



Congratulations! You now own a Symtec Light Pen. This is the finest light pen available for the Apple Computer and meets professional quality and specification standards.

A System equipped with a light pen opens entire new vistas of application for computers. Applications are numerous and include graphics, games, scientific and technical uses as well as educational, exhibit and handicapped uses. Literally any function programmable on your computer, can be controlled by your light pen. Disk control, printer control, light pen music, and lo-res graphic data measurement, and more, are all achievable with a light pen. In fact, programs can be written to allow users to operate your computer without ever requiring the use of the keyboard.

The Symtec Light Pen is also designed to operate with video provided from non-computer sources such as videotape, videodisc, or closed circuit television and can control identification and measurement uses.

We hope that you will enjoy this powerful professional instrument and the new dimensions that it provides to your system.

Symtec, Inc.

WHAT YOU WILL NEED

This manual was in the box. The box should also contain:

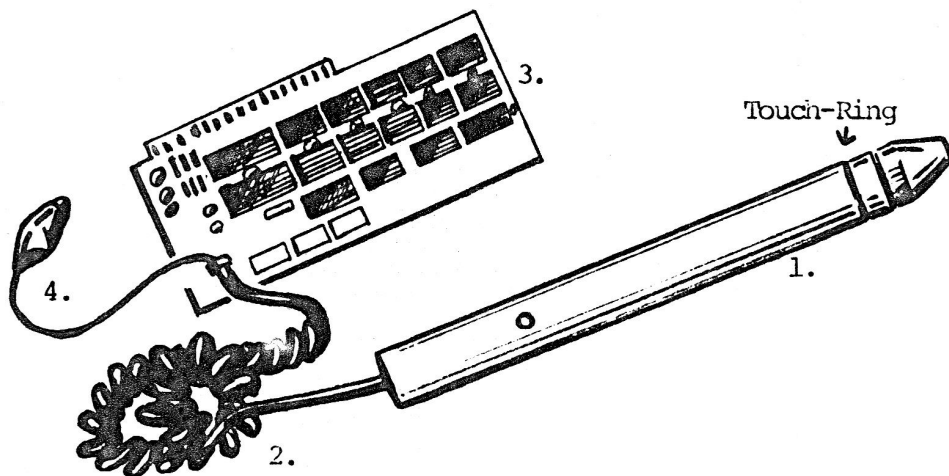
1. Light Pen barrel on a,
2. black telephone cord attached to,
3. the Apple interface card with a,
4. colored wire with a red, covered clip.
5. A 5 1/4" diskette.

On the barrel, just behind the nose of the pen, is the "touch-ring". (NOTE: A Push-Tip Light Pen is available, same price)

You, of course, must supply the Apple computer, and 1 or 2 disk drives. Our diskette is DOS 3.3 if your DOS is 3.2 please call or write us and we'll exchange it for you.

Your light pen can be used on a monitor or color TV. A color TV will require an "RF Modulator" with connecting cables, a monitor (color or B&W) can be hooked up directly with a cable that has a phono plug (male RCA connector) for the Apple and something to match the monitor at the other end. The light pen reacts best to B&W and color screens and can even be adjusted with most sets to respond to areas of the screen normally said to be "black". however, the Light Pen is designed to respond to light from the screen and this implies that a display is on the screen that provides something for the pen to "see". Some TV monitors with green screens do not permit enough light to pass through and the light pen cannot "see" anything on these sets.

If you already have your Apple computer set up you won't have to do much more.

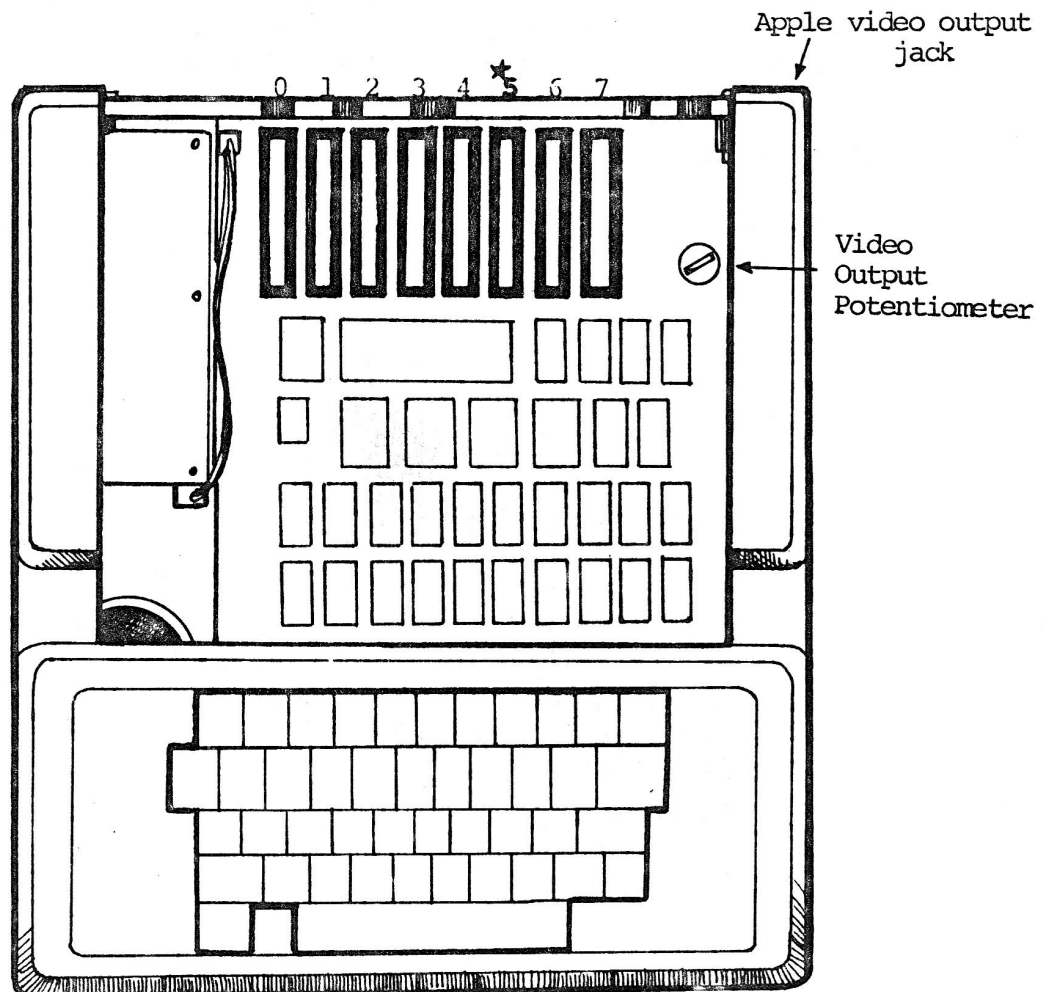


TO INSTALL THE SYMTEC LIGHT PEN IN YOUR COMPUTER PERFORM THE FOLLOWING:

1. Turn the Apple II OFF.
2. Open the lid of the Apple II case.
3. Install the interface card in slot #5*
(see Figure 1). NOTE: The slots are numbered at the back end of the motherboard. When installing the interface card, the components are to the right as you sit in front of the keyboard.
4. Clip the colored wire to the center post of the Apple VIDEO OUTPUT JACK. (Locate the video output jack and the video output potentiometer adjustment screw at the back right corner of the Apple.)
5. Turn the VIDEO OUTPUT POTENTIOMETER fully clockwise.
6. Run the light pen cord through the rear of the case.
7. Leave the lid off and turn the power ON.

You are now ready to align the Pen and register it to your own TV set.

*To operate the light pen in a different slot, refer to page 17.



Put the light pen diskette in and "boot it" by turning the computer on or hit reset then type 6 control-p or pr#6

If the boot is good, on the screen will appear

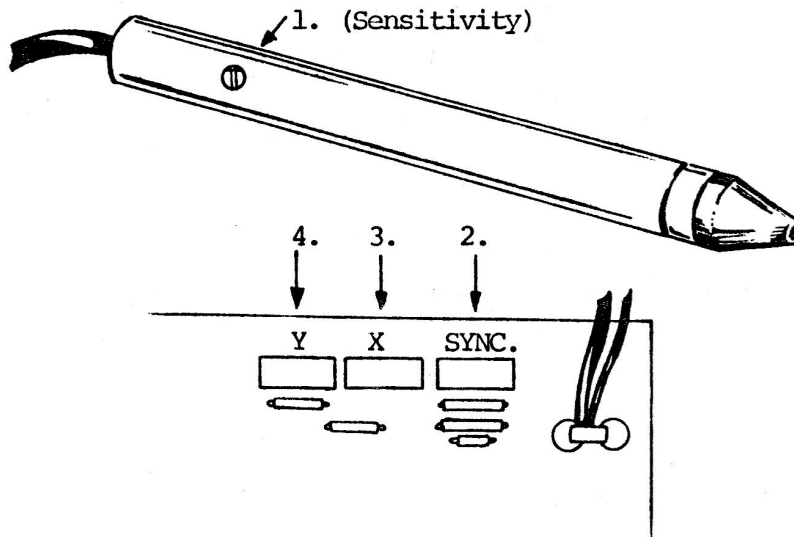
SYMTEC LIGHT PEN DISK
VERSION 2
APPLE DOS 3.3
ALL PROGRAMS COPYRIGHT SYMTEC, INC.

1. LIGHT PEN OPERATED CATALOG
2. CATALOG
3. EXIT

PLEASE TYPE OPTION:

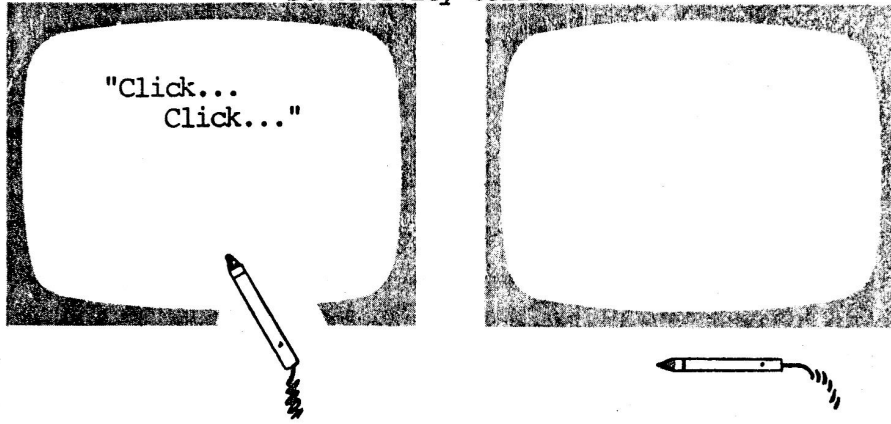
If not, you may have a D.O.S. 3.2 machine or a loose connection between your computer and disk drive. Try again or refer to page 15 of the Applesoft tutorial manual supplied with your Apple.

