. However, pressing the OOPS key (the "." key next to ENTER) will restore the lost characters as long as no other function is performed in the meantime.

7. PAINTING FUNCTIONS

These functions provide a quick way to "paint" large portions of the screen with a single character. One common use is to draw vertical or horizontal lines by defining a one character wide or one character high rectangle and filling it with a line-drawing character from the graphics character set.

The INVERT function is included in this section, although it is not strictly a painting function. INVERT turns part or all of the screen into an "instant negative".

FILL TO RIGHT

The F2 key causes the next (printable) character struck to be entered at each position on the current line from the cursor position to the right edge. The message "Fill to right" is displayed on the information line to indicate that this function is active. The OOPS key may be used to cancel this function either before or after the fill character is typed.

FILL FROM LEFT

The F2 key struck twice causes the next (printable) character struck to be entered in each position on the current line from the left edge to the cursor position. The message "Fill from left" is displayed on the information line to indicate that this function is active. The OOPS key may be used to cancel this function either before or after the fill character is typed.

FILL TO BOTTOM

The F1 key causes the next (printable) character struck to be entered at each position on the screen beginning at the current cursor position and extending across each line below, down to the bottom of the screen. The message "Fill to bottom" is displayed on the information line to indicate that this function is active. The OOPS key may be used to cancel this function either before or after the fill character is typed.

FILL FROM TOP

The F1 key struck twice causes the next (printable) character struck to be entered at each position on the screen starting at the current cursor position and extending back, filling each line above, up to the top of the screen. The message "Fill from top" is displayed on the information line to indicate that this function is active. The OOPS key may be used to cancel this function either before or after the fill character is typed.

FILL AREA The F1 and the F2 key have the same effect when struck when an area is defined. Either key will enter the next (printable) key struck into each position on the screen within the defined area.

ERASE The ERASE key erases each position from the cursor to the end of the current line. If an area is defined, each position within the defined area will be erased. This is almost the same as filling the line or area with blanks, except where the ENTER PUT function and relative positioning pictures are concerned. See Section 12 for more details.

INVERT The F5 key causes each character position on the screen to be replaced by the same character in inverse video. Characters already in inverse video are changed to normal video. This has the effect of turning the screen into a negative image of itself.

If an area is defined, only the character positions within that area are inverted.

Characters overwritten by any of these functions are lost. However, pressing the OOPS key (the "." next to ENTER) will restore the lost characters as long as no other function is performed in the meantime.

8. CUT AND PASTE

When the graphics designer wishes to rearrange a layout on paper, he often takes up an X-Acto knife and glue (or hot wax) and performs a series of operations called "cut and paste." The functions described in this section allow you to accomplish the same thing, and more, without the opportunity to cut, cement, or burn your fingers.

The PICK key may be used to pick up an area, or one or more full lines, and store them temporarily (and invisibly) in an internal storage area called the Pick Buffer. PICK does not change anything on the screen. The PUT key then places a copy of the Pick Buffer down at any point on the screen. If desired, several copies of the Pick Buffer may be placed at various points on the screen.

PICK The RED key enters the current line into the Pick Buffer. If the "define area" mode is on, each character within the defined area is entered into the Pick Buffer. The contents of the screen are not altered.

PUT The WHITE key causes the contents of the Pick Buffer to be placed on the screen, starting at the current cursor position, and writing over the characters already in those screen positions. If the Pick Buffer is empty, an error message will be displayed.

If the Pick Buffer was filled with an area (i.e., during the PICK operation, "define area" mode" was on and a rectangle was selected; see Section 5), the contents of the buffer will deposited with the upper left corner of the area at the current cursor position. If the cursor is too close to the edge of the screen (either right or bottom), as much of the buffer as fits will be deposited.

If the Pick Buffer was filled with lines (i.e. "define area" mode was not on, or the area was defined to be a number of full lines), the Pick Buffer will be deposited over the entire line(s).

If the ENTER key is struck, and then the PUT (WHITE) key, a PUT function is performed as described above, but only the non-empty characters in the Pick Buffer are deposited on the screen. Any characters which would be overwritten by holes in the normal PUT function are left undisturbed by ENTER, PUT. See Section 12 for the distinction between blanks and empty holes.

OOPS

The '.' on the keypad is an "OOPS" key. Certain functions overwrite large areas of the screen - functions such as Insert/Delete, Fill, Put, Erase,and Invert. These functions provide the user with an opportunity to erase large portions of the picture with a single slip of the finger. When this happens, the user invariably says "Oops!"

A picture which has been mutilated by one of these functions may be restored by striking the OOPS key. This key will restore the affected area of the screen to its state before the last function key was typed. See the Function Key Summary for the functions which are restorable by OOPS.

If a function key operation is performed on an area, and then characters are typed within that area, those characters will be replaced by OOPS. Typing outside the affected area will not be altered.

Note that OOPS is also a restorable function key; pressing OOPS again will restore the picture to the state before the previous OOPS. This can be useful for jumping back and forth to compare two alternate ways of drawing something.

