

PRINTOGRAPHTM

a hi-res graphics printing package from southwestern data systems

PRINTOGRAPHER™

by Stephen Billard

Documentation by
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and
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INSTRUCTION MANUAL

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by STEPHEN L. BILLARD

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PRINTER GRAPHICS

If you have a printer with graphics capabilities, you may have noticed that it requires a good deal more to get graphics to the printer than it does text. PRINTOGRAPHER is a program that allows you to easily transfer images from your Hi-Res screen to your printer. Such programs are commonly called "screen dumps", "printer dumps" or "graphic dumps". PRINTOGRAPHER is unique as a graphic printing program in several respects:

1. It is extremely simple to use.
2. It allows the user to crop images both horizontally and vertically in a purely visual manner.
3. It can magnify images up to ninety-nine times using the "CROP" program or up to 127 times from within a program.
4. It has a "diamond" option to make images into diamond shapes and a "cameo" option to make images into an oval or circular shape.
5. It can be easily configured to work with just about any printer and interface.
6. Images can be printed horizontally or vertically.
7. Graphics can be saved in their cropped pattern.
8. A special "compressing" program saves pictures in fewer sectors than the normal 34 sector files.
9. Additional instructions are provided on how to do graphics printing from within your own personal programs.
10. The data normally sent to your printer to create the picture may be optionally written to disk and later printed from your own program using a small "driver" subroutine.
11. Full color printing on appropriate printers is supported.

YOUR DISKETTE

If you have already booted on a standard Apple DOS 3.3 diskette, you may examine the files on your PRINTOGRAPHER diskette by placing the diskette in the drive and typing in 'CATALOG'. If you wish to boot on the PRINTOGRAPHER diskette, simply boot in the usual way, and press any key (other than 'C') as soon as the red drive light comes on. In either case you will see a display of the following files. Press any key other than RETURN to page through the directory.

DISK VOLUME 254

30

THE PRINTOGRAPHER

*A 018 HELLO

PROGRAM FILES

*A 003 PRINTOGRAPHER
*B 010 PRINT GRAPHICS.OBJ
*B 003 PRINTFILE.OBJ
*A 048 CONFIGURE
*B 026 CROP

PRINTER DRIVERS

*B 002 AIOPARDRIVER.O
*B 002 AIOSERDRIVER.O
*B 002 ANADIX TABLE.O
*B 002 APLPARDRIVER.O
*B 002 APLSERDRIVER.O
*B 002 B2/A2DRIVER.O
*B 002 BASE 2 TABLE.O
*B 002 CCSSERDRIVER.O
*B 002 CENTRONICS TABLE.O
*B 002 CPSPARDRIVER.O
*B 002 CPSSERDRIVER.O
*B 002 DIABLO TABLE.O
*B 002 DTC 300S TABLE.O
*B 002 EPSON MX100 TABLE.O
*B 002 EPSON MX70 TABLE.O
*B 002 FIRMDRIVER.O
*B 002 GENIDRIVER.O
*B 002 GRPDRIVER.O
*B 002 MALIBU TABLE.O
*B 002 MICBUFDRIVER.O
*B 002 MPI 88G TABLE.O
*B 002 NEC TABLE.O
*B 002 OKIDATA TABLE.O
*B 002 PKASODRIVER.O
*B 004 PRINTFILE DRIVER.O
*B 002 PRISM TABLE.O
*B 002 SILENTYPE TABLE.O
*B 002 SLNTDRIVER.O
*B 002 TIGER 44X TABLE.O
*B 002 TIGER X60 TABLE.O

SAMPLE PICTURES

*S 027 MOSAIC PATTERN
*S 015 DIAMOND MOSAIC
*B 033 PLOTTER
*B 033 RAVEN
*B 033 MAGNETIC DISKS

USER PROGRAM MODULES

*B 003 PRINT GRAPHICS.RM
*B 003 PRINTFILE.RM
*B 004 SCREEN LOADER.RM
*B 004 SCREEN SAVER.RM

LANGUAGE CARD FILES

*I 006 APPLESOFT
*B 050 FPBASIC

USER PROGRAM DEMOS

*I 002 GRAPHICS PRINT.INT
*A 002 GRAPHICS PRINT.FP
*A 007 GRAPHICS PRINT.RM
*A 003 LOAD/SAVE/PRINT.FP
*A 011 DELUXE LOAD/SAVE/PRINT
*A 002 PRINTFILE DEMO.FP

The files are organized into general categories to make finding the files of interest easier. PRINTOGRAPHER, PRINT GRAPHICS.OBJ, CONFIGURE, and CROP are the main program files that constitute the graphics printout function. Once you have run CONFIGURE, several new files, specifically PRINT GRAPHICS and DISK GRAPHICS will appear in the directory. These files are your individualized versions of the main routine of the PRINTOGRAPHER. You may revise the PRINT GRAPHICS and DISK GRAPHICS files at any time by running CONFIGURE again.

The PRINTER DRIVERS section contains the data files which CONFIGURE uses to customize PRINT GRAPHICS.OBJ to your particular requirements. In most cases the user need not be concerned with any of the files since the CONFIGURE program will automatically select the files it needs.

SAMPLE PICTURES contains a number of both normal and compressed Hi-Res pictures. These are provided for your experimentation while learning to use the PRINTOGRAPHER. PLOTTER is of particular interest when determining the ideal placement of Hi-Res pictures on a page for your particular printer.

USER PROGRAM MODULES is a special section of the utilities needed to allow you to do graphics printing from within your own programs. See Appendix D on "Printing Graphics in Your Own Programs" for information on how to use these files to your best advantage.

The LANGUAGE CARD FILES are provided so that the PRINTOGRAPHER diskette can boot on any configuration of Apple II, Apple II+ or Apple IIE.

Last of all, USER PROGRAM DEMOS is a selection of short demo programs which give specific examples of using the PRINT GRAPHICS routine within your own programs.

SPECIAL DOS FEATURES

If you do boot on the PRINTOGRAPHER diskette, a special Disk Operating System (DOS) will be in effect which you may find to be of some advantage.

The first thing you will notice is a number just to the right of the 'DISK VOLUME 254' message, similar to the '30' in the sample directory listed on the previous page. This is a listing of the number of free sectors remaining on the diskette being 'CATALOG'ed.

The second feature is an optional termination of the CATALOG listing at any of the 'pauses' which usually occur when a directory has more files than can be displayed on the screen at once. When using the modified DOS, pressing RETURN will terminate the CATALOG listing. Pressing any other key will continue it.

Although not a specific function of the PRINTOGRAPHER DOS, it should be mentioned that whenever the PRINTOGRAPHER diskette is booted, three options are possible.

A direct boot, without pressing any key after the boot starts, will automatically run the PRINTOGRAPHER program.

If the 'C' key is pressed during the boot process, the back-up copy program will run instead.

Pressing any key other than 'C' will simply CATALOG the diskette and leave the user with the usual Applesoft prompt (]).

The free space and 'Catalog Clip' features may be propagated to other diskettes by 'INIT'ing fresh blank diskettes after first booting on the PRINTOGRAPHER diskette. Invoking the copy program is not necessary to propagate just the DOS modifications.

GETTING STARTED

The following pages detail how to produce your first graphics printout using the PRINTOGRAPHER, and also the many options and finer points available in this package.

We think you'll find the PRINTOGRAPHER makes it easy to produce hard copy forms of your Hi-Res graphics, regardless of your printer or interface card.

CONFIGURING THE PROGRAM FOR YOUR PRINTER

PRINTOGRAPHER can be used either from within the "CROP" program or as part of your own program. The next section will focus on using the basic cropping program on the disk, "CROP", and in the APPENDICES there is an explanation of how to work with PRINTOGRAPHER in more sophisticated ways.

The first thing to do though is to configure the program for your printer. Once this is done, you don't have to reconfigure it again. However, first make a back-up of your disk and put the original someplace where it will be safe, like a metal filing cabinet, and work with the back-up. See Appendix F for more information on making back-up copies.

When you boot the disk the first time, it will run the CONFIGURE program. Simply follow the steps as you are prompted indicating the type of printer, interface and so forth you have. Once that is done, a program called "CROP" will be run automatically, and you are ready to print graphics!

If you do not see your printer or interface card listed in the menu choices, make the best guess you can. In the case of interface cards, Choice #1 works for most parallel cards, and Choice #2 for most serial cards. Option #12, the FIRMWARE DRIVER, is also a good choice since many newer printer interface cards have been designed to conform to this Apple Computer Co, Inc. standard. If you have trouble configuring your diskette, see Appendix A for a full discussion of configuration. Also, you might have put in the wrong parameters; if so, just run the program called CONFIGURE again to make sure you put in the correct ones or change ones you weren't sure about. You won't hurt anything; this is a very friendly program!

If you continue to have problems, please don't hesitate to call us. If your printer or interface requires a special driver, we will do our best to provide you with the necessary information to get your printer going.

SELECTING THE PICTURE YOU WANT TO PRINT

Once you are in the CROP program, there are two ways to get your image on the screen:

1. From a disk.

If you have not loaded a picture into memory, simply press RETURN. You will then be prompted to indicate which slot and drive to load the file from. Just press RETURN alone to accept the current values. After specifying the drive values, insert your disk with the graphics pictures on it into the appropriate drive.

This disk comes with several pictures on it; so to get started, just press RETURN and a list of graphic files will be presented. By pressing ESC the flashing cursor will move down the screen over the files. When you get to the one you want, press RETURN and the picture will be loaded into memory.

2. From memory.

If you already have a picture in memory, simply press ESC to move the cursor bar over the EDIT A PICTURE IN MEMORY choice and press RETURN. You will then be shown Hi-Res screen 1. If this is not the picture you wanted, press ESC and you will be offered Hi-Res screen 2. Press RETURN to indicate your selection.

Using either method, your picture is ready for cropping and printing. At this point you will be shown a screen of instructions, and by pressing RETURN, you will then be presented with a Hi-Res picture. If the picture on the screen is not the one you wanted, you may press Control-C to return to the picture selection menu.