Now type "2" and hit RETURN. You'll get a catalog of files on the diskette. Type "run startup". There are 4 adjustments you may have to make, they are (1)Sensitivity, (2)Sync, (3)Horizontal alignment (X), (4)Vertical alignment (Y). See below.

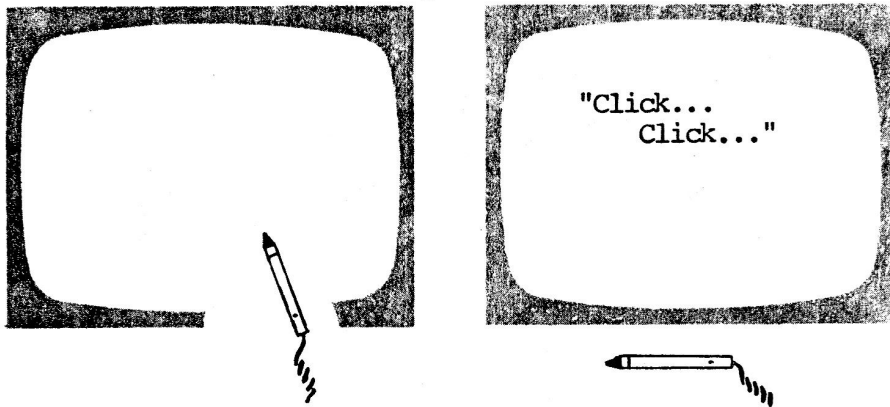


(1) Adjust the sensitivity as instructed on the screen. See below for reference.

Sensitivity Correct

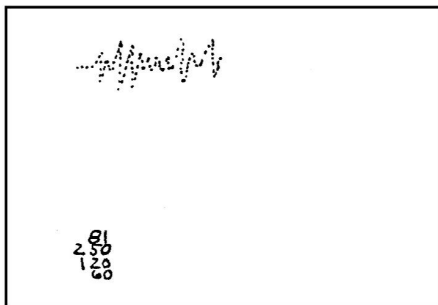


Sensitivity Incorrect

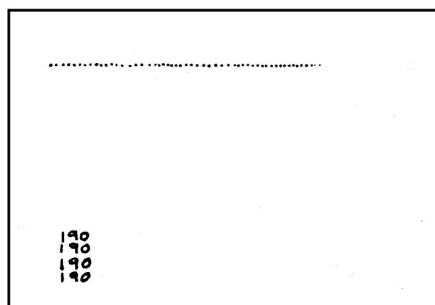


(2) To adjust the "sync", touch the ring and the screen should go black. If a straight line moves left to right and the same numbers appear at the bottom, your light pen is already in sync. If not, turn the sync pot until the numbers are appearing the same and the dots plot a straight line. Once completed, hit RESET, type RUN X Y CHECK, and do adjustments 3 and 4.

Incorrect Sync



Correct Sync



Note: The number 190 is used as an example. Your number may be different.

(3 and 4) This adjustment is for aligning your pen to the exact pixel. 4 dots will appear and their coordinates will be the same as below. To verify that your light pen sees only these dots, turn the brightness down until numbers flash only when you point at one of the 4 dots. Then turn your X and Y pots until the numbers below (the X coordinate is on the left) match. When you are finished hit RESET and type BRUN C to get to the light pen operated catalog.

(20,20)

(250,20)

(20,140)

(250,140)

Now that you have successfully set up your light pen, you are ready to program your light pen. But you need to learn the commands.

THE SEVEN COMMANDS OF THE SYMTEC HIGH RESOLUTION LIGHT PEN
(Applesoft)

1. 29000 POKE -16176,0
this starts the light pen receiving light from the TV screen and calculates the X and Y position of where the pen is being pointed. It stores the numbers in Apple memory.
2. 29010 IF PEEK(-16175)<128 then 29010
this command stalls the program until the entire screen is scanned.
3. 29020 IF PEEK(-16170)<128 then 29020
stalls the program until the ring is touched.
4. 29030 ZY = PEEK(-16173)
this reveals the high resolution Y coordinate to the computer and stores it in variable ZY
5. 29040 ZX = PEEK(-16174)+256*(PEEK(-16172)>127)
this reveals the high resolution X coordinate to the computer, makes adjustments for X values over 255, and stores it in variable ZX
6. 29050 Y =INT(ZY/8)+1
this resolves the Y high resolution coordinate into low resolution format.
7. 29060 X =INT(ZX/7)+1
this does the same conversion to low-res for X as Y
8. 29100 Return

]LIST

```

10  REM  MENU EXAMPLE
25  HOME
29  HTAB 20
30  VTAB 1: INVERSE : PRINT "1"
39  HTAB 20
40  VTAB 2: INVERSE : PRINT "2"
49  HTAB 20
50  VTAB 3: INVERSE : PRINT "3"
51  NORMAL
52  VTAB 15: PRINT "PLEASE POINT THE LIGHT PEN AT ONE OF THE NUMBERS"
60  GOSUB 29000
70  IF Y = 1 THEN  GOSUB 1000
80  IF Y = 2 THEN  GOSUB 2000
90  IF Y = 3 THEN  GOSUB 3000
500 GOTO 25
1000 HOME : PRINT "SEGMENT 1 COULD BE A FILE OF A CUSTOMER"
1001 VTAB 10: PRINT "TOUCH RING TO RETURN TO MENU"
1010 FOR G = 1 TO 1000: NEXT G
1020 GOSUB 29000
1040 RETURN
2000 GOTO 2010
2010 HOME : FLASH : PRINT "NEW"
2011 NORMAL : PRINT "HOW MANY LETTERS IN THE ALPHABET?"
2020 VTAB 5: PRINT "29"
2030 VTAB 10: PRINT "26"
2035 VTAB 15: PRINT "23"
2040 GOSUB 29000
2050 AN = Y
2060 IF AN < 10 THEN PRINT "TOO HIGH, TRY AGAIN": GOTO 2011
2070 IF AN > 10 THEN PRINT "TOO LOW, TRY AGAIN": GOTO 2011
2080 IF AN = 10 THEN PRINT "RIGHT!": FOR D = 1 TO 500: NEXT
2100 RETURN
3000 HOME : VTAB 15: PRINT "YOU COULD PUT YOUR CHECKBOOK UNDER THIS SEGMENT"
3010 FOR M = 1 TO 1000: NEXT
3020 VTAB 10: FLASH : PRINT "TOUCH RING TO RETURN TO MENU"
3040 GOSUB 29000
3060 RETURN
29000 POKE - 16176,0
29010 IF PEEK ( - 16175) < 128 THEN 29010
29020 IF PEEK ( - 16170) < 128 THEN 29020
29030 ZY = PEEK ( - 16173)
29040 ZX = PEEK ( - 16174) + 256 * ( PEEK ( - 16172) > 127)
29050 Y = INT (ZY / 8) + 1
29060 X = INT (ZX / 7) + 1
29100 RETURN

```

Type the commands in first whenever you are writing a program to use the light pen and then put in "GOSUB 29000" whenever you want to use the light pen. We recommend the Applesoft Tutorial as a prerequisite for continuing.

You can make a flip chart type program that is activated by the light pen. Type in the 7 commands and the return statement first and then type this:

```
100 VTAB 12:PRINT "1981 was a good year"  
110 GOSUB 29000  
120 VTAB 14:PRINT "1980 was a great year"  
130 GOSUB 29000  
140 VTAB 16:PRINT "1982 will be better!"  
150 GOSUB 29000  
160 HOME:VTAB 12:PRINT"how's that for optimism?"  
170 GOTO 100
```

You must touch the ring before the next print statement will be activated. Try it.

On the following page is an example of a light pen operated menu. Remember that the Apple prints text in the screen mode called 'LORES/TEXT' or resolution of 40 pixels across by 24 down. To make your light pen "see" 40 X 24 we use commands #6 and #7. This enables you to make the light pen coordinates of X and Y equal to VTABS and HTABS. Thus, you can VTAB 1:HTAB 20 and then print the number "1", and know that when the light pen is pointing at the number "1", its x and y coordinates in LORES/TEXT will match(Y will equal 1, X will equal 20). Now you can tell the computer to do a specific task if Y equals 1 and if Y is equal to something else, then do another specific task. Take a minute or two and try this program.

SYMTEC LIGHT PEN SOFTWARE

LIGHT PEN TABLET

WHAT YOU'LL NEED

- .Apple II (with applesoft card) or Apple II Plus, 48K
- .1 or 2 disk drives (Dos 3.3)
- .Color Monitor
- .Symtec High-Res Light Pen
- .Symtec L.P. Diskette

WHAT YOU'LL BE ABLE TO DO

Use the light pen to create colorful graphics or pictures. Designed to work similar to the Apple Graphics Tablet. You can draw in different colors on colored backgrounds. You can touch two dots on the screen and the computer will make a colored box or frame or line using the dots as corners or endpoints. You can touch two dots on the screen and the computer will draw the perimeter of a circle or a colored disk using the first dot as the center and the second dot as the edge of the circle. Or the pen will draw colored dots only! You can save your artwork on disk for future touch-ups or put the picture on another disk to use in a program.

HOW TO START

Hook up the Apple equipment according to the manual. Hook up the Symtec light pen according to the manual and calibrate it to the TV. Then put the Light Pen diskette into disk drive #1. "RUN TABLET"

The first menu you'll see will be the "main menu". Point to "pen mode", touch the ring, okay the choice and the "pen mode" menu will appear. Choose "BACKGROUND COLOR". (You must choose your background color before any other pen mode choice.) Eight colors will be displayed in columns (left to right-black, magenta, ..., etc.). Choose a color by pointing the pen to a color and touching the ring. When the color is chosen the computer will fill the screen with that color background and then display the "pen mode" menu. Choose "pen color", pick a color, then box or disk, etc. and off you go.

MAIN MENU

CLEAR-clears screen
PEN MODE-takes you to "pen mode" menu
DISK COMMANDS-lets you "save" or "load" a picture. You must type the picture name in. Catalog allows you to see what's already on the disk.
DISTANCE-plot two points (by touching the ring) on your picture and the distance (in pixels) will be displayed.
QUIT-lets you go on to another program.