9. SAVING THE PICTURE

SAVE The F4 key is used to exit from ED-A-SKETCH and save the picture. When this key is struck, a sequence of questions will be asked:

"Enter file name to write file, <ESC> to avoid saving:"

If a file was read in initially, ED-A-SKETCH will suggest using that file name to save on, and a RETURN will accept the suggestion. Striking the "ESC" key proceeds without saving anything. Typing a file name will save the picture on that file. A RETURN ends the name. BACKSPACE and DELETE may be used to correct typing errors. The file is assumed to be on SY0: unless otherwise specified.

"Format (Asm,Basic,MicroSoft,Picture): Picture"

Striking either a carriage return or a "P" will save the picture in "picture format". A picture saved in this format can be displayed on the screen by using the command "TYPE filename", and may be read back into ED-A-SKETCH.

Striking a "B" will save the picture as a series of BASIC statements, compatible with Benton Harbor Extended BASIC. ED-A-SKETCH requests a line number (default 9000) at which to start the statements. A series of PRINT statements is generated, ending with a RETURN statement, so that the picture may be printed using a GOSUB.

Similarly, an "M" will save the picture in MicroSoft BASIC format. This format is similar to BASIC but uses CHR$ expressions for characters which may not be included in MicroSoft BASIC string constants. "M" format files may be read by Benton Harbor BASIC, but "B" format files may not be read by MicroSoft BASIC.

Striking an "A" will save the picture in Assembly Language format. ED-A-SKETCH requests a label (default PIC) for the first location of the picture. The picture is saved as a series of "DB" statements, ending with a null character (0 byte). Files saved in this format may be included in assembly language programs, or in C/80 programs using the #asm directive.

"Rel.Pos. (Asm,Basic,MicroSoft,Picture): Picture"

If "define area" mode is in effect when F4 is struck, only the designated area of the picture will be saved, and it will be saved using relative cursor positioning, rather than absolute. Section 10 describes relative positioning.

"Do you wish to continue SKETCHing this picture?"

An answer of "Y" will continue ED-A-SKETCH in the same state as before the save. An "N" will continue the question sequence.

"Do you wish to SKETCH another picture?"

An answer of "N" will cause a return to system command level. A "Y" will restart ED-A-SKETCH and ask for a new picture file name.

WARNING: Picture format is the only way to save pictures to be read back in later. Pictures saved in A, B or M format can not be read back into ED-A-SKETCH.

The strings generated for either Assembly Language or BASIC contain ESCs, so the will look strange if listed.

If you use the PIE text editor to edit A, B or M format files, you should patch PIE as described in the PIE documentation so that blanks are not replaced with tabs. Otherwise, portions of the picture may become garbled.

10. DISPLAYING PICTURES FROM BASIC PROGRAMS

This section describes how to incorporate a picture that was created with ED-A-SKETCH into a Benton Harbor Extended BASIC program. The method for assembly, C, etc., is analogous, except that the A format is used to save the picture. If MicroSoft BASIC is used, the method is identical, except that the picture must be saved in M format, and all MBasic programs involved must be saved on disk in readable, not compressed, format.

First, the picture must be created on the screen in ED-A-SKETCH. Next, it would be wise to save a copy of the picture in Picture format, since if it is saved only in Basic format it will be impossible to read it back into ED-A-SKETCH later on.

Another copy of the picture should be saved in B (Basic) format, as described in the previous section. (If MicroSoft BASIC is being used, save the picture in MicroSoft format instead.) Make a note of the starting line number used in saving the picture. We will assume for this example that line 9000, the default, was used, and that the picture was saved on file PICTURE.BAS.

Next, create the BASIC program which will display the picture. The simplest such program would consist of three lines:

```
00010 GOSUB 9000
00020 STOP
09999 END
```

(It is the "GOSUB 9000" statement that actually displays the picture.) If anything else is to be done besides displaying the

picture, the program will naturally contain more statements. The important point is to number the END statement higher than the highest line number in the picture. This program should be saved on a file. Suppose it is called DRIVER.BAS.

Next, combine the picture file with the program by typing the command

```
COPY SHOWIT.BAS=DRIVER.BAS,PICTURE.BAS
```

under HDOS, or the CP/M command

```
PIP SHOWIT.BAS=DRIVER.BAS,PICTURE.BAS
```

File SHOWIT.BAS may now be loaded into BASIC and executed by running BASIC and typing

```
OLD "SHOWIT"
RUN
```

If several pictures are to be displayed in the same program, each picture should be saved on a separate file, using a different starting line number for each picture. All the pictures should be combined with the DRIVER.BAS program using a single COPY (or PIP on CP/M) command.

11. RELATIVE POSITIONING MODE

This section and the following one discuss relative positioning mode. This is an advanced feature of ED-A-SKETCH which, although useful for certain kinds of displays, does not necessarily have to be mastered in order to make use of ED-A-SKETCH.

Normally, ED-A-SKETCH generates pictures which occupy the entire screen. These pictures, which are saved using F4 without an area designation, begin by clearing the screen, and use cursor addressing to position characters at the correct screen locations.