* * * * *

IMPORTANT NOTE: AT VIRTUALLY ALL STAGES OF THE PRINTOGRAPHER PROGRAM, PRESSING 'CONTROL-C' WILL RETURN YOU TO THE PREVIOUS MENU LEVEL. TO EXIT PRINTOGRAPHER, USE CONTROL-C TO BACK UP TO THE FIRST MAIN MENU AND USE THE 'QUIT PROGRAM' OPTION.

* * * * *

CROPPING THE PICTURE, RECTANGULAR

Now back to the picture! Assuming that you have the correct picture on your screen, you can crop it to cut out the parts you don't want printed. You will notice that in the upper left hand corner and lower right hand corner, there are little "L" shaped markers. (These may not be clearly visible if the picture has a white background.)

The one at the top is "T" and the one at the bottom, "B". To activate either one simply press "T" or "B". You will notice that initially the top marker is flashing at a faster rate than the bottom marker. When "B" is pressed, this situation will reverse. You can always tell which marker is active by noting which marker is flashing faster.

To move the marker, use the I,J,K, and M keys to move the markers up, left, right or down respectively. (Just like the editor on the APPLE II.) For faster motion, use these keys with the 'REPEAT' key.

To move the markers 10 screen lines at a time, press the ESCAPE key once. This places you in a larger increment mode. The picture will now be cropped by 10 units each time the I,J,K or M keys are pressed. Pressing any key other than I,J,K, or M will release this function and return the cropping increment to the normal mode.

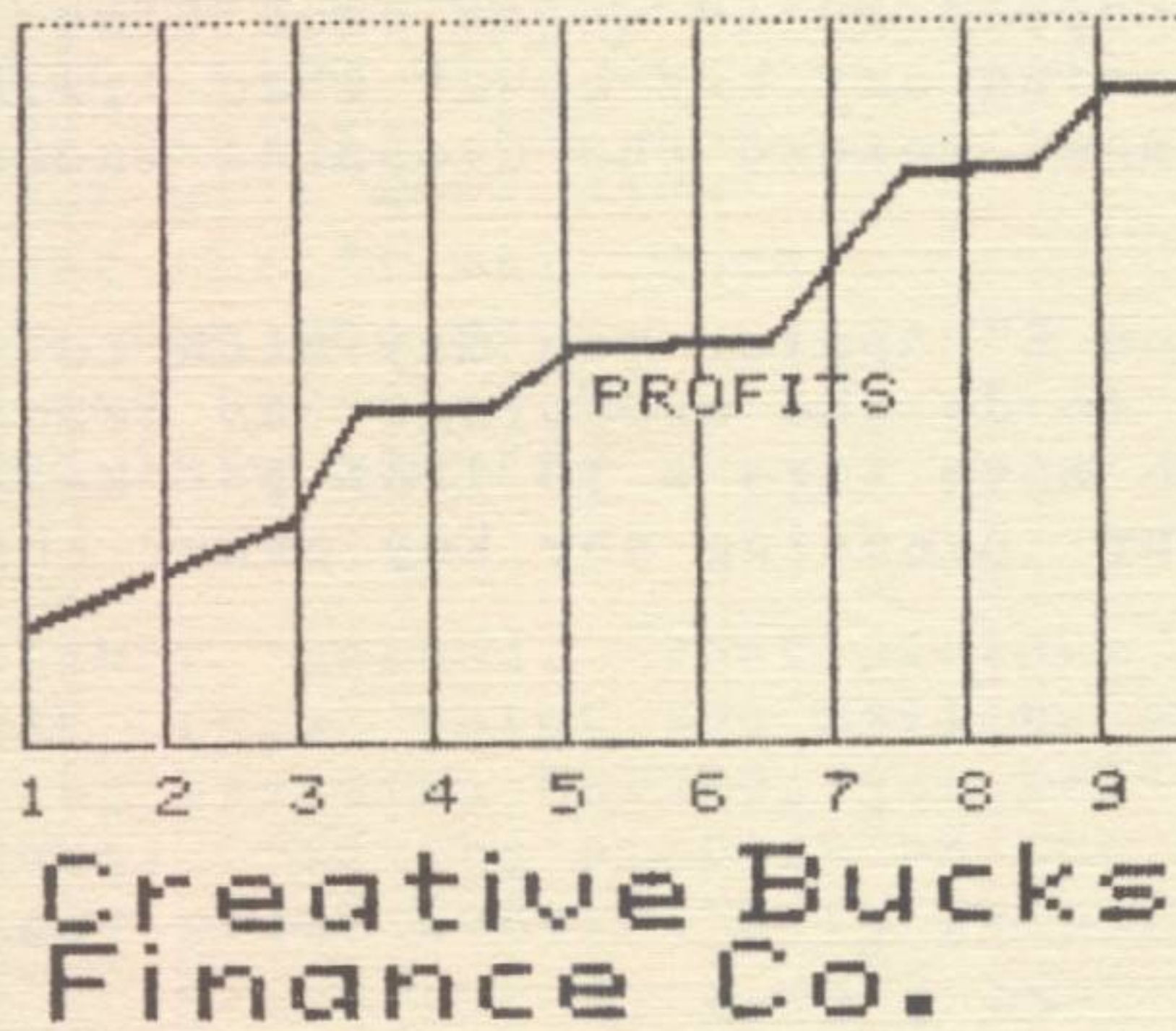
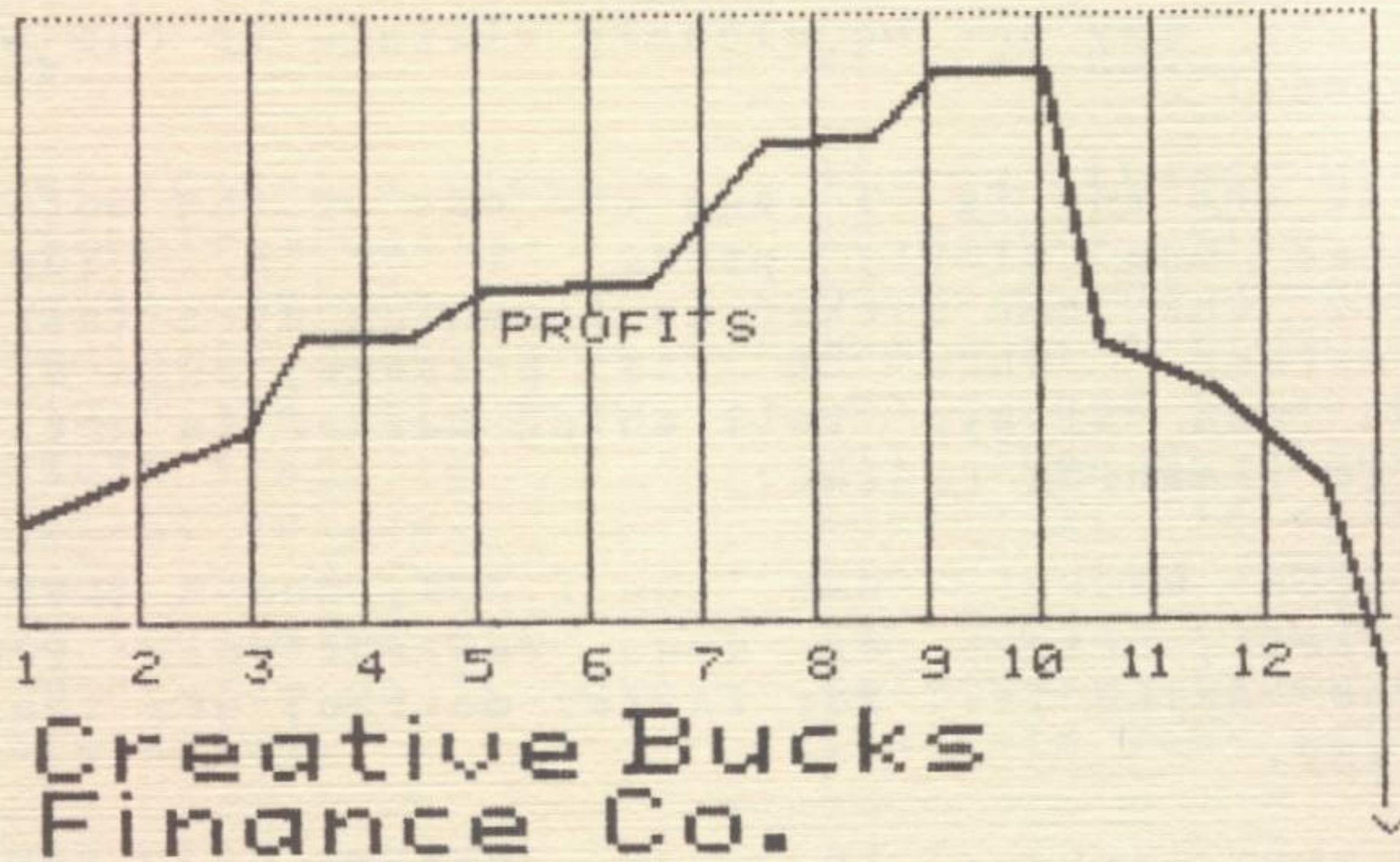
NOTE: On the new "Revision E" Apple, you may wish to use the four directional arrow keys to do the cropping. As described above, ESC may still be used to move into a 10 line per keystroke mode, which can be cleared by pressing any key other than the arrow keys or I,J,K,M.

	^
"T": Top Marker	I
"B": Bottom Marker	<- J K ->
	M
ESC: Enter 10x Mode	
	v

As the markers are moved, parts of the picture are cut out. Practice moving the markers to see how easily cropping is done. If you should crop too far, simply reverse your direction and the picture will be restored, one line (or 10) at a time. Pressing the "O" key (for "Original") can also be used to restore the complete original picture to the screen.

If at any time you should wish to return to the functions help list page, simply press the question mark key (?). It is not necessary to shift this key.