PEN MODE

DRAW-draws in color-when the ring is touched it will draw. When you let go, it won't.
LINES-draws line from first dot to second dot. Dot is plotted when you touch the ring
DOTS-puts colored dots on the screen when ring is touched.
FRAME-uses first dot as upper left corner of frame and second dot as lower right corner. Draws rectangular frame.
BOX-same as frame only the entire inside is filled in color.
CIRCLE-same principle as frame only first dot is center, second dot outside edge of circle.
DISK-same as circle only inside is filled in color.
BACKGROUND COLOR-changes entire screen to one color, which you choose immediately after okaying background color.
PEN COLOR-changes pen color, same way as changing background color.
VIEW PICTURE-lets you view the drawing
MAIN-takes you to main menu

COLOR ANOMALIES

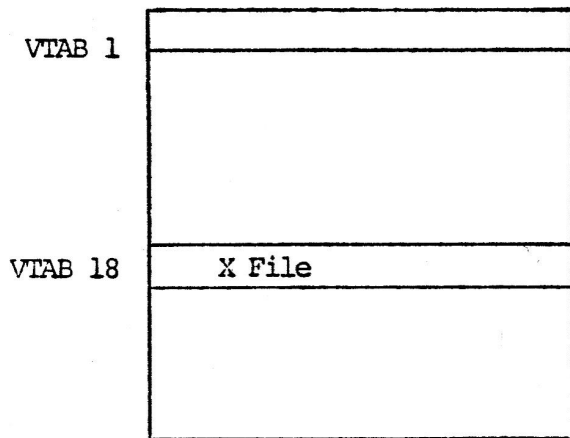
UNUSUAL COLOR EFFECTS

Unusual things happen with color combinations and the Symtec Tablet software program. These dashed lines, zebra stripes, and color shadows are a result of the Apple computer and not your light pen or software. The reason is that in the high resolution graphics mode, there are 280 X 192 or 53,760 pixels that require a "bit" of memory. Multiply that by 8 colors and the Apple would require several hundred thousand bits of information to properly handle an 8 color high resolution picture. A 48K Apple simply cannot handle all the colors.

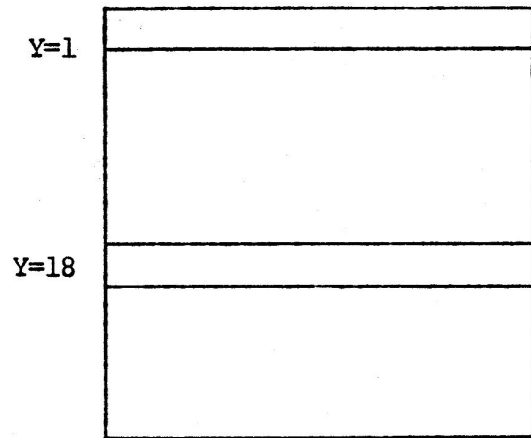
The best way to avoid the "anomalies" is to use only black and white. The functions draw, frame, lines, and circle are most affected, while box, disk, and dots are least bothered by using colors. You can also get better results by using colors in the "1" group with "1"'s and "2"'s with 2's. The "1" group includes the four colors on the left and the "2"'s are the rest, each group has its own black and white.

MENU EXAMPLE is a partially completed menu. Study it and this page to understand the basic idea.

How you view the screen...



How your light pen views the screen...



Whatever you print after VTAB 1 will correspond equally with the "Y" value returned by the light pen. (You have 40 characters with which to print on that line). Thus when you VTAB 18:PRINT "X File" and then GOSUB 29000, the light pen will be pointing at "X File" when Y=18. Then just say "If Y=18 GOTO (X File)"

The following programs are on your diskette:

```
*A 024 LIGHT PEN TABLET
*B 006 PEN DRAW OBJ V2
*B 016 ZPEN DRAW.OBJ
*A 003 LIGHT PEN DRAW APLSFT
*I 003 LIGHT PEN DRAW INT BASIC
*A 003 HELLO
*I 003 APPLESOFT
*A 007 ZAPPLESOFT PEN ROUTINE
*I 026 CHECKERS
*B 037 HYDRAULICS TUTOR
*I 008 ZINTEGER PEN ROUTINE
*A 017 LIGHT PEN CONCENTRATION
*B 005 C
*B 002 ZMACHINE CODE PEN ROUTINE
*A 009 STARTUP
*A 004 X Y CHECK
*B 002 YCNT
*A 005 MENU EXAMPLE
```

MENUEXAMPLE, STARTUP, and X Y CHECK have already been explained. LIGHT PEN TABLET is explained on the following pages. Programs that have a Z in the front of their file names are machine code programs called by other programs on this diskette. YCNT and PEN DRAW OBJ V2 are binary files called by startup and LIGHT PEN TABLET. HELLO and APPLESOFT are catalog programs. The program C is the light pen operated catalog which will automatically add any new files that you save onto the disk.

LIGHT PEN DRAW has an integer, applesoft, and machine code version. First, choose a background color by typing a B or W (black or white) and then the pen will draw the opposite color. To erase the screen, point at the bottom line. To point at the screen and not draw, touch the ring. To save a drawing, hit RESET, then type BSAVE(picture name),A\$2000,L\$3FFF. To recall a saved picture on disk, type HGR2, hit RETURN and type BLOAD (picture name).

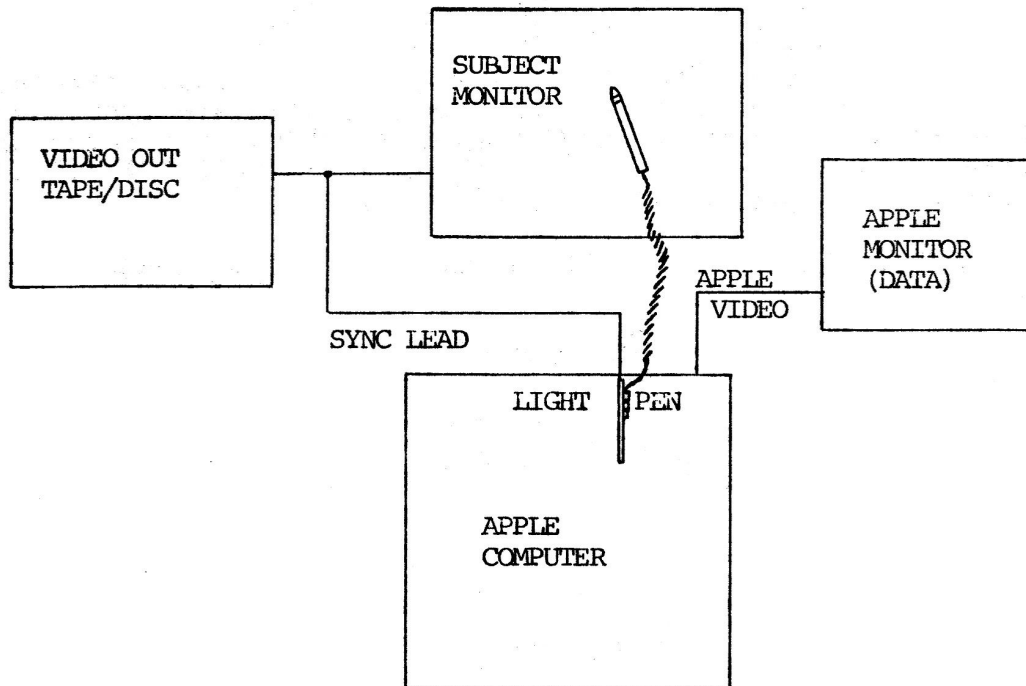
Try LIGHT PEN CONCENTRATION. The object is to match two squares and score a point. To uncover the contents of a square, point the light pen at it and touch the ring. The computer will keep score. You can have 2 players or try your luck against the computer.

CHECKERS requires your computer to have Integer language. First, choose the colors of your checkerboard and players. Point and touch the ring to move a player.

HYDRAULICS TUTOR has its instructions built into it and is an interactive training system. Students use the light pen to take readings and locate the malfunction in the system.

HOW TO USE YOUR SYMTEC HIGH-RES LIGHT PEN WITH VIDEO FROM NON-COMPUTER SOURCES

The Symtec light pen for the Apple has an interesting feature. The pen can be used to measure, trace, etc., video images from a tape recorder, video-disc player, live camera, etc. You'll need another monitor and a source of video. The diagram below shows you how to hook up this system.



THE SCREEN

The Apple Computer sends out signals to the CRT (cathode ray tube) or TV which then displays the message on the screen. The screen mode or picture is a collection of tiny dots or pixels which can be individually colored. The Apple picture does not use all the possible pixels that are available to it from the CRT. It uses a square in the middle that is 280 pixels across and 192 pixels down or most of the screen. When your light pen is pointing to the screen, it "sees" a grid of pixels (280 x 192) or 53,760 dots. It automatically puts the X and Y coordinate in memory. Since it is working with the Apple computer, it can only receive or work with the pixels that it is given or the 53,760 in the square. Sometimes, this accuracy is not necessary because you would be happy to be somewhat near a general area. There are ways to do this with software.

A popular screen mode is called low resolution with text (LORES/TEXT). A LORES/TEXT pixel is actually 4 HIRES pixels high and 7 HIRES pixels wide. To make your light pen "see" only LORES/TEXT pixels you have to tell it that pixels in an area 7 pixels across and 4 pixels deep (28 pixels in all) are the same point. Your light pen always sees individual pixels, so after you find out what the HIRES coordinates are, you have to mathematically convert HIRES to LORES/TEXT. The formulas are below. We mostly convert to the popular LORES/TEXT which is the screen mode your Apple prints text in.

CONVERTING HIRES COORDINATES TO LORES /TEXT OR LORES

LORES/TEXT

$$\begin{aligned} X &= \text{INT}(ZX/7) + 1 \\ Y &= \text{INT}(ZY/8) + 1 \end{aligned}$$

LORES

$$\begin{aligned} X &= \text{INT}(ZX/7) \\ Y &= \text{INT}(ZY/4) \end{aligned}$$

USING A DIFFERENT SLOT

Moving the Symtec Light pen card to a different slot requires that you change the card addresses in the driver routines. If you are willing to do this, you may place the Light Pen card in any slot except #0. The addresses for the peeks and pokes can be calculated as follows:

$$\text{address} = \text{old address} + 16 * (\text{slot \#} - 5)$$

or in hexadecimal*

$$\text{\$CO8X} + \text{\$NO}$$

Where N is slot # and X is card address

The old addresses are:

START	POKE-16176,LINE	\$COD0
DONE	PEEK(-16175)>127	\$COD1
X>255	PEEK(-16172)>127	\$COD4
X	PEEK(-16174)	\$COD2
Y	PEEK(-16173)	\$COD3
RING	PEEK(-16170)>127	\$COD6

SLOT	1	2	3	4	6	7
Start	-16240	-16224	-16208	-16192	-16160	-16144
Done	-16239	-16223	-16207	-16191	-16159	-16143
X	-16238	-16222	-16206	-16190	-16158	-16142
Y	-16237	-16221	-16205	-16189	-16157	-16141
X>255	-16236	-16220	-16204	-16188	-16156	-16140
Ring	-16234	-16218	-16202	-16186	-16154	-16138