ED-A-SKETCH may also be used to create smaller pictures or picture segments that can be displayed at different positions on the screen. These pictures may be used to create "moving" displays, in which parts of the screen are changed or overwritten. Such pictures are written out in relative positioning mode, which uses cursor motion keys instead of cursor addressing.

A picture is saved in relative mode by designating the area to be saved (see Section 5) and pressing F4. A relative picture contains no cursor addressing, but only cursor motion commands. Thus, for a program to display the picture at a particular place on the screen, it must first position the cursor at the upper left hand corner of the desired picture position. This can be done by writing the positioning commands directly. Then the picture may be written to the screen.

For example, suppose a relative picture is included in a BASIC program starting at statement number 9000. Then the following BASIC statements will display the picture starting at column C, line L:

```
10 PRINT CHR$(27);"Y";CHR$(31+L);CHR$(31+C);
20 GOSUB 9000
```

For more information about cursor positioning, see the H89 or H19 Operating Manual.

NOTE: Relative pictures written in Picture Mode contain Line Feed characters, so that they may cause scrolling when they are typed to the terminal. This makes it easier to view such pictures using the TYPE command. However, relative pictures saved in M, B or A format do not contain Line Feed characters, since such pictures will not generally be displayed in a scrolling situation.

12. BLANKS AND HOLES

This section and the preceding one apply only to relative positioning mode and the ENTER PUT commands. These are advanced features of ED-A-SKETCH which, although useful for certain kinds of displays, do not necessarily have to be mastered in order to make use of ED-A-SKETCH.

When the contents of the Pick Buffer (Section 8) are placed on the screen, using the PUT key, on top of a non-blank area of the picture, a question arises. Should any blank characters be PUT down and erase whatever was in those character positions? Or should the previous picture "show through" blank spaces in the new, overlaid picture?

The same question comes up when a relocatable picture, previously created using ED-A-SKETCH, is displayed on a portion of the screen that already contains non-blank characters.

ED-A-SKETCH allows both modes of operation by making a distinction between blanks, which, when displayed, do overwrite characters, and holes, which do not alter the previous character at that screen position.

Since absolute pictures begin by clearing the screen, the distinction between blanks and holes may be ignored except when generating pictures which are to be overlaid in relative mode, and when using the ENTER PUT command (Section 8), which allows previous characters to show through holes in the characters which are PUT.

While creating a picture in ED-A-SKETCH, both blanks and holes normally are displayed as spaces. There is a special display mode for distinguishing them:

DISPLAY HOLES

Pressing ENTER followed by F3 causes the display to enter Display Holes mode. In this mode, blanks still display as spaces, but holes are displayed as the character "'". Pressing ENTER, F3 again will return to the normal display. (The character "'" looks the same as a hole in Display Holes mode, but can be distinguished by returning to the normal display.)

The ERASE and DELETE keys generate holes. Areas cleared by IC, DC, IL and DL are cleared to holes. The BACK SPACE key and space bar generate blanks. An area may be "erased" to blanks by using the FILL AREA functions and filling with the space bar.

ED-A-SKETCH FUNCTION KEY SUMMARY

KEY	FUNCTION NAME	FUNCTION	SEE SECT.
F1	FILL TO BOTTOM	*Fill to End of screen	7
F1-F1	FILL FROM TOP	*Fill from Beginning of screen	7
F2	FILL TO RIGHT	*Fill to Right end of line	7
F2-F2	FILL FROM LEFT	*Fill from Left end of line	7
F3	CHART	Display Graphics Chart	3
F3-OOPS	ERASE CHART	Erase Graphics Chart	3
ENTER-F3	DISPLAY HOLES	Toggle Dipslay Blanks/Holes Mode	12
F4	SAVE	Save file	9
F5	INVERT	*Inverse video (portion of) screen	7
ERASE	ERASE	*Erase (portion of screen)	7
BLUE	GRAPHICS	Toggle Graphics Mode	3
RED	PICK	Pick (portion of screen)	8
WHITE	PUT	*Put picked area at cursor position	8
ESC	BACKTAB	Backtab	4
IC	INSERT CHAR	*Insert (#) characters	6
DC	DELETE CHAR	*Delete (#) characters	6
IL	INSERT LINE	*Insert (#) lines	6
DL	DELETE LINE	*Delete (#) lines	6
HOME		Home cursor	4
UP		Cursor up 1 line	4
DOWN		Cursor down 1 line	4
RIGHT		Cursor right 1 positon	4
LEFT		Cursor left 1 position	4
Shift-UP		Cursor to top of screen	4
Shift-DOWN		Cursor to bottom of screen	4
Shift-RIGHT		Cursor to right edge of screen	4
Shift-LEFT		Cursor to left edge of screen	4
ENTER		Enter Define Area mode (area)	5
ENTER-ENTER		Enter Define Area mode (line)	5
'.'	OOPS	*Cancel (designated functions)	8
'0'	INVERSE VIDEO	Toggle Inverse Video Mode	3

Note: Functions marked with * may be applied to defined areas, and may be canceled by the OOPS key.