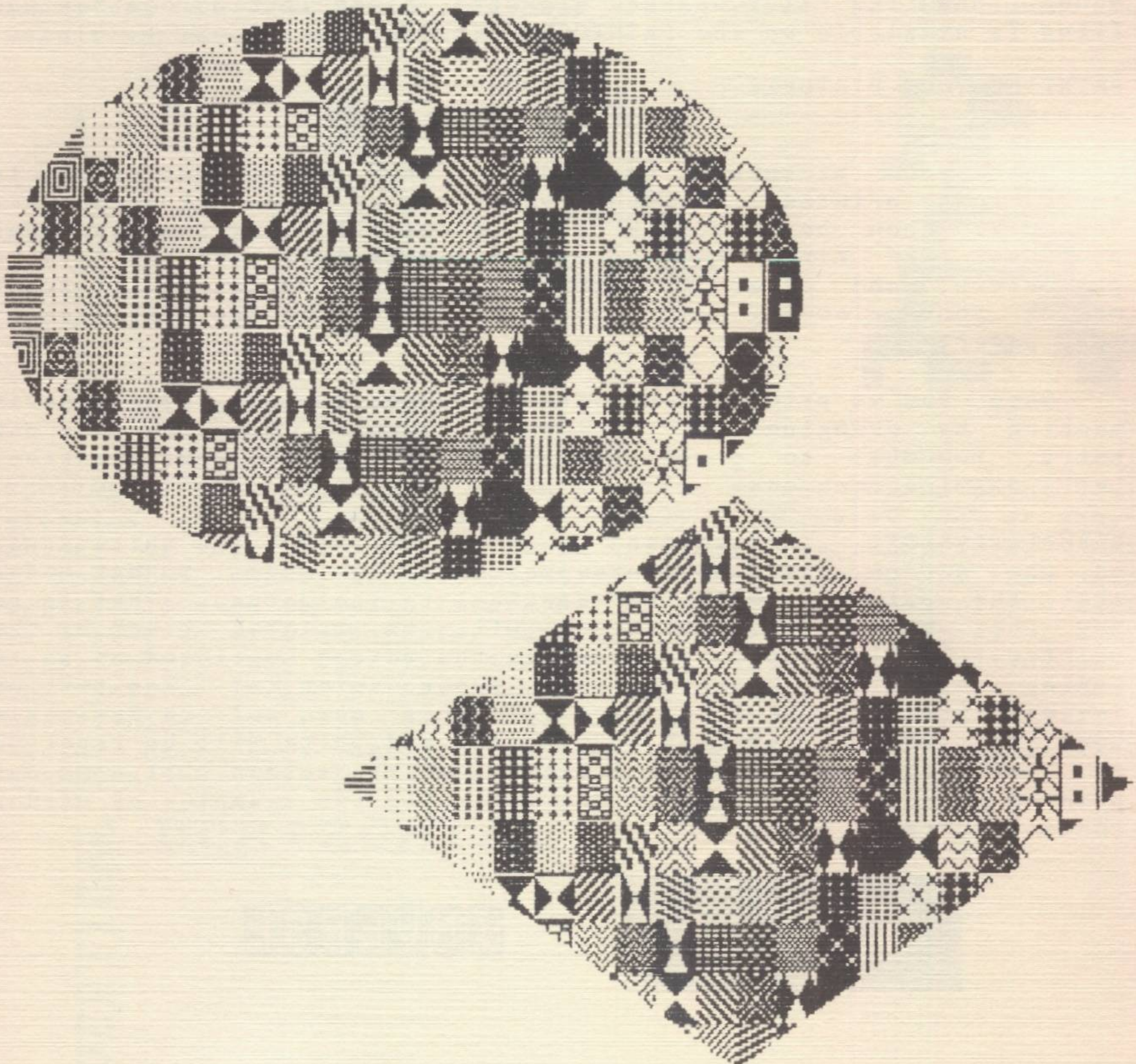
If for any reason you wish to re-load a new Hi-Res picture without printing the one you are currently working on, you may press Control-C to return to the main menu.



As you can see, cropping can be quite useful!

CROPPING THE PICTURE, DIAMOND AND COME O SHAPES

Another cropping feature of PRINTOGRAPHER is "diamond and cameo" cropping. All you do is press "D" or "C" and your picture will be cropped in a diamond or cameo shape. Since the horizontal and vertical cropping only move up or down or from side to side, you may not be able to crop unwanted corners in pictures. By using the diamond crop in conjunction with the vertical and horizontal cropping, you are able to crop in several different directions and do just about anything you want with a graphic display. For rounding corners, and putting old fashioned cameo frames around your picture, the "cameo" is quite useful. Together with the horizontal and vertical crop, the diamond and cameo crops give you a great deal of versatility. Play with some of the graphics on the disk until you get the hang of it - about 5 minutes is all you'll need! While it is very effective, it is also quite simple. Note that both diamond and cameo cropping are always done with respect to the current 'L' markers. Smaller rectangular screens produce proportionally smaller diamond or cameo pictures.



SAVING YOUR PICTURES

Either before or after you have cropped your pictures, you can save them to the disk. To save a picture simply press "S" and you will be given a choice to save your files as a "compressed" or "regular" file. In general, it is best to save your file in the "compressed" version since it takes nothing from your graphics and saves a good deal of disk space. It will then be saved as an "S" file. However, if you plan to do some more work on your picture with another program such as a graphic drawing routine, it would probably be a good idea to save it as a regular 34 sector file.

This is because most programs do not recognize an "S" file; they look for a "B" file of 34 sectors. (Just for fun, save the same picture as a compressed and then a regular file to see how much space you've saved.) You do not have to save a file before printing it, but if you want to print a picture in its cropped version several times, it is easier to save it in the cropped format and then just print it the next time it is used without having to re-crop it. (For all 'SAVE's, you should use a diskette other than the PRINTOGRAPHER diskette, since little room for new files is available on the PRINTOGRAPHER diskette.)

PRINTING YOUR PICTURES

Once your picture is cropped just the way you want it, it is ready to be printed. Make sure your printer is on and press "P". You will then be given a set of options for formatting your picture. The first time, keep pressing RETURN to the default parameters, and after the last option your printer will start making your picture. It should be printed on the left side of your paper.

Once you've printed your first picture, you can begin experimenting by changing the options. Whenever you type in a new entry, remember to press RETURN to move to the next question. Let's examine each one.

NORMAL/INVERSE. This is used to select how black and white areas on the screen will be interpreted when printed. **NORMAL** means that the printout will be identical to the screen. That is to say that black on the screen will be printed black by the printer, leaving the white areas on the screen unprinted so as to appear white (or whatever your paper color is). For text or images like the PLOTTER picture, this may not be desirable however. In the **INVERSE** mode, black and white will be reversed so that, for example, white letters on the screen will come out printed black on the paper. The following two examples of Hi-Res fonts illustrate this:



NORMAL

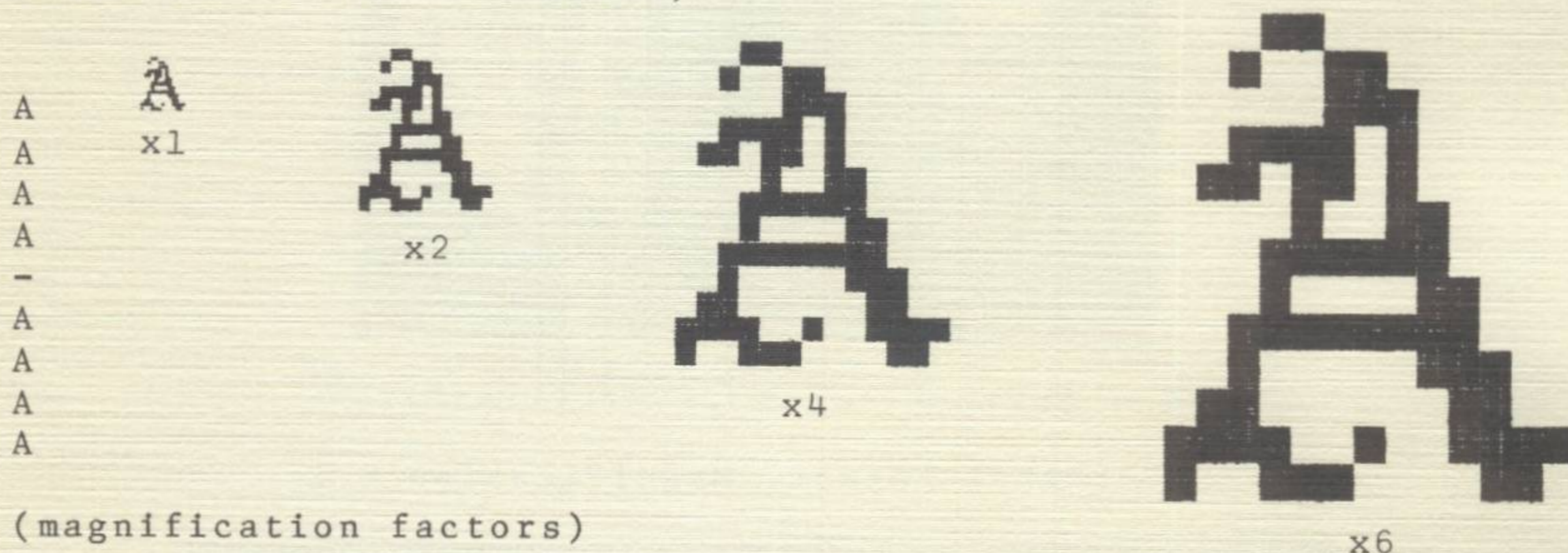


INVERSE

If you're worried about knowing when to choose which mode, don't be! The PRINTOGRAPHER program looks at the picture and decides what is background and what is the main image desired and automatically sets the default to NORMAL or INVERSE, giving the background in white (on paper) and the main image in black just as in printing text. However, to change the NORMAL/ INVERSE option, simply press ESC and the program makes the necessary switch. Experiment with this option to see the different effects. If you have a color printer, only black and white will be reversed. All actual colors will remain unchanged.

MAGNIFICATION. The next choice is to magnify your picture from 1 to 99 times. Both dot matrix and daisy-wheel printers use little dots to print pictures, and depending on the size of the pins or periods used to make the dots your picture will be of different sizes. On daisy wheel printers, the pictures are relatively large compared to dot matrix printers.

The following shows the graphic letter "A" printed in different magnifications. The greater the magnification, the poorer the resolution. There are more dots used to create the same image. (However, if you stand on the other side of the room, the magnified letters look fine...)