Or In Hexidecimal

SLOT	1	2	3	4	6	7
Start	CO90	COA0	COB0	COC0	COE0	COF0
Done	CO91	COA1	COB1	COC1	COE1	COF1
X	CO92	COA2	COB2	COC2	COE2	COF2
Y	CO93	COA3	COB3	COC3	COE3	COF3
X>255	CO94	COA4	COB4	COC4	COE4	COF4
Ring	CO96	COA6	COB6	COC6	COE6	COF6

Section IV. APPENDICES

APPENDIX 1
Subroutine Listings

Machine Code Pen Routine	16
Light Pen Draw	19
Catalog Select Program	32
Integer Pen Routine	42
Applesoft Pen Routine	43
Light Pen Concentration	44

```

0800          1          DCM "PR#1"
0800          2          ;
0800          3          ; MACHINE CODE LIGHT PEN DRIVFR ROUTINE
0800          4          ; ON ENTRY
0800          5          ; RWAIT = 0 FOR NO PEN SWITCH WAIT
0800          6          ;          =-1 FOR PFN SWITCH WAIT
0800          7          ;
0800          8          ; ON FXIT:
0800          9          ; XHIGH,XLOW      = HI-RFS X COORD
0800         10          ; YLOW          = HI-RFS Y COORD
0800         11          ; XLORFS,YLORFS = LORFS COORDS
0800         12          ; XTEXT YTEXT  = TFXT COORDS
0800         13          ;
0800 A9FF      14 LPEN   LDA  #$FF                ;INIT MAX X-COORD
0802 8D3103   15       STA  XHIGH
0805 8D3003   16       STA  XLOW
0808 8D3203   17       STA  YLOW
080B 8D3803   18       STA  LINE
080E A528     19       LDA  BASE                ;SAVE OLD TEXT BASE ADDRESS
0810 8596     20       STA  OLDBAS
0812 A529     21       LDA  BASE+1
0814 8597     22       STA  OLDBAS+1
0816 EE3803   23 LOOP   INC  LINE                ;INCREMENT PEN COORDINATES AROUND
0819 AD3803   24       LDA  LINE                ;'TFARDROP' WINDOW UNTIL MINIMUM X IS
081C 8DD0C0   25       STA  START              ;START PEN
081F 2CD1C0   26 WAIT   BIT  DONE                ;WAIT FOR PEN TO GO DONE
0822 10FB     27       BPL  WAIT
0824 2C3903   28       BIT  RWAIT              ;IF PEN WAIT IS TRUF (-1)
0827 1005     29       BPL  DNT
0829 2CD6C0   30       BIT  RING                ;THFN WAIT FOR PFNSWITCH
082C 10F1     31       BPL  WAIT
082F ADD4C0   32 DNT    LDA  XOVFL              ;GET X OVERFLOW VALUF (0 OR 1)
0831 2A       33       ROL
0832 A900     34       LDA  #0
0834 2A       35       ROL
0835 CD3103   36       CMP  XHIGH                ;CHECK IF WE HAVE NEW MINIMUM
0838 9008     37       BCC  NEWC              ;SO WE CAN SFT UP TO FIND THE
083A ADD2C0   38       LDA  XCOORD            ;NFXT VALUF OR SFF IF
083D CD3003   39       CMP  XLOW                ;WE HAVE ALREADY HAD A SMALLEST X
0840 B019     40       BCS  GREST
0842 ADD4C0   41 NEWC   LDA  XOVFL              ;SFT UP A NEW MINIMUM VALUF
0845 2A       42       ROL
0846 A900     43       LDA  #0
0848 2A       44       ROL
0849 8D3103   45       STA  XHIGH
084C ADD2C0   46       LDA  XCOORD
084F 8D3003   47       STA  XLOW
0852 ADD3C0   48       LDA  YCOORD
0855 8D3203   49       STA  YLOW
0858 38       50       SEC
0859 B0BB     51       BCS  LOOP                ;AND GET ANOTHER VALUE FROM PEN

```

```

085B          52          PAG
085B AD3203   53  GRFST  LDA  YLOW          ;CALCULATE RFST OF COORDS
085F 4A      54          LSR          ;XLORFS = (XHIGH,XLOW)/7
085F 4A      55          LSR          ;YLORFS = YLOW/4
0860 8D3403  56          STA  YLORES      ;XTEXT  = (XHIGH,XLOW)/7 + 1
0863 4A      57          LSR          ;YTEXT  = YLOW/8 + 1
0864 8D3603  58          STA  YTEXT
0867 A907    59          LDA  #7
0869 8D3F03  60          STA  YH
086C AD3103  61          LDA  XHIGH
086F 8D3D03  62          STA  XH
0872 AD3003  63          LDA  XLOW
0875 8D3C03  64          STA  XL
0878 A900    65  DIVIDE LDA  #0          ;DIVIDE XH,XL/YH -> QUOTH
087A 8D3A03  66          STA  QUOTL
087D 8D3B03  67          STA  QUOTH
0880 8D3E03  68          STA  YL
0883 A010    69          LDY  #16          ;SIXTEEN BITS
0885 0E3A03  70  DIV2  ASL  QUOTL
0888 2E3B03  71          ROL  QUOTH
088B 2E3C03  72          ROL  XL
088F 2E3D03  73          ROL  XH
0891 38      74          SFC
0892 AD3C03  75          LDA  XL
0895 ED3E03  76          SBC  YL
0898 AA      77          TAX
0899 AD3D03  78          LDA  XH
089C FD3F03  79          SBC  YH
089F 9009    80          BCC  DIV3
08A1 8E3C03  81          STX  XL
08A4 8D3D03  82          STA  XH
08A7 EF3A03  83          INC  QUOTL
08AA 88      84  DIV3  DFY
08AB D0D8    85          BNF  DIV2
08AD AD3B03  86          LDA  QUOTH          ;STORE QUOTIENT IN X-COORD
08B0 8D3503  87          STA  XTEXT
08B3 8D3303  88          STA  XLORES
08B6 AD3603  89          LDA  YTEXT
08B9 20C1FB  90          JSR  BASCAL          ;GET THE CHARACTER OFF SCREEN
08BC AC3503  91          LDY  XTEXT
08BF B128    92          LDA  (BASE),Y
08C1 8D3703  93          STA  CHAR
08C4 EE3503  94          INC  XTEXT          ;TEXT COORD'S ARE RELATIVE
08C7 EE3603  95          INC  YTEXT          ;TO ONE NOT ZERO SO INCREMENT
08CA A596    96          LDA  OLDBAS          ;RESTORE OLD TEXT BASE ADDRESS
08CC 8528    97          STA  BASE
08CE A597    98          LDA  OLDBAS+1
08D0 8529    99          STA  BASE+1
08D2 60     100         RTS

```

```

8D3      101      PAG
8D3      102  DONE  EQU  $C0D1      ;PEN DONE FLAG
8D3      103  START EQU  $C0D0      ;START AT LINE Q
8D3      104  XOVFL EQU  $C0D4      ;X > 255 FLAG
8D3      105  XCOORD EQU  $C0D2      ;LOW X-COORD
8D3      106  YCOORD EQU  $C0D3      ;Y-COORD
8D3      107  RING  EQU  $C0D6      ;TOUCH SWITCH FLAG
8D3      108  BASCAL EQU  $FBC1      ;CALCULATE TEXT BASE ADDRESS AT BASE
8D3      109  BASE  EPZ  $28        ;TEXT LINE BASE ADDRESS
8D3      110  OLDBAS EPZ  $96
8D3      111  XLOW  EQU  $330        ;X RETURN COORDINATE
8D3      112  XHIGH EQU  $331        ;HIGH PART OF X
8D3      113  YLOW  EQU  $332        ;HIRFS Y-COORD
8D3      114  XLORFS EQU  $333        ;LORFS X-COORD
8D3      115  YLORFS EQU  $334        ;LORFS Y-COORD
8D3      116  XTEXT EQU  $335        ;X TEXT COORD
8D3      117  YTEXT EQU  $336        ;Y TEXT COORD
8D3      118  CHAR  EQU  $337        ;CHARACTER AT TEXT COORD. X,Y
8D3      119  LINE  EQU  $338        ;SCAN LINE OF 'TEARDROP' WINDOW OF MIN
8D3      120  RWAIT EQU  $339        ;PARAMETER TO WAIT FOR PEN SWITCH
8D3      121  QUOTL EQU  $33A
8D3      122  QUOTH EQU  $33B
8D3      123  XL    EQU  $33C
8D3      124  XH    EQU  $33D
8D3      125  YL    EQU  $33E
8D3      126  YH    EQU  $33F
8D3      127  LENGTH EQU  *-LPEN
128      END

```

**** END OF ASSEMBLY

```

*****
*                                *
* SYMBOL TABLE -- V 1.5 *
*                                *
*****

```

ABFL. LOC. LABFL. LOC. LABFL. LOC.

* ZERO PAGE VARIABLES:

BASE 0028 OLDBAS 0096

* ABSOLUTE VARIABLES/LABELS

```

.PEN  0800  LOOP  0816  WAIT  081F  DNT   082E
JEWC  0842  GREY  085B  DIVIDE 0878  DIV2  0885  DIV3  08AA  DONE  C0D1
START C0D0  XOVFL C0D4  XCOORD C0D2  YCOORD C0D3  RING  C0D6  BASCAL FBC1
XLOW  0330  XHIGH 0331  YLOW  0332  XLORES 0333  YLORES 0334  XTEXT 0335
YTEXT 0336  CHAR  0337  LINE  0338  RWAIT 0339  QUOTL 033A  QUOTH 033B
XL    033C  XH    033D  YL    033E  YH    033F  LENGTH 00D3