HORIZONTAL/VERTICAL. Use of this option allows you to print your graphics either horizontally (the way we normally look at something) or vertically (which looks "sideways" on the printer). As a rule of thumb, on most printers (those using 8 1/2 inch wide paper), a magnification factor of '3' will fill up a printed page from side to side. Anything over X3 will be truncated; so if your image fills the horizontal screen of your monitor, and you want the entire image printed at X4 or greater, choose a vertical positioning on your paper or crop the picture so it will fit. Again, here some experimentation is a good idea. The following examples show both horizontal and vertical positioning:

VERTICAL

HORIZONTAL

(4 3 2 1 0 1 2 3 4)
Platter
Southwestern
Data
Systems
Vertical 100
Vertical 120
Vertical 140
Vertical 160
Vertical 180
Vertical 190 (191 = MAX)

Horizontal Format, Magnification = 1

(4 3 2 1 0 1 2 3 4)
Platter
Southwestern
Data
Systems
Vertical 100
Vertical 120
Vertical 140
Vertical 160
Vertical 180
Vertical 190 (191 = MAX)

Vertical Format, Magnification = 1

PICTURE POSITIONING. Using PRINTOGRAPHER, it is possible to place your image anywhere you want horizontally on your paper. There are two options for this positioning. Press ESCAPE to move the white cursor to the choice you prefer. These options behave as follows:

1. JUSTIFY

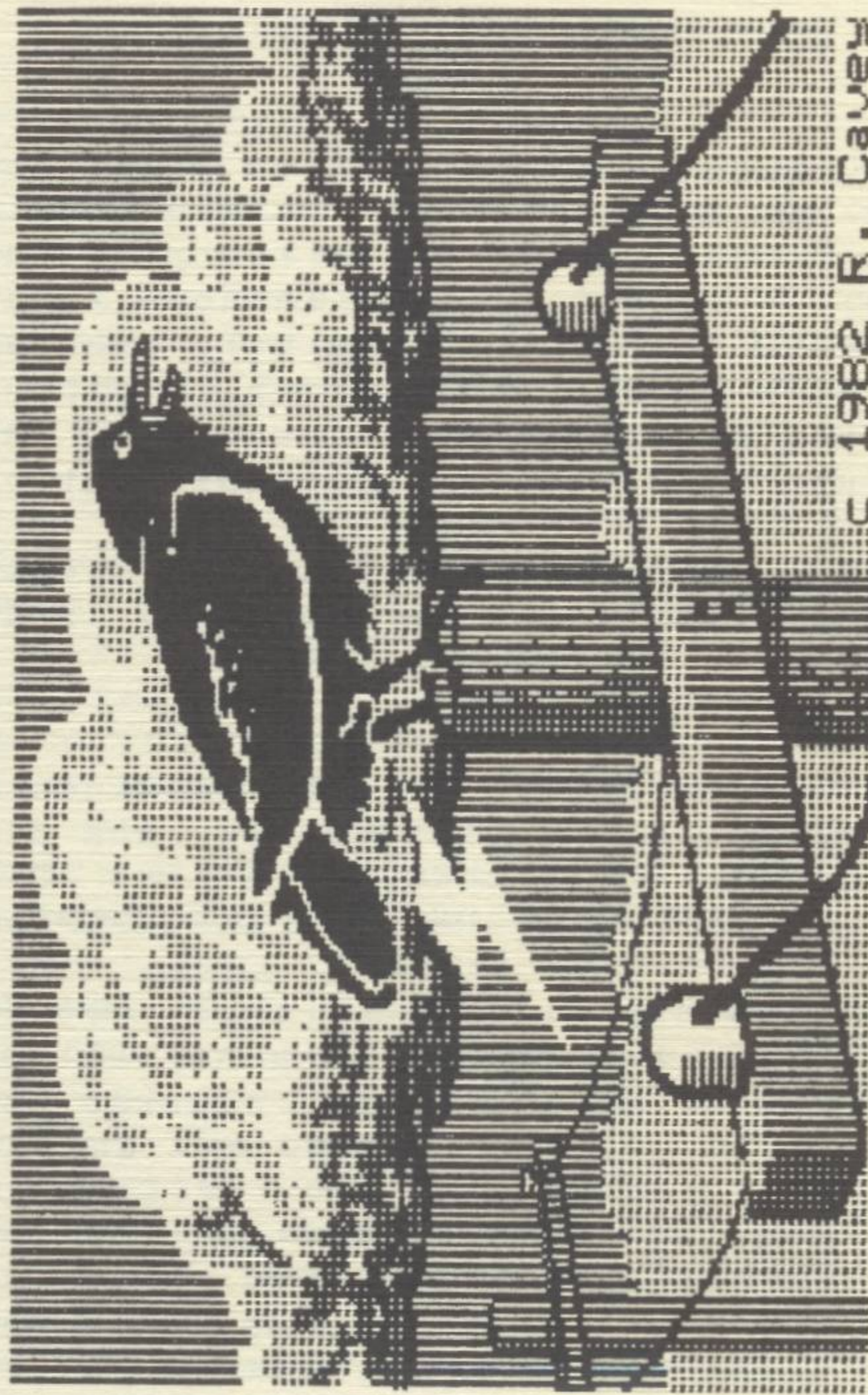
2. INDENT

LEFT/CENTER/RIGHT

INDENT ... DOT POSITIONS

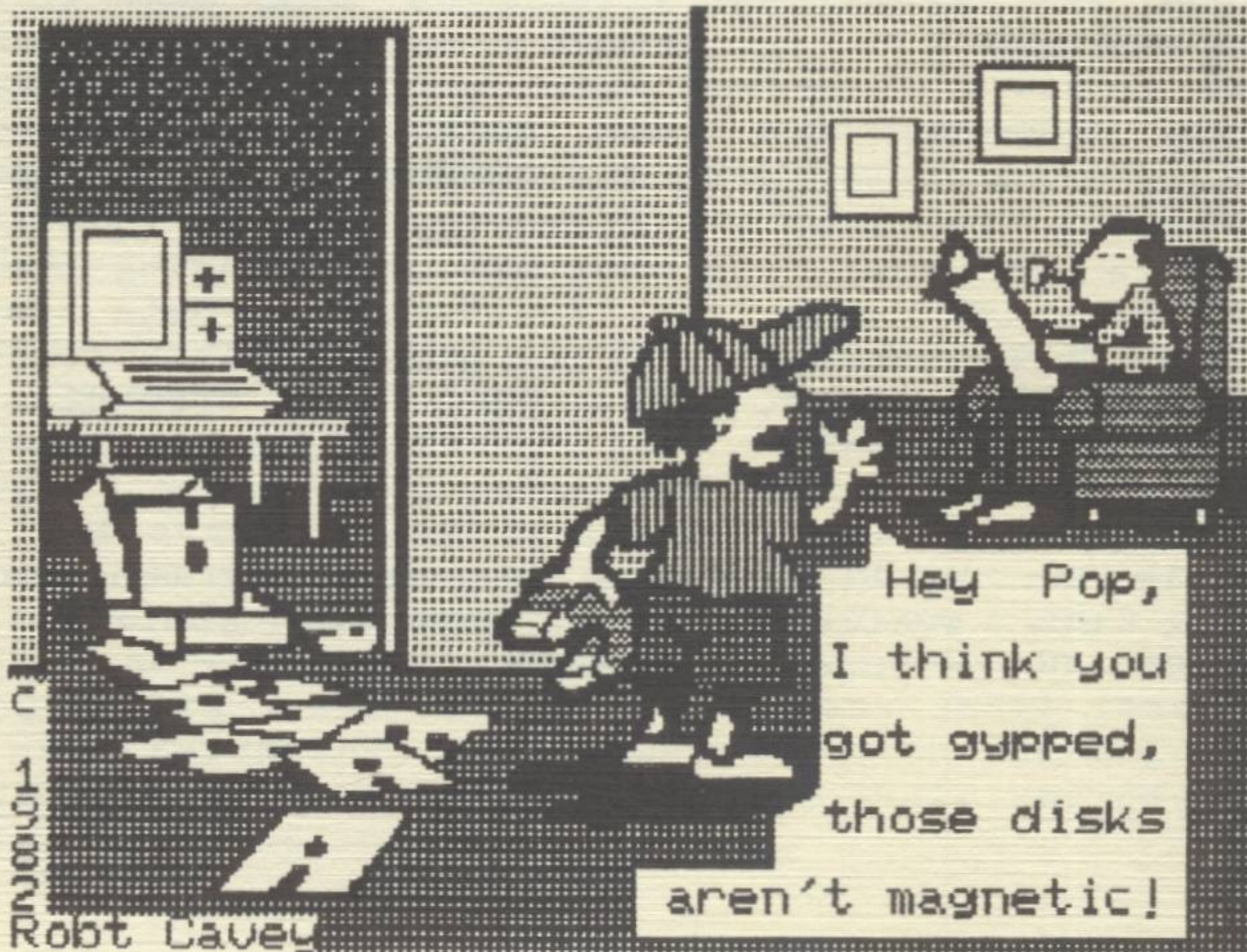
Selecting LEFT will cause the picture to be printed at the left edge of the paper. CENTER will print the picture centered on the page. RIGHT will print the picture with the right edge of the picture aligned with the right margin of the paper.

This option allows you to specify the left margin indentation of your picture. You may specify 0 to 999 dots. Specifying '0' is equivalent to left justification. To help you in any experiments with precise dot positioning, a file called PLOTTER has been included on the PRINTOGRAPHER diskette.



© 1982 R. Cavey

Vertical Format, Magnification = 2



© 1982 R. Cavey

Hey Pop,
I think you
got gypped,
those disks
aren't magnetic!

Horizontal Format, Magnification = 2

SOME OTHER SPECIAL FEATURES...

RETURN TO PRINT MENU. If you want to print several copies of a picture, or use different print values for the same cropping pattern, simply press any key while the printing of your picture is still going on. When the picture is done, you will be returned to the print menu, rather than the main menu as would otherwise happen. This avoids having to "re-crop" a picture to do a second printing. Once you're at the print menu, you can back up further to the cropping functions list by pressing Control C.

Note that you can stop the printing process at any time by pressing Control-C. After the current line is done printing, the program will return you to the print menu.

PRINT TO DISK. The CROP program also provides you with a hidden option of "printing" your picture to the disk, rather than a printer. To activate this mode, press the 'D' key (for "Disk") immediately after typing in "BRUN CROP <RETURN>".

When in this mode, all data that would have gone to the printer will instead be stored in a normal DOS text file. The CROP program is used normally in regards to file selection, cropping, etc.

Because the printer data file may be fairly large, it is recommended that a diskette be used with a large amount of remaining space on it. The free space on any diskette may be checked by simply CATALOG'ing it any time after having once booted on the PRINTOGRAPHER diskette, and noting the value indicated next to the volume number as described earlier under "Special DOS Features". For best results, it is recommended that you use a blank INITIALIZED diskette for the first file save. Then, depending on its resulting size, you may move it to another diskette if desired.

The main advantage to this mode is the added ability to 1) "spool" pictures while using the computer with another program, 2) avoid having to load a picture into memory to print it when doing graphics in your own programs and 3) using these created graphics text files with the Southwestern Data System's text editor, "The Correspondent" to put graphics into text documents such as letters, reports, etc. See the Appendices for more details on these options.

NOTE: Details on combining the Printographer routines with The Correspondent are available in a special applications note, included in The Correspondent package.

TROUBLE SHOOTING

Different printers have different quirks when it comes to printing graphics. Some will choke up at the slightest irregular impulse, while others will keep on cranking out graphics after you've dropped them on the floor. Depending on the type and temperament of your printer, you will have different results. Again, before you begin doing final prints of your graphics, test it several times. The following are some quirks noted on selected printers:

1. EPSON MX-70. This little printer will print graphics with PRINTOGRAPHER with almost no chokes. About the only thing found to upset the MX-70 was failure to turn it on before hitting "P" for printing the graphics. If you turn on the printer after pressing "P", the printout will have horizontal blank spaces between the printing. So... remember to turn on the MX-70 before attempting to print.

2. EPSON MX-80 with GRAFTRAX. This highly popular printer performed extremely well with PRINTOGRAPHER. However, if the picture you're trying to print exceeds the width of the page one of two things will happen. With the older GRAFTRAX (pre-March '82), the printer will lock up. To unfreeze it, turn the printer off and then on again, then press CTRL-C before it completes printing the next line. You will then be taken back to the last section of the CROP program. With the newer GRAFTRAX-PLUS, the picture will be truncated at the right margin. In either event, using a smaller magnification, screen orientation, and/or cropping should be used to bring the picture within printer limits.

3. JUST ABOUT ALL PRINTERS. When printing on the horizontal, most printers tend to squash pictures somewhat. Sometimes this squashing actually enhances resolution since it places the vertical dots closer together, but at other times it distorts the picture. There is a good reason for this phenomenon, but rather than explain it, simply try printing the picture vertically. This will usually clear up the distortion. On printers that give you fine tuning on the line feed, try different adjustments for better horizontal format pictures.

4. DAISY-WHEEL PRINTERS. Daisy wheel printers have different sized "periods" or "dots" they use to print graphics. Some are round, some square, some diamond shaped, and some triangular. Also, they come in several different sizes. Try using different sized print heads and styles until you find the one that gives you the best graphic for the purpose at hand. The "cubic" or "square" gives a very solid looking graphic and would look great with graphs. On the other hand, for portraits, use a wheel with very small fine type heads. Also, we recommend using wheels with the metal reinforced periods. Plastic wheels will get their periods banged flat printing graphics.

When the PRINTOGRAPHER disk (or a back-up) is booted for the first time, the CONFIGURE program will be automatically run. If at some later time you change equipment, you can re-configure the disk by placing the PRINTOGRAPHER diskette in the drive and typing in:

RUN CONFIGURE

from the immediate mode of the Apple. The disk will then come on and the CONFIGURE program will customize PRINTOGRAPHER to your own particular equipment by inquiring about the following areas:

PRINTER TYPE

The first thing asked will be "WHICH PRINTER DO YOU HAVE?". If you don't see your printer listed, press RETURN alone for the next page of possible printers.

If you go past the page you want, just keep pressing RETURN to go back to the beginning. When you see your printer, enter the appropriate number and press RETURN. If your printer is not listed, enter the number for "OTHER" and consult the special section below (entitled "SPECIAL SETUPS"). When done, press RETURN to go to the next section on INTERFACE CARDS.

After specifying your printer type, the program may ask certain other questions related to your particular printer. If you have specified a color printer, it will ask "DO YOU WISH MULTI-COLOR PRINTOUT?". Enter "Y" or "N" followed by pressing RETURN depending on whether you are using the color ribbon option. (PRINTOGRAPHER assumes the Color Process Ribbon for the IDS PRISM color option).

You will always be asked for the width of the paper you are using. PRINTOGRAPHER uses this information for centering or right justifying your pictures. You should enter the width of the print area of the page (normally '8' (inches) for 8 1/2 by 11 paper and '14' (inches) for 132 column paper.

After you have answered these and any other questions needed for your printer, CONFIGURE will proceed to the next part to specify the printer interface type.

INTERFACE CARDS

After specifying your printer, CONFIGURE will ask "WHICH PRINTER INTERFACE DO YOU HAVE?"

As with the printer section, use RETURN alone to page through until you find your printer interface card listed. Then enter the appropriate number.

If your interface card is not listed, consult the next section entitled "WRITING YOUR OWN DRIVERS." After writing a custom driver, re-run CONFIGURE and enter the number for "OTHER". Then enter the name of the file for the special driver you have created.

PRINTER SLOT

At this point simply type in the number of the slot that your printer interface card is plugged into and press RETURN.

FILES SAVED

After entering the slot number, CONFIGURE will save the customized routines to disk. It will also mention where in memory the PRINT GRAPHICS (and thus the DISK GRAPHICS) routines are set up for. This is useful when BLOADing these files for use within your own programs. A typical message might read:

```
PRINT GRAPHICS CONFIGURED  
LOAD ADDRESS 35584
```

The CONFIGURATION program is largely self-documenting, and should not require any additional assistance from this manual.

If however, you have a printer or interface card which is not listed in the menus, please call Southwestern Data Systems for assistance.

The following information is provided only as a technical supplement, to enable advanced programmers to implement their own special software/hardware projects.

>>> SPECIAL SETUPS <<<

The following printers (and many others) are supported by tables contained on this disk. Some notable characteristics or special configuration considerations are also annotated with the printer.

*EPSON MX-70, MX-80, MX-100

Because the interface line for bit 7 is usually tied to ground with these printers, certain picture sizes must be broken into multiple print passes for a single line. You will notice this as a partial printing followed by a return of the print head to the leftmost carriage position, followed by a continuation of the printing of the line. This is a normal operation and does not affect the printed picture.

The MX-70 printer also has an "AUTO" jumper which may be used to cause an automatic line advance whenever a carriage return is received. The configuration program will ask if you have AUTO LINE FEED enabled. Answer "yes" if this jumper is on the white post. (If you do not get a line feed when printing, then the line feed is OFF, so all you have to do is re-configure the disk and answer "NO" when asked about the AUTO LINE FEED.)

*CENTRONICS 739
*NEC PC-8023A-C

There is an option for these printers called AUTO LINE FEED, which when set, causes the printer to insert a line feed after each carriage return it receives. The PRINT GRAPHICS routine must know the setting of this option to properly space the graphics picture. The configuration routine will ask for the setting of the option.

*ANADDEX DP-9500
*ANADDEX DP-9501

These printers have as an option a 2K buffer. This option is called OPTION R. Special graphics control sequences are required to prevent the printer from hanging up if more than 500 columns of graphics are printed on a printer without OPTION R installed. We highly recommend obtaining this option if you intend to do much graphics printing since it improves print speed. The PRINT GRAPHICS routine will run correctly on a printer without OPTION R if you specify that it is not installed when the routine is configured.

*DIABLO 1640
*DIABLO 1650
*NEC SPINWRITER 5510
*NEC SPINWRITER 5515
*NEC SPINWRITER 5520
*NEC SPINWRITER 5525
*QUME SPRINT 5

These printers have a "local line feed" switch on the front of the unit. You must inform the configuration program of the setting of the switch. If the setting is other than specified, the graphics lines will be spaced incorrectly.

*C.ITOH STARWRITER
*VISTA V300

These printers are treated like the Diablo; however, its local line feed is not on the front of the unit.

CUSTOM PRINTER TABLES

PRINTOGRAPHER is a table driven program and can be configured to graphics printers other than those provided on the diskette. For each printer desired, a configuration table must be built using the print configuration routine. The parameters of the configuration and a description of their usage are given below. The table created is configured into PRINT GRAPHICS and DISK GRAPHICS by using the "OTHER PRINTER" menu option. If you have not already created a printer configuration table, just press RETURN alone when CONFIGURE asks you for the name of the printer table. The program will then prompt you as appropriate for the following parameters. Since some of the parameters can be determined from others, not all of the following parameters will necessarily be requested.

Printer Type:

There are six printer types defined, five of which cause the PRINT GRAPHICS to do unique handling. Enter the number from 0 to 5 in response to this question.

Printer type ZERO (0) is used for most printers. It invokes no special processing.

Print TYPE ONE (1) is used by the Integral Data Systems' printers. It causes each occurrence of the graphics code '03' to be sent twice as is required for these printers.

Printer TYPE TWO (2) is used for daisy wheel printers such as the DIABLO and NEC printers. It causes graphics to be plotted with period and space characters.

Printer TYPE THREE (3) is used by the EPSON printers. These printers require that a column count precede each block of graphics codes. This count is sent as a two byte integer. The least significant byte is sent first, followed by the most significant byte.

Printer TYPE FOUR (4) is used by the NEC PC-8023A-C printer. This printer requires that a column count be sent preceding each block of graphics, much like the EPSON printers. For the NEC this count is sent as a string of four ASCII digits.

Printer TYPE FIVE (5) is used by the BASE 2 printer, or any printer which requires that a full print buffer of graphics be sent even when all print columns are not used.

COLOR RIBBON BANDS

After asking printer type, CONFIGURE will ask,

"DOES YOUR PRINTER HAVE A MULTI-COLOR RIBBON?"