```

SYMBOL TABLE STARTING ADDRESS:5800

SYMBOL TABLE LENGTH:012A

```

0800          1          DCM "PR#1"
0900          2          ORG $0900
0900          3          ;
0900          4          ; LIGHT PEN HIRES DRAW SUBROUTINE PACKAGE
0900          5          ; WITH AVERAGING
0900          6          ;
0900 20DA0A    7  MAIN   JSR INIT           ;CLFAR SCREEN
0903 A9FF     8          LDA #$FF         ;HCOLOR = WHITE
0905 8DE90C   9          STA HCLR1
0908 8DF60C  10         STA HCOLOR
090B A9BD    11         LDA #$BD         ;DRAW CLEARING LINE AT BOTTOM
090D 8DED09  12         STA YP
0910 ADED09  13  STLP   LDA YP
0913 A200    14         LDX #0
0915 A000    15         LDY #0
0917 20140B  16         JSR HPOSN
091A A917    17         LDA #23
091C A201    18         LDX #1
091E ACED09  19         LDY YP
0921 20500C  20         JSR HLIN
0924 EEED09  21         INC YP
0927 ADED09  22         LDA YP
092A C9C0    23         CMP #$C0
092C D0F2    24         BNF STLP
092F A900    25  ST1    LDA #0           ;ZFRO TOTALS
0930 8DF709  26         STA XA
0933 8DF809  27         STA XA+1
0936 8DF909  28         STA YA
0939 8DFA09  29         STA YA+1
093C A208    30         LDX #8           ;GFT A LIGHT PEN NUMBER
093E 208B0A  31  LOOP1 JSR LPFN
0941 ADE709  32         LDA XA
0944 6DD50A  33         ADC XLOW
0947 8DF709  34         STA XA
094A ADE809  35         LDA XA+1
094D 6DD60A  36         ADC XHIGH
0950 8DE809  37         STA XA+1
0953 18      38         CLC           ;YA = YA + YLOW
0954 ADE909  39         LDA YA
0957 6DD70A  40         ADC YLOW
095A 8DE909  41         STA YA
095D A900    42         LDA #0
095F 6DEA09  43         ADC YA+1
0962 8DEA09  44         STA YA+1
0965 CA      45         DEX           ;IF LAST ONE THE PLOT
0966 D0D6    46         BNF LOOP1
0968 ADE909  47         LDA YA           ;YP = YA
096B 8DED09  48         STA YP
096E ADEA09  49         LDA YA+1
0971 8DEE09  50         STA YP+1
0974 ADE709  51         LDA XA           ;XP = XA
0977 8DFB09  52         STA XP
097A ADE809  53         LDA XA+1
097D 8DFC09  54         STA XP+1
0980 20F209  55         JSR DIV8        ;XP=XP/8 : YP=YP/8
0983 ADED09  56         LDA YP           ;NOW PLOT THE POINT
0986 AEFB09  57         LDX XP
0989 ACEC09  58         LDY XP+1
098C 20620B  59         JSR HPLOT

```

```

098F      60      PAG
098F 208B0A  61  LOOPM  JSR LPEN          ;NOW GET REST OF POINTS
0992 2CD6C0  62          BIT RING
0995 303B    63          BMI WTRING
0997 ADD70A  64          LDA YLOW          ;CLFAR SCREEN IF Y>188
099A C9BD    65          CMP #SBD
099C 9003    66          BCC ST23
099E 4C0009  67          JMP MAIN
09A1 20060A  68  ST23   JSR MPY7          ;XP = (7*XP + ZX)
09A4 18      69          CLC
09A5 ADEB09  70          LDA XP
09A8 6DD50A  71          ADC XLOW
09AB 8DEB09  72          STA XP
09AF ADEC09  73          LDA XP+1
09B1 6DD60A  74          ADC XHIGH
09B4 8DFC09  75          STA XP+1
09B7 18      76          CLC          ;YP = (7*YP + ZY)
09B8 ADFD09  77          LDA YP
09BB 6DD70A  78          ADC YLOW
09BE 8DFD09  79          STA YP
09C1 ADEF09  80          LDA YP+1
09C4 6900    81          ADC #0
09C6 8DFE09  82          STA YP+1
09C9 20F209  83          JSR DIV8          ;XP=XP/8 : YP=YP/8
09CC 205C0A  84          JSR PLOT          ;NOW PLOT
09CF 4C8F09  85          JMP LOOPM
09D2 2CD6C0  86  WTRING  BIT RING
09D5 30FB    87          BMI WTRING
09D7 4C2E09  88          JMP ST1
09DA AD56C0  89  RETURN  LDA $C056
09DD AD54C0  90          LDA $C054
09E0 AD53C0  91          LDA $C053
09E3 AD51C0  92          LDA $C051
09E6 60      93          RTS
09E7 0000    94  XA     HFX 0000
09E9 0000    95  YA     HFX 0000
09EB 0000    96  XP     HFX 0000
09ED 0000    97  YP     HEX 0000
09EF 00      98  T1     HEX 00
09F0 00      99  T2     HFX 00
09F1 00     100  T3     HFX 00

```

```

09F2      101      PAG
09F2      102      ;
09F2      103      ; DIVIDE XP,YP BY 8
09F2      104      ;
09F2 A203    105      DIV8   LDX #3           ;SHIFT RIGHT 3 TIMES
09F4 18     106      DIVL   CLC
09F5 6EEC09 107      ROR   XP+1
09F8 6EFB09 108      ROR   XP
09FB 18     109      CLC
09FC 6EEE09 110      ROR   YP+1
09FF 6EED09 111      ROR   YP
0A02 CA     112      DFX
0A03 D0EF   113      BNE   DIVL
0A05 60     114      RTS
0A06      115      ;
0A06      116      ; MULTIPLY XP,YP BY 7
0A06      117      ;
0A06 A202    118      MPY7   LDX #2
0A08 ADEB09 119      LDA   XP
0A0B 8D580A 120      STA   XT
0A0E ADEC09 121      LDA   XP+1
0A11 8D590A 122      STA   XT+1
0A14 ADED09 123      LDA   YP
0A17 8D5A0A 124      STA   YT
0A1A ADEE09 125      LDA   YP+1
0A1D 8D5B0A 126      STA   YT+1
0A20 18     127      MPYL   CLC
0A21 2F580A 128      ROL   XT
0A24 2F590A 129      ROL   XT+1
0A27 18     130      CLC
0A28 2F5A0A 131      ROL   YT
0A2B 2F5B0A 132      ROL   YT+1
0A2E 18     133      CLC
0A2F ADFB09 134      LDA   XP
0A32 6D580A 135      ADC   XT
0A35 8DFB09 136      STA   XP
0A38 ADFC09 137      LDA   XP+1
0A3B 6D590A 138      ADC   XT+1
0A3E 8DEC09 139      STA   XP+1
0A41 18     140      CLC
0A42 ADED09 141      LDA   YP
0A45 6D5A0A 142      ADC   YT
0A48 8DFD09 143      STA   YP
0A4B ADEE09 144      LDA   YP+1
0A4E 6D5B0A 145      ADC   YT+1
0A51 8DEF09 146      STA   YP+1
0A54 CA     147      DFX
0A55 D0C9   148      BNE   MPYL
0A57 60     149      RTS
0A58 0000   150      XT    ADR $0000
0A5A 0000   151      YT    ADR $0000

```



```

0A5C          152          PAG
0A5C          153          ;
0A5C          154          ; PLOT HLIN TO X,Y
0A5C          155          ;
0A5C ADED09   156          PLOTP  LDA YP
0A5F C9BD     157          CMP  #$BD
0A61 9005     158          BCC  PP1
0A63 A9BC     159          LDA  #$BC
0A65 8DED09   160          STA  YP
0A68 ADEC09   161          PP1   LDA  XP+1
0A6B F011     162          BEQ  PP3
0A6D ADEB09   163          LDA  XP
0A70 C916     164          CMP  #$16
0A72 900A     165          BCC  PP3
0A74 A901     166          LDA  #1
0A76 8DFC09   167          STA  XP+1
0A79 A916     168          LDA  #$16
0A7B 8DFB09   169          STA  XP
0A7E ADEB09   170          PP3   LDA  XP
0A81 AFEC09   171          LDX  XP+1
0A84 ACED09   172          LDY  YP
0A87 20500C   173          JSR  HLIN
0A8A 60       174          RTS

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```

0A8B      175          PAG
0A8B      176          ;
0A8B      177          ; MACHINE CODE LIGHT PEN DRIVER ROUTINE
0A8B      178          ;
0A8B      179          ; ON EXIT:
0A8B      180          ; XHIGH,XLOW      = HI-RES X COORD
0A8B      181          ; YLOW          = HI-RES Y COORD
0A8B      182          ;
0A8B A9FF      183 LPEN   LDA  #$FF
0A8D 8DD60A    184         STA  XHIGH
0A90 8DD50A    185         STA  XLOW
0A93 8DD70A    186         STA  YLOW
0A96 8DD80A    187         STA  LINE          ;LOOP FOR PEN COORDINATES
0A99 EED80A    188 LOOP   INC  LINE          ;INCREMENT AROUND 'TEARDROP'
0A9C ADD80A    189         LDA  LINE          ;UNTIL MINIMUM X IS FOUND
0A9F 8DD0C0    190         STA  START        ;START PEN AT LINE Q
0AA2 2CD1C0    191 WAIT   BIT  DONE          ;WAIT FOR PEN TO GO DONE
0AA5 10FB      192         BPL  WAIT
0AA7 ADD4C0    193 DNT    LDA  XOVL          ;GET X OVERFLOW VALUE (0 OR 1)
0AAA 2A        194         ROL
0AAB A900      195         LDA  #0
0AAD 2A        196         ROL
0AAE CDD60A    197         CMP  XHIGH          ;IF LOWER THAN OLD X
0AB1 9009      198         BCC  NEWC          ;THEN SET NEW MINIMUM X COORD
0AB3 ADD2C0    199         LDA  XCOORD
0AB6 CDD50A    200         CMP  XLOW
0AB9 9001      201         BCC  NEWC
0ABB 60        202         RTS
0ABC ADD4C0    203 NFWC   LDA  XOVL          ;SET UP A NFW MINIMUM VALUF
0ABF 2A        204         ROL
0AC0 A900      205         LDA  #0
0AC2 2A        206         ROL
0AC3 8DD60A    207         STA  XHIGH
0AC6 ADD2C0    208         LDA  XCOORD
0AC9 8DD50A    209         STA  XLOW
0ACC ADD3C0    210         LDA  YCOORD
0ACF 8DD70A    211         STA  YLOW
0AD2 4C990A    212         JMP  LOOP          ;AND GET ANOTHER VALUF FROM PEN
0AD5      213 DONF   FQU  $C0D1
0AD5      214 START  FQU  $C0D0
0AD5      215 XOVL   EQU  $C0D4
0AD5      216 XCOORD FQU  $C0D2
0AD5      217 YCOORD EQU  $C0D3
0AD5      218 RING   FQU  $C0D6
0AD5      219 BASCAL EQU  $FBC1
0AD5 00       220 XLOW   HEX  00
0AD6 00       221 XHIGH  HEX  00
0AD7 00       222 YLOW   HEX  00
0AD8 00       223 LINE   HEX  00
0AD9 00       224 RWAIT  HEX  00