Respond "Y" or "N" and press RETURN. If you enter "N", the program will proceed to the other questions about special printer parameters. If you respond "Y", it will then ask,

"HOW MANY COLOR BANDS ARE THERE? (1-7)"

You should enter a number between one and seven depending on how many distinct color bands are present on your color ribbon. For example, the IDS PRISM Process Color Ribbon has four bands, thus you would enter a "4" and press RETURN if you were manually configuring PRINTOGRAPHER to use this printer.

SPECIAL PRINTER PARAMETERS

Graphics Offset Character:

Many printers require that all graphics codes have a certain bit set or a certain value added to the code. To identify that the printer you are configuring is of this class, specify the appropriate values for this parameter. Otherwise specify zero.

Bits per Graphics Row:

This parameter indicates to PRINT GRAPHICS the number of rows of dots which are printed in each column. This number may not be greater than eight.

Bit Orientation:

PRINT GRAPHICS must know which bit of a graphics row is the top bit on the the line. CONFIGURE will ask you if bit zero is the top bit. Answer "YES" if it is. Answer "NO" if the most significant bit of the graphics codes is the top row.

Graphics Dots per Inch:

In order for PRINTOGRAPHER to do accurate centering of your picture, or to print it aligned with the right margin, it must know the dot spacing of the printer when in the graphics mode. You should enter this information (as an integer number) in response to this question.

NOTE: Your printer manual may give this information in terms of dots per line. If so, use the number in the manual divided by eight (or 14 for a 132 column printer). You can also print out the PLOTTER picture at a magnification of '1'. Each vertical line is equal to ten dot positions.

Print Limitations:

If there is a maximum number of columns which your printer can print in one graphics operation (such as is true of the old EPSON GRAFTRAX (NOT the EPSON GRAFTRAX-PLUS) and ANADEx printers) you should answer "YES" to this question.

Maximum Columns per Print:

If you answered "YES" to the above question, or specified printer type FIVE (5), then you must provide the maximum number of columns which can be printed on one graphics print pass.

PRINTER CONTROL SEQUENCES

NOTE: For each of the following sequences you may enter a series of parameters (as many as required for your printer). Pressing only the RETURN key in response to the question indicates that the sequence is NULL and no codes will be sent to the printer.

Values for each character of the sequence may be entered as decimal or hex numbers or as ASCII strings. Each item (decimal number, string or hexadecimal number) must be separated by a space. Hexadecimal numbers are indicated by a preceding dollar sign (eg. \$80 is equal to decimal 128). ASCII strings must be enclosed in single quotation marks (eg. 'IPZ').

Graphics Initialization Sequence:

This sequence is used for the one-time setup of the printer. It is sent once at the start of printing a picture. It is recommended that this sequence contain a carriage return or other code to insure that the printer is positioned at the leftmost position prior to beginning graphics printing.

Graphics Row Preamble:

This parameter allows specification of characters which will be sent to the printer prior to printing each graphics row. Its prime use is to select graphics mode on those printers which automatically leave graphics mode when a row is complete.

Graphics Block Separator:

This sequence of characters will be sent to the printer after each block of columns is printed when you have indicated that multiple blocks are required. Its normal use is to close and re-open the graphics mode without causing the printer to feed to the next row of graphics.

Graphics Row Postamble:

The characters specified by this parameter are sent to the printer to close each row of graphics printing. This sequence is used to cause the printer to begin the next row of graphics.

Graphics Termination Sequence:

When the picture printing is done, PRINT GRAPHICS will send this sequence of characters to the printer to cause it to return to normal (non-graphics) mode.

COLOR RIBBON SETUP

If you specified a color printer earlier, CONFIGURE will now ask,

"ENTER RIBBON ONE SETUP:"

This will prompt you to enter the sequence of characters needed to select each ribbon band of the multi-color ribbon. As with the other sequences, each string may be given as a decimal or hex number, or as an ASCII string. Entering a null here would result in no selection string being sent out for that band.

Color bands should be assigned with lighter colors first. For example, on the IDS PRISM Process Color Ribbon, the four color bands are Yellow, Red, Blue, and Black. Since Yellow is the lightest color, it would be assigned to band #1. Band number need not bear any relationship to actual ribbon positioning. It is more important that the colors be assigned in order of lightness so that overprinting does not smear the color any more than necessary.

After specifying the band selection strings, you will need to enter the actual color assignments to colors on the screen. CONFIGURE will prompt:

```
"ENTER RIBBON VALUE(S) FOR BLACK:"  
"                               " VIOLET:"  
"                               " BLUE:"  
"                               " GREEN:"  
"                               " ORANGE:"  
"                               " WHITE:"
```

For each entry, specify the one or more color bands to be used to create that color. "0" or RETURN alone means no color will be printed. Remember that the values for WHITE and BLACK will be substituted with each other depending on whether INVERSE or NORMAL is chosen in the CROP program.

Each entry corresponds to a possible screen dot color. To print this color, it may be necessary to combine color bands on your printer. For example, on the IDS PRISM Process Color Ribbon there are four bands, Yellow, Red, Blue and Black. Let's suppose you had assigned them the ribbon values one through four in the earlier CONFIGURE step. (Yellow=1, Red=2, Blue=3, Black=4).

A reasonable setup for this ribbon would then be:

```
"BLACK: 4"  
"VIOLET: 2+3"  
"BLUE: 3"  
"GREEN: 1+3"  
"ORANGE: 1+2"  
"WHITE: 0"
```


This will then conclude the configuration of the printer type. You will then be prompted for a name to save this driver table under, which will be used in creating a version of PRINT GRAPHICS and DISK GRAPHICS specific to your printer.

Particular note should be taken here of some special options available at this point. The first is in regards to color printing. By specifying different color assignments, you can create interesting variations on color pictures. By creating four separate versions of PRINT GRAPHICS, each of which only prints the components of a picture within a certain color band, you could in theory do your own color separations.

This brings us to the second special option. This option is similar to the "print-to-disk" option described earlier in this manual. The difference is that this option is used to select different versions of PRINT GRAPHICS. To create these unique versions, simply rename "PRINT GRAPHICS" as "PRINT GRAPHICS0" after configuring you particular way. Now when CROP is BRUN, press the "0" key immediately after the RETURN key when CROP starts to load from disk. PRINT GRAPHICS0 will then be used instead of the usual PRINT GRAPHICS. You can create up to ten versions besides the usual PRINT GRAPHICS and number them 0-9. Any of these special versions can then be individually selected at run time by pressing the number keys 0-9.

Remember that if no special key is pressed, the usual PRINT GRAPHICS file will be looked for by CROP. Therefore, don't forget to always have a file of this name for your usual work.

Because little space remains on the PRINTOGRAPHER diskette, you may wish to create additional room by deleting the LANGUAGE CARD FILES, unwanted printer drivers, or the Hi-Res pictures on your working backup diskette (NOT YOUR ORIGINAL). You can always use the FID program on your Apple System Master diskette to move files back and forth between diskettes.

PRINTOGRAPHER supports a large variety of printer interface cards. If your particular interface is not in the menu, try the experimental suggestions given earlier in the section on the CONFIGURE program. If this is not successful, you may elect to write your own custom driver routine. This routine is selected by using the OTHER PRINTER INTERFACE option of the CONFIGURATION menu. It is assumed at that point that your routine has been written and is on the PRINTOGRAPHER diskette.

If your printer or interface is not listed, please call us and we will do our best to call the appropriate manufacturer ourselves and then relay the information to you.

If you are writing your own printer driver, you must adhere to the following conventions. You must write your driver to be location independent. If the driver is not location independent, the PRINTFILE program will fail to operate properly.

If it is impossible for the driver to be location independent, you may determine the starting address of the driver by BLOADing PRINT GRAPHICS.RM, entering the APPLE monitor (CALL-151) and typing 8B00L. The first JSR instruction after address \$8B00 is the call to the printer interface initialization entry of the printer driver, and thus provides the base address of the driver. Your driver must also be slot specific since the configuration routine will not attempt to configure slot information for it.

Two entry points are required for the driver. The first is the printer initialization entry, located at relative address zero of the routine. This entry is called at the start of graphics printing to enable you to execute any one-time initialization code for your driver. It is also called to turn off the printer. Starting the printer is indicated by the value of the X register being set to zero (0). X register values other than zero are used to indicate a termination of the print process. This call is used to "wrap-up" any operations as required.

The second entry is at relative location three of the driver and is called each time a character is to be sent to the printer. The character to be printed is passed in the 'A' register of the 6502.

APPENDIX B: An Example of a Location Independent Printer Driver.

To be location independent, the printer driver must not use any absolute addresses which are within the driver itself. Thus, JSR and JMP cannot be used nor can loads and stores to labels within the driver. The relative branch commands are used in place of JMP and JSR and the I/O Scratchpad RAM addresses described in APPENDIX A of the APPLE II Reference Manual can be used for temporary storage.

The following is an example driver. This is the driver supplied for use with the CCS 7710 serial interface.

```

1 *****
2 *
3 *   CCS 7710 SERIAL
4 *   INTERFACE DRIVER
5 *
6 *****
7 *
8 * 5/18/82
9 *
10 STATUS EQU $C080
11 DATA  EQU $C081
12 *
8000: 38 13 INIT SEC
8001: B0 OD 14 BCS SINIT ; FORCED BRANCH
8003: 48 15 CSOUT PHA ; SAVE CHARACTER
8004: AD 80 C0 16 ACK LDA STATUS ; READ STATUS
8007: 29 02 17 AND #$02 ; CHECK BUSY BIT
8009: F0 F9 18 BEQ ACK ; AGAIN IF BUSY
800B: 68 19 PLA ; RETRIEVE CHARACTER
800C: 8D 81 C0 20 STA DATA ; CHAR IN DATA REG & PRINT
800F: 60 21 RTN RTS ; DONE
8010: 8A 22 SINIT TXA ; INIT OR TERMINATE?
8011: D0 FC 23 BNE RTN ; X<>0 SO TERMINATE
8013: A9 23 24 LDA #$23 ; INIT SEQ. REQUIRED
8015: 8D 80 C0 25 STA STATUS ; BY THIS CARD...
8018: A9 11 26 LDA #$11
801A: 8D 80 C0 27 STA STATUS
801D: 60 28 DONE RTS ; DONE

```


APPENDIX C: The PRINT GRAPHICS subroutine.

The PRINT GRAPHICS subroutine may be used from other programs to print parts of the High-Res graphics screens. The subroutine loads at address 35584 (\$8B00) and is approximately 1600 bytes long. (The exact length depends on the printer driver configured in). Parameters to the routine are passed in memory page three. The parameters, their addresses and functions are described below.

High-Res Page 768 (\$300)

Set to zero if page one (\$2000-\$3FFF) is to be printed.

Set to one if page two (\$4000-\$5FFF) is to be printed.

Inking 769 (\$301)

Set to zero for a black background and white dots.

Set to one for a white background and black dots.

Indentation 770 (\$302) least significant byte
 771 (\$303) most significant byte

This location contains a two byte integer specifying the number of graphic columns the picture is to be indented.

To obtain the PRINTOGRAPHER justification functions, location 771 (\$303) should have an ASCII character with the high bit (bit 7) set stored in it. "L" causes left justification, "C" will center the picture, and "R" will cause right justification.

NOTE: If you forget to set the high bit, PRINT GRAPHICS will treat the parameter as a very large indentation value!

Magnification 772 (\$304)

Bit seven of this byte is the format selector. When equal to zero (mag. < 128), the picture will be printed in a horizontal format. When bit seven is one (mag. > 127) the picture will be printed rotated 90 degrees to a vertical format.

Bits six through zero contain the enlargement specification. The size of the picture will be magnified by the factor specified by this field for all horizontal pictures (mag. < 128). For vertical formats (mag. > 127) the magnification will be equal to the value of the contents of \$304 minus 128.

Top Row 773 (\$305)

Bottom Row 774 (\$306)

These parameters select the top and bottom borders of the picture to be printed.

Left Column	775 (\$309) least significant byte
	776 (\$308) most significant byte
Right Column	777 (\$309) least significant byte
	778 (\$30A) most significant byte

These parameters select the left and right borders of the picture to be printed. They are both two-byte integers.

|

|

The DISK GRAPHICS routine is virtually identical to the PRINT GRAPHICS module with one important exception. When called, the DISK GRAPHICS module will open up a standard DOS sequential text file of the name "PRINTFILE.PIC". This file is then sent all the data that would otherwise have gone to the printer.

The parameter block at \$300, or alternatively, the call using the PRINT GRAPHICS.RM interface, is done in exactly the same manner as when PRINT GRAPHICS was used. The sample listings given in this manual that demonstrate the use of PRINT GRAPHICS apply equally well to DISK GRAPHICS. Again, the only difference will be that a disk file will be created, rather than the printer activated.

Ordinarily, PRINT GRAPHICS is automatically loaded by the CROP program when the PRINTOGRAPHER disk is booted or CROP is BRUN. However, if the 'D' key is pressed while CROP is loading, it will instead load the DISK GRAPHICS routine.

It should be noted that the data in the file and the driver "PRINTFILE.RM" are specific to the printer configuration specified by the original setup program, CONFIGURE. This means you will have to make sure you have properly run CONFIGURE prior to creating any disk files to be printed later by a given printer and interface card combination.

A normal Hi-Res picture, uncropped, when "printed to disk" occupies about 30 sectors. If a letter quality printer is used however, it may take 8 times that amount (240 sectors or more), so some judgement in selecting the diskette to be used for the disk files should be exercised. The best choice is usually a blank, freshly INIT'ed disk. After the PRINTFILE has been created, you can transfer the file to another diskette as is appropriate to the file's eventual use.

Because DISK GRAPHICS always saves the output file under the name "PRINTFILE.PIC", you may wish to rename the created file to avoid having the data overwritten by subsequent runs of the DISK GRAPHICS routine.

When using any of the PRINTOGRAPHER routines that access the disk (DISK GRAPHICS, PRINTFILE.RM, SCREEN LOADER.RM and SCREEN SAVER.RM), disk errors such as FILE NOT FOUND, etc. may occur. Such errors will not stop the routine, but instead must be detected by the user by examining location 6 in memory after the routine is called. A non-zero value at this location indicates an error has occurred. The number stored there will correspond to the standard DOS error codes indicated in the DOS 3.3 reference manual. See the sample listings for LOADING AND SAVING COMPRESSED FILES for examples of how this can be done.

TECHNICAL NOTE: Files that end with ".0" or ".OBJ" such as SLNTDRIVER.0 or PRINTFILE.OBJ are the "raw" files used by CONFIGURE to generate the customized PRINT GRAPHICS routines. Such files should never need to be accessed directly by the user of the PRINTOGRAPHER package.

APPENDIX E: Printing Graphics in Your Own Programs

PRINTOGRAPHER is a unique package in that, not only can you print out Hi-Res graphics using the main program, but provisions have been made to print out graphics directly from your own urograms.

The file necessary to do this is the PRINT GRAPHICS file created for your particular system by the CONFIGURE program. The general procedure is to:

1. Set HIMEM: 35584 (or HIMEM: -29952 for Integer)
2. BLOAD PRINT GRAPHICS, A\$8B00

The routine is then called by either:

1. 'POKE'ing the appropriate values for the screen to be printed, etc. into the \$300-\$30A (768-778) block, and then executing a CALL 35584 (or CALL -29952 in Integer BASIC).

or...

2. In Applesoft BASIC, use the PRINT GRAPHICS.RM interface routine to pass the desired parameters in a manner more consistent with Applesoft.

Following is a listing of a number of Applesoft demonstration programs provided on the PRINTOGRAPHER diskette, along with an explanation of the techniques used in each.

NOTE #1: The PRINT GRAPHICS and DISK GRAPHICS routines are programmed to check the keyboard periodically for a Control-C, which would indicate the user wanted to stop the printout process. It is important to note that the keyboard strobe is purposely NOT CLEARED by the read operation, so that the user program has the option of determining what the source of the termination was. For Applesoft programs, this would be handled by an ONERR statement.

If the ONERR trap is not used, the Control-C will stop the BASIC program as well.

NOTE #2: All the sample listings that follow use the "PRINT GRAPHICS" routine in the example programs. For disk output, the "DISK GRAPHICS" routine may be substituted in place of any references to "PRINT GRAPHICS". See the earlier section on "DISK GRAPHICS" for more information on disk output.

GRAPHICS PRINT.INT

```

10 HIMEM: -29952 : REM A$8B00
20 PRINT "BLOAD PRINT GRAPHICS,A$8B00"
30 PRINT "BLOAD PLOTTER,A$2000"
40 POKE 768,0: POKE 769,1: POKE 770,0: POKE 771,0:
   POKE 772,1: POKE 773,0: POKE 774,191: POKE 775,0:
   POKE 776,0: POKE 777,23: POKE 778,1
50 CALL -29952
60 END

```

For Integer BASIC, the program must first be moved down in memory to make room for the PRINT GRAPHICS module. The PRINT GRAPHICS routine is then loaded at \$8B00. So we have something to print, the PLOTTER Hi-Res picture is loaded onto the Hi-Res display screen, page 1. Line #40 then POKES the usual values into the page three (\$300+) parameter block. (See Appendix C).

Line #50 does the call to the to the graphics print routine. The routine will automatically turn on the printer (no PR#1 is needed in the BASIC program). When the printing is completed, the printer will automatically be turned off (no PR#0 needed).

Note that for Integer BASIC, a Control-D must precede each DOS command within the quotes.

MEMORY MAP, INTEGER BASIC WITH PRINT GRAPHICS:

	PARAM	<-VARIABLES->	INT	PRINT	DOS	
	BLOCK		BASIC	GRPH.		
			PROG.			

^	^	^	^	^	^	^
\$0	\$300	\$800	\$???	\$8B00	\$9600	\$FFFF
		LOMEM:		HIMEM:		

GRAPHICS PRINT.FP

```

10 HIMEM: 35200 : D$ = CHR$(4) : REM CTRL-D
20 PRINT D$;"BLOAD PRINT GRAPHICS,A$8B00"
30 PRINT D$;"BLOAD PRINT GRAPHICS.RM,A$8980":REM 35200
40 PRINT D$;"BLOAD PLOTTER,A$2000"
50 CALL 35200,HGR,I,H,1,"C",0,191,0,279
60 END

```

Although somewhat similar in appearance to the Integer listing, the internal workings of this program are rather different.

Line #10 protects the area for the PRINT GRAPHICS and PRINT GRAPHICS.RM routines with a lower HIMEM: address. In this case, however, it is the future storage of variables that is restricted, rather than the location of the BASIC program itself. (See memory maps). Additionally, because Applesoft can accept values greater than 32767, we can use a more familiar value to set HIMEM:.

The print routine is then loaded as usual. The advantage now is that since this is an Applesoft program, we can use the special interface routine to avoid the rather inconvenient POKE's that would otherwise be required. The only concern here is where to put the interface routine in memory. Since we are already required to use \$8B00+ (35584+) for the PRINT GRAPHICS program module (See Appendix C), location \$8980 (35200) is rather arbitrarily chosen for the PRINT GRAPHICS.RM interface. After loading the picture via line #40, the PRINT GRAPHICS.RM routine is called and the parameters passed for a "normal" graphics print.

The general syntax for the PRINT GRAPHICS.RM call is:

```

CALL <load address>, Screen, Inking, Format, Magnification,
                          Indentation, Beg. Row, End Row,
                          Beg. Column, End Column

```

Where:

SCREEN: Which Hi-Res display page to print.

HGR = Hi-Res page 1.

HGR2 = Hi-Res page 2.

INKING: Normal is black background, Inverse gives a white background.

N = Normal

I = Inverse

FORMAT: Whether to print the picture horizontally or vertically.

H = Horizontal

V = Vertical

MAGNIFICATION: Value to use in enlarging the original image.
 Values should range from 1 to 127.

INDENTATION: Number of dot positions to move the image to the right. See page 12 for more details. Range of values will depend on your particular printer. For left justification, centering or right justification the parameter should be a "L", "C", or "R" instead of an indentation value. An unrecognized character will result in left justification.