```

```

0ADA      225          PAG
0ADA      226      ;
0ADA      227      ; INITIALIZE SCREEN
0ADA      228      ;
0ADA A940   229      INIT   LDA #$40          ;INIT PAGE 2
0ADC 8DF80C 230          STA HPAG
0ADF AD57C0 231          LDA HIRES          ;SET HIRES DISPLAY MODE
0AE2 AD52C0 232          LDA $C052         ;NO TEXT
0AE5 AD55C0 233          LDA $C055         ;PAGE 2
0AE8 AD50C0 234          LDA TXTCLR        ;SET GRAPHICS DISPLAY MODE
0AEB A900   235      HCLR   LDA #0          ;SET FOR BLACK BACKGROUND
0AED 8DE90C 236      BKGND0 STA HCLR1
0AF0 ADF80C 237      BKGND  LDA HPAG
0AF3 85E9   238          STA SHAPEH          ;INIT HI-RES SCREEN MEMORY
0AF5 0910   239          ORA #$10
0AF7 85E1   240          STA HBASH
0AF9 A000   241          LDY #0            ;FOR CURRENT PAGE, NORMALLY
0AFB 84E0   242          STY HBASL
0AFD 84E8   243          STY SHAPEL          ;$2000-3FFF OR $4000-5FFF
0AFF ADF90C 244      BKGND1 LDA HCLR1
0B02 91E8   245          STA (SHAPFL),Y
0B04 91E0   246          STA (HBASL),Y
0B06 C8     247          INY
0B07 D0F6   248          BNE BKGND1
0B09 E6E9   249          INC SHAPEH
0B0B F6E1   250          INC HBASH
0B0D A5E1   251          LDA HBASH
0B0F 291F   252          AND #$1F
0B11 D0EC   253          BNE BKGND1
0B13 60     254          RTS

```

```

OB14      255      PAG
OB14      256      ;
OB14      257      ; HI=RES GRAPHICS POSITION AND
OB14      258      ; PLOT SUBROUTINES
OB14      259      ;
OB14      260      ; ENTFR:
OB14      261      ; Y - A REG.
OB14      262      ; XL- X REG.
OB14      263      ; XH- Y REG.
OB14 8DF50C 264      HPOSN STA YO
OB17 8EF30C 265      STX XOL
OB1A 8CF40C 266      STY XOH
OB1D 48      267      PHA
OB1F 29C0    268      AND #$C0
OB20 85E0    269      STA HBASL
OB22 4A      270      LSR
OB23 4A      271      LSR
OB24 05E0    272      ORA HBASL
OB26 85E0    273      STA HBASL
OB28 68      274      PLA
OB29 85E1    275      STA HBASH
OB2B 0A      276      ASL
OB2C 0A      277      ASL
OB2D 0A      278      ASL
OB2E 26E1    279      ROL HBASH
OB30 0A      280      ASL
OB31 26E1    281      ROL HBASH
OB33 0A      282      ASL
OB34 66E0    283      ROR HBASL
OB36 A5E1    284      LDA HBASH
OB38 291F    285      AND #$1F
OB3A 0DF80C 286      ORA HPAG
OB3D 85E1    287      STA HBASH
OB3F 8A      288      TXA
OB40 C000    289      CPY #0
OB42 F005    290      BEQ HPOSN2
OB44 A023    291      LDY #$23
OB46 6904    292      ADC #4
OB48 C8      293      HPOSN1 INY
OB49 F907    294      HPOSN2 SBC #$07
OB4B B0FB    295      BCS HPOSN1
OB4D 8CF70C 296      STY HNDX
OB50 AA      297      TAX
OB51 BD020C 298      LDA MSKTEL-$F9,X
OB54 8DEB0C 299      STA HMASK
OB57 98      300      TYA
OB58 4A      301      LSR
OB59 ADF60C 302      LDA HCOLOR
OB5C 8DE90C 303      HPOSN3 STA HCLR1
OB5F B02F    304      BCS CSHFT2
OB61 60      305      RTS
OB62        306      ;
OB62 20140B 307      HPLOT JSR HPOSN
OB65 ADE90C 308      LDA HCLR1
OB68 51E0    309      EOR (HBASL),Y
OB6A 2DEB0C 310      AND HMASK
OB6D 51E0    311      EOR (HBASL),Y
OB6F 91E0    312      STA (HBASL),Y
OB71 60      313      RTS

```

```

OB72      314      PAG
OB72      315      ;
OB72      316      ; L,R,U,D SUBROUTINES
OB72      317      ;
OB72 102A   318      LFTRT  BPL RIGHT
OB74 ADFB0C 319      LEFT   LDA  HMASK
OB77 4A     320      LSR
OB78 B006   321      BCS  LEFT1
OB7A 49C0   322      FOR  #$C0
OB7C 8DEB0C 323      LR1    STA  HMASK
OB7F 60     324      RTS
OB80 88     325      LEFT1  DEY
OB81 1002   326      BPL  LFFT2
OB83 A027   327      LDY  #$27
OB85 A9C0   328      LEFT2  LDA  #$C0
OB87 8DEB0C 329      NEWNDX STA  HMASK
OB8A 8CF70C 330      STY  HNDX
OB8D ADE90C 331      CSHIFT LDA  HCLR1
OB90 0A     332      CSHFT2 ASL
OB91 C9C0   333      CMP  #$C0
OB93 1008   334      BPL  RTS1
OB95 ADE90C 335      LDA  HCLR1
OB98 497F   336      FOR  #$7F
OB9A 8DF90C 337      STA  HCLR1
OB9D 60     338      RTS1   RTS
OB9E ADFB0C 339      RIGHT  LDA  HMASK
OBA1 0A     340      ASL
OBA2 4980   341      FOR  #$80
OBA4 30D6   342      BMI  LR1
OBA6 A981   343      LDA  #$81
OBA8 C8     344      INY
OBA9 C028   345      CPY  #$28
OBAB 90DA   346      BCC  NEWNDX
OBAD A000   347      LDY  #$00
OBAF B0D6   348      BCS  NEWNDX
OBB1 18     349      LRUDX1 CLC
OBB2 ADEF0C 350      LRUDX2 LDA  SHAPEX
OBB5 2904   351      AND  #$04
OBB7 F02C   352      BEQ  LRUD4
OBB9 A97F   353      LDA  #$7F
OBBB 2DEB0C 354      AND  HMASK
OBBE 31E0   355      AND  (HBASL),Y
OBC0 D01F   356      BNE  LRUD3
OBC2 EFA0C  357      INC  COLLSN
OBC5 A97F   358      LDA  #$7F
OBC7 2DFB0C 359      AND  HMASK
OBCA 1015   360      BPL  LRUD3
OBCC 18     361      LRUD1  CLC
OBCE ADEF0C 362      LRUD2  LDA  SHAPFX
OBD0 2904   363      AND  #$04
OBD2 F011   364      BEQ  LRUD4
OBD4 B1E0   365      LDA  (HBASL),Y
OBD6 4DF90C 366      FOR  HCLR1
OBD9 2DFB0C 367      AND  HMASK
OBDC D003   368      BNE  LRUD3
OBDE EFA0C  369      INC  COLLSN
OBE1 51E0   370      LRUD3  FOR  (HBASL),Y
OBE3 91E0   371      STA  (HBASL),Y

```

OBE5		372		PAG
OBE5	ADEF0C	373	LRUD4	LDA SHAPEX
OBE8	6DF00C	374		ADC QDRNT
OBEB	2903	375		AND #3
OBED		376	EQ3	FQU *-1
OBED	C902	377		CMP #2
OBFF	6A	378		ROR
OBFO	B080	379	LRUD	BCS LFTRT
OBF2	3030	380	UPDOWN	BMI DOWN4
OBF4	18	381	UP	CLC
OBF5	A5F1	382		LDA HBASH
OBF7	2C020D	383		BIT FQ1C
OBFA	D022	384		BNF UP4
OBFC	06E0	385		ASL HBASL
OBFF	B01A	386		BCS UP2
OC00	2CFE0B	387		BIT FQ3
OC03	F005	388		BFQ UP1
OC05	691F	389		ADC #\$1F
OC07	38	390		SFC
OC08	B012	391		BCS UP3
OC0A	6923	392	UP1	ADC #\$23
OC0C	48	393		PHA
OC0D	A5E0	394		LDA HBASL
OC0F	69B0	395		ADC #\$B0
OC11	B002	396		BCS UP5
OC13	69F0	397		ADC #\$F0
OC15	85E0	398	UP5	STA HBASL
OC17	68	399		PLA
OC18	B002	400		BCS UP3
OC1A	691F	401	UP2	ADC #\$1F
OC1C	66E0	402	UP3	ROR HBASL
OC1E	69FC	403	UP4	ADC #\$FC
OC20	85E1	404	UPDOWN1	STA HBASH
OC22	60	405		RTS
OC23	18	406	DOWN	CLC
OC24	A5E1	407	DOWN4	LDA HBASH
OC26	6904	408		ADC #\$04
OC28		409	FQ4	FQU *-\$01
OC28	2C020D	410		BIT FQ1C
OC2B	D0F3	411		BNF UPDOWN1
OC2D	06E0	412		ASL HBASL
OC2F	9019	413		BCC DOWN1
OC31	69E0	414		ADC #\$E0
OC33	18	415		CLC
OC34	2C270C	416		BIT FQ4
OC37	F013	417		BFQ DOWN2
OC39	A5E0	418		LDA HBASL
OC3B	6950	419		ADC #\$50
OC3D	49F0	420		EOR #\$F0
OC3F	F002	421		BFQ DOWN3
OC41	49F0	422		EOR #\$F0
OC43	85E0	423	DOWN3	STA HBASL
OC45	ADF80C	424		LDA HPAG
OC48	9002	425		BCC DOWN2
OC4A	69E0	426	DOWN1	ADC #\$E0
OC4C	66E0	427	DOWN2	ROR HBASL
OC4E	90D0	428		BCC UPDOWN1

```

0C50          429          PAG
0C50          430          ;
0C50          431          ; LINE DRAW SUBROUTINFS
0C50          432          ;
0C50          433          ; ON ENTRY:
0C50          434          ; XL - A REG
0C50          435          ; XH - X REG
0C50          436          ; Y - Y REG
0C50 48       437          HLIN   PHA
0C51 38       438          SEC
0C52 EDF30C   439          SBC  X0L
0C55 48       440          PHA
0C56 8A       441          TXA
0C57 EDF40C   442          SBC  X0H
0C5A 8DF00C   443          STA  QDRNT
0C5D B00B     444          BCS  HLIN2
0C5F 68       445          PLA
0C60 49FF     446          FOR  #$FF
0C62 6901     447          ADC  #$01
0C64 48       448          PHA
0C65 A900     449          LDA  #$00
0C67 EDF00C   450          SBC  QDRNT
0C6A 8DFD0C   451          HLIN2  STA  DXH
0C6D 8DF20C   452          STA  FH
0C70 68       453          PLA
0C71 8DFC0C   454          STA  DXL
0C74 8DF10C   455          STA  FL
0C77 68       456          PLA
0C78 8DF30C   457          STA  X0L
0C7B 8EF40C   458          STX  X0H
0C7E 98       459          TYA
0C7F 18       460          CLC
0C80 EDF50C   461          SBC  Y0
0C83 9004     462          BCC  HLIN3
0C85 49FF     463          FOR  #$FF
0C87 69FE     464          ADC  #$FF
0C89 8DEE0C   465          HLIN3  STA  DY
0C8C 8CF50C   466          STY  Y0
0C8F 6EF00C   467          ROR  QDRNT
0C92 38       468          SFC
0C93 EDEC0C   469          SBC  DXL
0C96 AA       470          TAX
0C97 A9FF     471          LDA  #$FF
0C99 EDED0C   472          SBC  DXH
0C9C 8DEA0C   473          STA  COUNTH
0C9F ACF70C   474          LDY  HNDX
0CA2 B005     475          BCS  MOVEX2
0CA4 0A       476          MOVEX  ASL
0CA5 20720B   477          JSR  LFTRT
0CA8 38       478          SFC
0CA9 ADF10C   479          MOVEX2 LDA  FL
0CAC 6DFF0C   480          ADC  DY
0CAF 8DF10C   481          STA  FL
0CB2 ADF20C   482          LDA  FH
0CB5 E900     483          SBC  #0

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0CB7		484		PAG
0CB7	8DF20C	485	HCOUNT	STA FH
0CBA	B1E0	486		LDA (HBASL),Y
0CBC	4DE90C	487		EOR HCLR1
0CBF	2DEB0C	488		AND HMASK
0CC2	51E0	489		EOR (HBASL),Y
0CC4	91E0	490		STA (HBASL),Y
0CC6	E8	491		INX
0CC7	D005	492		BNE HLIN4
0CC9	EEEE0C	493		INC COUNTH
0CCC	F01A	494		BFQ RTS2
0CCF	ADF00C	495	HLIN4	LDA QDRNT
0CD1	B0D1	496		BCS MOVEX
0CD3	20F20B	497		JSR UPDWN
0CD6	18	498		CLC
0CD7	ADF10C	499		LDA FL
0CDA	6DEC0C	500		ADC DXL
0CDD	8DF10C	501		STA FL
0CF0	ADF20C	502		LDA FH
0CF3	6DFD0C	503		ADC DXH
0CF6	50CF	504		BVC HCOUNT
0CF8	60	505	RTS2	RTS

0CE9	506	PAG	
0CE9	507	;	
0CE9	508	; FQUATES	
0CE9	509	;	
0CE9	510	SHAPEL	FPZ \$E8
0CE9	511	SHAPEH	FPZ \$E9
0CF9 00	512	HCLR1	HFX 00
0CEA 00	513	COUNTH	HFX 00
0CEB	514	HBASL	FPZ \$E0
0CEB	515	HBASH	FPZ \$E1
0CEB 00	516	HMASK	HFX 00
0CEC 00	517	DXL	HFX 00
0CED 00	518	DXH	HFX 00
0CEE 00	519	DY	HFX 00
0CEF 00	520	SHAPEX	HFX 00
0CF0 00	521	QDRNT	HFX 00
0CF1 00	522	EL	HFX 00
0CF2 00	523	EH	HFX 00
0CF3 00	524	XOL	HFX 00
0CF4 00	525	XOH	HFX 00
0CF5 00	526	YO	HFX 00
0CF6 00	527	HCOLOR	HFX 00
0CF7 00	528	HNDX	HFX 00
0CF8 00	529	HPAG	HFX 00
0CF9 00	530	SCALE	HFX 00
0CFA 00	531	COLLSN	HFX 00
0CFB 818284	532	MSKTBL	HFX 8182848890A0C0
0CFF 8890A0			
0D01 C0			
0D02 1C	533	FQ1C	HFX 1C
0D03 FFFEFA	534	COS	HFX FFFEFAF4ECF1D4C5
0D06 F4ECF1			
0D09 D4C5			
0D0B B4A18D	535		HFX B4A18D7861493118FF
0D0E 786149			
0D11 3118FF			
0D14	536	HIRES	EQU \$C057
0D14	537	MIXSFT	EQU \$C053
0D14	538	TXTCLR	EQU \$C050
0D14	539	LENGTH	EQU *-MAIN


```

0800          1          DCM "PR#1"
0900          2          ORG $0900
0900          3          ;
0900          4          ; THIS PROGRAM WILL PRINT OUT THE ENTIRE CATALOG IN SECTIONS
0900          5          ; AND WAIT FOR THE USER TO SELECT A FILE TO RUN WITH THE
0900          6          ; LIGHT PEN. IF THE USER PAGES THROUGH THE WHOLE CATALOG
0900          7          ; WITHOUT SELECTING ANYTHING, THE PROGRAM WILL END.
0900          8          ;
0900 2058FC    9  CTRL JSR HOME
0903 A900     10         LDA #0
0905 8D3903   11         STA WAIT          ;SET UP RING WAIT
0908 8D0F0C   12         STA INDEX
090B 20170A   13         JSR GETCUR          ;GET CURRENT SLOT AND DRIVE
090E 20F309   14         JSR CAT
0911 A949     15         LDA #BUFFER        ;SET UP BUFFER POINTER
0913 85FE     16         STA BUFPTR
0915 A90C     17         LDA /BUFFER
0917 85FF     18         STA BUFPTR+1
0919          19         ;
0919          20  CTRLP:
0919 2058FC   21         JSR HOME          ;CLEAR THE SCREEN
091C 20320A   22         JSR CAT1          ;PRINT 15 FILES
091F A999     23         LDA #MESS
0921 A00B     24         LDY /MESS
0923 20B10A   25         JSR PBUFF
0926 AD130C   26         LDA OLDY          ;GET INITIAL CHAR AT X,Y
0929 20C1FB   27         JSR BASCAL
092C AC120C   28         LDY OLDX
092F B128     29         LDA (BASE),Y
0931 8D140C   30         STA TFMP
0934          31         ;
0934          32  CTRL:
0934 20C60A   33         JSR LPFN          ; AND WAIT FOR USER RESPONSE
0937 CF3603   34         DFC YTEXT          ;DFCREFMNT FOR M.C. PURPOSES
093A AD120C   35         LDA OLDX
093D CD3503   36         CMP XTEXT
0940 D008     37         BNE CHANGE
0942 AD130C   38         LDA OLDY
0945 CD3603   39         CMP YTEXT
0948 F028     40         BEQ CTR2
094A          41         ;
094A          42  CHANGE:
094A AD130C   43         LDA OLDY
094D 20C1FB   44         JSR BASCAL
0950 AC120C   45         LDY OLDX
0953 AD140C   46         LDA TEMP
0956 9128     47         STA (BASE),Y
0958 AD3603   48         LDA YTEXT
095B 8D130C   49         STA OLDY
095E 20C1FB   50         JSR BASCAL
0961 AC3503   51         LDY XTEXT
0964 8C120C   52         STY OLDX
0967 B128     53         LDA (BASE),Y
0969 8D140C   54         STA TEMP
096C 293F     55         AND #$3F
096E 0940     56         ORA #$40
0970 9128     57         STA (BASE),Y

```

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0972          58          PAG
0972          59          ;
0972          60          CTR2:
0972 2CD6C0    61          BIT RING
0975 10BD      62          BPL CTR1
0977 AE3603    63          LDX YTEXT          ;CHECK Y COORD AGAINST
097A CA        64          DEX          ; THE NUMBER OF FILES PRINTED OUT
097B EC100C    65          CPX COUNT      ; TO SEE IF THE LIGHT PFN
097E B046      66          BCS CTR3      ; WAS ON ONE OF THE FILFS
0980 8A        67          TXA          ;POINT TO FILE DESCRIPTOR
0981 0A        68          ASL
0982 AA        69          TAX
0983 BD160C    70          LDA PTRS,X
0986 85FA      71          STA POINT
0988 E8        72          INX
0989 BD160C    73          LDA PTRS,X
098C 85FB      74          STA POINT+1
098E A002      75          LDY #2          ;CHECK IF A GOOD FILE TO RUN
0990 B1FA      76          LDA (POINT),Y
0992 2907      77          AND #7          ;CAN'T RUN ANYTHING BUT
0994 F03E      78          BEQ FILFRR      ; INT, APPL, BINARY
0996 48        79          PHA
0997 2039FB    80          JSR SFTTXT      ;SFTUP FOR NORMAL OPERATION
099A 2058FC    81          JSR HOMF
099D 68        82          PLA
099E 2904      83          AND #4          ;CHFK IF BASIC OR BINARY
09A0 F00A      84          BFQ BASIC
09A2 A9E1      85          LDA #BRUN
09A4 A00B      86          LDY /BRUN
09A6 20B10A    87          JSR PBUFF
09A9 4CB309    88          JMP PFILE      ;PRINT FILE NAMF
09AC          89          ;
09AC          90          BASIC:
09AC A9EA      91          LDA #RUN          ;RUN THE BASIC FILE
09AE A00B      92          LDY /RUN
09B0 20B10A    93          JSR PBUFF
09B3          94          ;
09B3 A003      95          PFILE LDY #3          ;PRINT OUT FILE NAME
09B5 A21E      96          LDX #30
09B7 B1FA      97          PFLP  LDA (POINT),Y
09B9 20EDFD    98          JSR PUTC
09BC C8        99          INY
09BD CA        100         DEX
09BE D0F7      101         BNF PFLP
09C0 A98D      102         LDA #$8D
09C2 20EDFD    103         JSR PUTC          ;RUN THF FILE
09C5 60        104         RTS
09C6          105         ;
09C6          106         CTR3:
09C6 A900      107         LDA #0          ;WAIT FOR USFR
09C8 20A8FC    108         JSR WAIT1
09CB 2C110C    109         BIT FOB          ;CHECK FOR FND OF CATALOG
09CF 3003      110         BMI CTRFX
09D0 4C1909    111         JMP CTRLP
09D3 60        112         CTREX  RTS

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09D4      113      PAG
09D4      114      ;
09D4      115      FILERR:
09D4 A914    116      LDA #20                ;TAB DOWN TO LINF 20
09D6 2024FC 117      JSR VTAB
09D9 A900    118      LDA #0
09DB 8524    119      STA CSRHRZ
09DD A9F2    120      LDA #FRR              ; AND PRINT FRROR MESSAGE
09DF A00B    121      LDY /FRR
09F1 20B10A 122      JSR PBUFF
09E4 A900    123      LDA #0
09E6 20A8FC 124      JSR WAIT1            ;WAIT FOR USER READ
09F9 A900    125      LDA #0                ; AND FRASF THE LINF
09FB 8524    126      STA CSRHRZ
09ED 209CFC 127      JSR FRFOL
09F0 4C7209 128      JMP CTR2
09F3      129      ;
09F3      130      ;
09F3      131      ;
09F3      132      ; READ IN CATALOG TRACK OFF DISK
09F3      133      ;
09F3      134      CAT:
09F3 A90C    135      LDA /BUFFER          ;SELECT BUFFER POINTER
09F5 8D3D0C 136      STA BUF+1
09F8 A911    137      LDA #$11             ;TRACK NUMBFR
09FA 8D380C 138      STA TRACK
09FD A90C    139      LDA #$C              ;SECTOR NUMBER
09FF 8D390C 140      STA SECTOR
0A02 A901    141      LDA 01
0A04 8D400C 142      STA CMD
0A07 A90C    143      CLOOP LDA /IOB
0A09 A034    144      LDY #IOB
0A0B 2000BD 145      JSR $BD00
0A0F FF3D0C 146      INC BUF+1          ;INCRFMNT BUFFFR ADDRESS
0A11 CF390C 147      DFC SECTOR
0A14 D0F1    148      BNF CLOOP
0A15 60      149      RTS
0A17      150      ;
0A17      151      ;
0A17      152      ; GET CURRENT SLOT AND DRIVE
0A17      153      ;
0A17 20F303 154      GETCUR JSR GETIOB          ;GET IOCB
0A1A 85FF    155      STA BUFPTR+1
0A1C 84FF    156      STY BUFPTR
0A1E A00F    157      LDY #$F              ;GET DRIVE AND SLOT
0A20 B1FE    158      LDA (BUFPTR),Y
0A22 8D430C 159      STA PRVSLT
0A25 8D350C 160      STA SLOT
0A28 C8      161      INY
0A29 B1FE    162      LDA (BUFPTR),Y
0A2B 8D440C 163      STA PRVDRV
0A2E 8D360C 164      STA DRIVE
0A31 60      165      RTS

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0A32      166      PAG
0A32      167      ;
0A32      168      ; PRINT OUT SFGMENT OF CATALOG (15 FILFS MAX)