ROW; BEG. and END: Which horizontal row to begin and end the print-out on. Equivalent to horizontal cropping. Values should be in the range of 0 to 159 (191 for full screen display).

COLUMN; BEG. and END: Which vertical rows to begin and end the print-out on. Equivalent to vertical cropping. Values should be in the range of 0 to 279.

It is not necessary to enter all the parameters. Any remaining values can always be defaulted on by omitting the rest of the sequence. For example:

```
CALL <load address>, HGR2,I,V,"L",50,100
```

Print Hi-Res page two, inverse inking, vertically. Left justify, crop horizontally, start printing on row 50 and end on row 100; default is to print vertical columns 0 to 279.

```
CALL <load address>, HGR2,N,V
```

Print Hi-Res page two vertically with normal inking; default is to print entire screen, left justified.

```
CALL <load address>
```

Use all defaults when printing picture.

In the example program, line #50 could just as easily have been: 50 CALL 35200

MEMORY MAP, APPLESOFT BASIC WITH PRINT GRAPHICS:

		FP		PRINT			
	PARAM	BASIC	<-VARS->	GRPH.	PRINT	DOS	
	BLOCK	PROG.		INTERF	GRPH.		

^	^	^		^	^	^	^
\$0	\$300	\$800	\$???	\$8980	\$8B00	\$9600	\$FFFF
			LOMEM:	HIMEM:			

GRAPHICS PRINT.RM

```
1 CALL PEEK (175) + PEEK (176) * 256 - 46  
  
10 HIMEM: 35584: D$ = CHR$(4) : REM CTRL-D  
20 PRINT D$;"BLOAD PRINT GRAPHICS,A$8B00"  
40 PRINT D$;"BLOAD PLOTTER,A$2000"  
50 &"PRINT",HGR,I,H,1,"C",0,191,0,279  
60 END
```

The main difference in this program is that another Applesoft programming utility, "The Routine Machine", has been used to eliminate the concern over the placement and loading of the PRINT GRAPHICS.RM file.

Routine Machine is a powerful programming tool produced by Southwestern Data Systems that allows even a novice programmer to put almost an unlimited number of machine language routines in any Applesoft program, and then call them via the ampersand (&) and a function name, without having to be aware of memory allocation or machine language programming techniques.

Note that line #1 is generated automatically by Routine Machine and need not be entered by the user.

NOTE ON PRINT GRAPHICS.RM

Because PRINT GRAPHICS.RM is location independent machine language code, it can be put anywhere in Apple's memory that will not conflict with other operations. The easiest way to do this is with Routine Machine. However, if you do not have Routine Machine, and are not familiar (or are not inclined to bother) with the internal workings of the Apple, just use the general procedure illustrated in the GRAPHICS PRINT.FP demonstration program.

LOADING AND SAVING COMPRESSED FILES

Because the Apple does not have an intrinsic ability to load or save the S-Type files (compressed pictures), two additional utilities are included on the PRINTOGRAPHER diskette, SCREEN LOADER.RM and SCREEN SAVER.RM.

These are both location independent machine language routines, similar to PRINT GRAPHICS.RM in that they are designed to be used by an Applesoft program by a CALL, or via Routine Machine. If you do not have Routine Machine, you should BLOAD the files into a protected part of memory. The syntax for calling the routines is:

CALL <load address>, "FILE NAME"

The routines will load or save an S-Type compressed picture file, of the name "FILE NAME", onto or from page 1 of the Hi-Res display. Note that saving uses all of Page 2, plus some, while loading uses all of page 2, with no overflow.

Any disk errors (FILE NOT FOUND, etc.) during disk access may be detected by PEEKING location 6 after the CALL to the load or save routine for the standard DOS error codes.

LOAD/SAVE/PRINT.FP

```

10 HIMEM:33792 : D$ = CHR$(4) : REM CTRL-D
20 PRINT D$;"BLOAD PRINT GRAPHICS,A$8B00":REM A35584, L$A00
30 PRINT D$;"BLOAD PRINT GRAPHICS.RM,A$8980":REM A35200,L$16A
40 PRINT D$;"BLOAD SCREEN LOADER.RM,A$A700":REM A34560,L$214
50 PRINT D$;"BLOAD SCREEN SAVER.RM,A$8400":REM A33792,L$2DD
60 HOME: INPUT "LOAD(L), SAVE(S), OR PRINT(P)?" ; I$
70 IF I$ = "L" THEN CALL 34560, "CAMEO MOSAIC"
80 IF I$ = "S" THEN CALL 33792, "PIC.COMPRESSED"
90 IF I$ = "P" THEN CALL 35200
100 IF PEEK (6) = 0 THEN 60
110 PRINT "DOS ERROR #";PEEK(6):END

```

LOAD/SAVE/PRINT.RM

```

1 CALL PEEK (175) + PEEK (176) * 256 - 46

10 HIMEM:35584 : D$ = CHR$(4) : REM CTRL-D
20 PRINT D$;"BLOAD PRINT GRAPHICS,A$8B00"
60 HOME: INPUT "LOAD(L), SAVE(S), OR PRINT(P)?" ; I$
70 IF I$ = "L" THEN &"LOAD", "CAMEO MOSAIC"
80 IF I$ = "S" THEN &"SAVE", "PIC.COMPRESSED"
90 IF I$ = "P" THEN &"PRINT"
100 IF PEEK (6) = 0 THEN 60
110 PRINT "DOS ERROR #";PEEK(6):END

```


APPENDIX F: Making back-up copies of the PRINTOGRAPHER diskette

The PRINTOGRAPHER diskette cannot be copied using conventional copy programs. It does, however, come with it's own copy program from which back-up copies of the disk may be produced.

It is HIGHLY RECOMMENDED that you DO NOT USE YOUR ORIGINAL diskette for daily use. Upon purchase, immediately make a back-up copy and put the original in a safe place.

To run the copy program, place the PRINTOGRAPHER diskette in your disk drive (with all write protect tabs removed) and type in: PR#6 to boot in the usual manner. When the red drive light comes on, immediately press the 'C' (for 'Copy') key on your Apple. The program will then confirm that you wish to make a copy, at which point you should enter the values for the SINGLE DRIVE which you want to use to make the copy. The copy process is restricted to a single drive copy to assure maximum reliability in the copy. You will, however, have to exercise due caution in exchanging the diskettes during the operation to make sure the appropriate diskette is in the drive at that moment. If you think you have made a mistake at any point, stop IMMEDIATELY and re-boot to restart the process.

The copy program will produce a total of three back-up copies of the PRINTOGRAPHER diskette. This gives you a total of four working copies of the program. In addition, if you should accidentally erase a particular file from a given diskette, you may use the 'FID' file transfer utility provided on your Apple System Master diskette to move the particular file from your original PRINTOGRAPHER diskette to the diskette from which the file was erased. This in no way affects the counter on the master back-up copy program.

It is not necessary to recopy the entire diskette should only a given file become damaged.

The printing of graphics is by no means a speedy process, and can take several minutes (or longer) to complete depending on the magnification used. If several pictures and/or copies thereof are being printed, this can be inconvenient. There are two possible solutions to this problem.

The first is to use a buffered printer card. These typically come with 8 to 32K of RAM and cost in the range of \$150-\$250. PRINTOGRAPHER is compatible with virtually all of these devices. Because the RAM buffering is limited, these will save time only on the printing of a single picture, but are otherwise quite serviceable.

The second alternative is the use of a product called "DOUBLE-TIME PRINTER" (Jan. '83 price: \$99.95) from Southwestern Data Systems. This is an interrupt driven print spooling system which uses the disk as its "buffer". What this means to you is that the PRINTOGRAPHER print-to-disk option can be used to create files which are directly printable at any time later by the DOUBLETIME PRINTER software. The DOUBLETIME system is also capable of printing multiple copies of any given file so it is not necessary to create multiple files of the same picture.

To have DOUBLETIME print a graphics file, simply follow the usual steps described in the DOUBLETIME manual of renaming the file with the "/D" conventions. The "transparent" mode should also be used to avoid having DOUBLETIME interpret picture data as command characters.

APPENDIX H: Modem Transfers of Picture Data

With the introduction of the new "ASCII EXPRESS: THE PROFESSIONAL" communications software from Southwestern Data Systems, Apple owners now have the option of sending Hi-Res pictures to one another using a modem device on conventional phone lines.

The basic principle is quite simple. Because ASCII EXPRESS: THE PROFESSIONAL can send any size or type of Apple file, it is a simple manner to send a Hi-Res picture in its original binary format to another Apple owner who also has A.E. PRO. This picture can then be printed out at the remote location using the PRINTOGRAPHER software.

This means that owners of plotting software, digitizers and light pens can now create graphic designs, charts, etc. and send them facsimile-style to another site in a matter of minutes.

For more information on the communications software available from Southwestern Data Systems, call or write the office listed in the front of this manual.

USER'S NOTES

USER'S NOTES

USER'S NOTES

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THANK YOU for purchasing our product. PLEASE complete this form & mail to SDS.

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CITY: _____ STATE: _____ ZIP: _____

TELEPHONE: _____ AREA CODE: _____

DATE PURCHASED: _____ PURCHASE PRICE: _____

WHERE PURCHASED: _____

STREET ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE: _____ AREA CODE: _____

HOW DID YOU SELECT PROGRAM? Salesperson/Demo? Advertisements?

Brand Name (SDS) Recognition Friend's Recommendation?

DO YOU OWN ANY OTHER SDS PRODUCTS? If yes, specify: _____

DO YOU DO ANY PROGRAMMING YOURSELF? Yes No

If yes, which? Professional Personal Use Both

What types of programs do you write? _____

Which program language(s) do you use? _____

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DO YOU HAVE CHILDREN WHO USE YOUR APPLE? Yes No

If yes, what are their ages? _____

HOW LONG HAVE YOU OWNED YOUR APPLE COMPUTER SYSTEM? _____

WOULD YOU LIKE TO RECEIVE THE SDS PRODUCT GUIDE? _____

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- Do not return the original packaging
- Ensure the product is in suitable protective packaging to ensure against physical damage.

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Primary Use of Computer: School Office Home Other

Programme Purchased: Date of Purchase

Registration No.Version No.

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