0A32      169      ;
0A32      170      CAT1:
0A32 A900      171      LDA #0          ;INIT COUNT OF FILES
0A34 8D100C    172      STA COUNT
0A37 8D110C    173      STA EOB          ;END OF BUFFER = FALSE
0A3A A98D      174      LDA #$8D        ;SPACE DOWN ONF LINE
0A3C 20EDFD    175      JSR PUTC         ; FROM THE TOP
0A3F AD0F0C    176      LDA INDEX
0A42 D00E      177      BNE CATLP2
0A44      178      ;
0A44      179      CATLP:
0A44 A90B      180      LDA #FILE1       ;INIT INDEX TO FILES
0A46 8D0F0C    181      STA INDEX
0A49 A001      182      LDY #LINK
0A4B B1FE      183      LDA (BUFPTR),Y   ;WHEN BOTH BYTES OF LINK ARE
0A4D C8        184      INY          ; ZERO YOU ARE THROUGH
0A4E 11FE      185      ORA (BUFPTR),Y
0A50 F01D      186      BEQ FXIT
0A52      187      ;
0A52      188      CATLP2:
0A52 AC0F0C    189      LDY INDFX        ;PRINT A FILF NAME
0A55 20700A    190      JSR PRTFIL
0A58 AD100C    191      LDA COUNT
0A5B C90F      192      CMP #15
0A5D B010      193      BCS FXIT
0A5F 18        194      CLC
0A60 AD0F0C    195      LDA INDFX        ;INCRFMNT TO NEXT
0A63 6923      196      ADC #$23
0A65 8D0F0C    197      STA INDEX
0A68 D0F8      198      BNE CATLP2
0A6A E6FF      199      INC BUFPTR+1   ;INCRFMNT POINTER FOR NEXT SFCTOR
0A6C 4C440A    200      JMP CATLP       ;LOOP FOR MORE
0A6F 60        201      FXIT      RTS

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0A70      202      PAG
0A70      203      ;
0A70      204      ; THIS PROCEDURE LOOKS AT THE
0A70      205      ; BUFFER AND PULLS OUT THE FILE
0A70      206      ; NAMES PRESENT.  THESE FILENAMES
0A70      207      ; ARE THEN PRINTED TO THE SCREEN.
0A70      208      ;
0A70      209      ;
0A70      210      PRTFIL:
0A70 B1FE      211      LDA (BUFPTR),Y
0A72 F037      212      BEQ SETEOB          ;END OF CATALOG
0A74 C9FF      213      CMP #$FF
0A76 F032      214      BEQ PRTX
0A78 A903      215      LDA #3
0A7A 8524      216      STA CSRHRZ          ;TAB 3
0A7C AD100C    217      LDA COUNT
0A7F EE100C    218      INC COUNT          ;COUNT # OF FILES PRINTED
0A82 0A        219      ASL
0A83 AA        220      TAX
0A84 18        221      CLC          ;POINT TO FILE DESCRIPTOR
0A85 98        222      TYA
0A86 65FE      223      ADC BUFPTR
0A88 9D160C    224      STA PTRS,X
0A8B E8        225      INX
0A8C A900      226      LDA #0
0A8E 65FF      227      ADC BUFPTR+1
0A90 9D160C    228      STA PTRS,X
0A93 C8        229      INY
0A94 C8        230      INY
0A95 C8        231      INY
0A96 A200      232      LDX 00
0A98 B1FE      233      PRT1 LDA (BUFPTR),Y
0A9A F00E      234      BEQ PRTX
0A9C 20EDFD    235      JSR PUTC
0A9F C8        236      INY
0AA0 E8        237      INX
0AA1 E01E      238      CPX #30
0AA3 90F3      239      BLT PRT1
0AA5 A98D      240      LDA 8D
0AA7 20EDFD    241      JSR PUTC
0AAA 60        242      PRTX RTS
0AAB          243      ;
0AAB A9FF      244      SETEOB LDA #$FF          ;FOB = TRUE
0AAD 8D110C    245      STA FOB
0AB0 60        246      RTS
0AB1          247      ;
0AB1          248      ; PRINT A BUFFER TO SCREEN (Y,A) --> BUFFER
0AB1          249      ;
0AB1 85FC      250      PBUFF STA PMESS
0AB3 84FD      251      STY PMESS+1
0AB5 A000      252      LDY #0
0AB7 B1FC      253      PBLP LDA (PMESS),Y
0AB9 F00A      254      BEQ PBEXIT
0ABB 20EDFD    255      JSR PUTC
0ABE C8        256      INY
0ABF D0F6      257      BNE PBLP
0AC1 E6FD      258      INC PMESS+1
0AC3 D0F2      259      BNE PBLP
0AC5 60        260      PBEXIT RTS

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0AC6      261      PAG
0AC6      262      ;
0AC6      263      ; MACHINE CODE LIGHT PEN DRIVER ROUTINE
0AC6      264      ; ON ENTRY:
0AC6      265      ;   RWAIT = 0 FOR NO PEN SWITCH WAIT
0AC6      266      ;           =-1 FOR PEN SWITCH WAIT
0AC6      267      ;
0AC6      268      ; ON EXIT:
0AC6      269      ;   XHIGH,XLOW   = HI-RES X COORD
0AC6      270      ;   YLOW           = HI-RES Y COORD
0AC6      271      ;   XLORES,YLORES = LORES COORDS
0AC6      272      ;   XTEXT,YTEXT  = TEXT COORDS
0AC6      273      ;
0AC6 A9FF      274      LPEN   LDA  #$FF           ;INIT MAX X-COORD
0AC8 8D3103    275      STA  XHIGH
0ACB 8D3003    276      STA  XLOW
0ACE 8D3203    277      STA  YLOW
0AD1 8D3803    278      STA  LINE
0AD4 A528      279      LDA  BASE           ;SAVE OLD TEXT BASE ADDRESS
0AD6 8506      280      STA  OLDBAS
0AD8 A529      281      LDA  BASE+1
0ADA 8507      282      STA  OLDBAS+1
0ADC EE3803    283      LOOP  INC  LINE           ;INCRFMFNT PEN COORDINATES AROUND
0ADF AD3803    284      LDA  LINE           ;'TEARDROP' WINDOW UNTIL MINIMUM X IS
0AF2 8DD0C0    285      STA  START         ;START PEN
0AE5 2CD1C0    286      WAIT  BIT  DONE         ;WAIT FOR PEN TO GO DONE
0AE8 10FB      287      BPL  WAIT
0AEA 2C3903    288      BIT  RWAIT         ;IF PFN WAIT IS TRUE (-1)
0AED 1005      289      BPL  DNT
0AEF 2CD6C0    290      BIT  RING         ;THEN WAIT FOR PENSWITCH
0AF2 10F1      291      BPL  WAIT
0AF4 ADD4C0    292      DNT   LDA  XOVL         ;GET X OVERFLOW VALUE (0 OR 1)
0AF7 2A        293      ROL
0AF8 A900      294      LDA  #0
0AFA 2A        295      ROL
0AFB CD3103    296      CMP  XHIGH         ;CHECK IF WE HAVE NEW MINIMUM
0AFE 9008      297      BCC  NEWC         ;SO WE CAN SET UP TO FIND THE
0B00 ADD2C0    298      LDA  XCOORD       ;NEXT VALUE OR SEE IF
0B03 CD3003    299      CMP  XLOW         ;WE HAVE ALREADY HAD A SMALLEST X
0B06 B019      300      BCS  GREY
0B08 ADD4C0    301      NEWC  LDA  XOVL         ;SET UP A NEW MINIMUM VALUE
0B0B 2A        302      ROL
0B0C A900      303      LDA  #0
0B0E 2A        304      ROL
0B0F 8D3103    305      STA  XHIGH
0B12 ADD2C0    306      LDA  XCOORD
0B15 8D3003    307      STA  XLOW
0B18 ADD3C0    308      LDA  YCOORD
0B1B 8D3203    309      STA  YLOW
0B1E 38        310      SEC
0B1F B0BB      311      BCS  LOOP
;AND GET ANOTHER VALUE FROM PEN

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0B21          312          PAG
0B21 AD3203   313  GREST  LDA  YLOW          ;CALCULATE REST OF COORDS
0B24 4A       314          LSR          ;XLORES = (XHIGH,XLOW)/7
0B25 4A       315          LSR          ;YLORES = YLOW/4
0B26 8D3403   316          STA  YLORES      ;XTEXT = (XHIGH,XLOW)/7 + 1
0B29 4A       317          LSR          ;YTEXT = YLOW/8 + 1
0B2A 8D3603   318          STA  YTEXT
0B2D A907     319          LDA  #7
0B2F 8D3F03   320          STA  YH
0B32 AD3103   321          LDA  XHIGH
0B35 8D3D03   322          STA  XH
0B38 AD3003   323          LDA  XLOW
0B3B 8D3C03   324          STA  XL
0B3E A900     325  DIVIDE LDA  #0          ;DIVIDE XH,XL/YH -> QUOTH
0B40 8D3A03   326          STA  QUOTL
0B43 8D3B03   327          STA  QUOTH
0B46 8D3E03   328          STA  YL
0B49 A010     329          LDY  #16          ;SIXTEEN BITS
0B4B 0E3A03   330  DIV2  ASL  QUOTL
0B4E 2E3B03   331          ROL  QUOTH
0B51 2E3C03   332          ROL  XL
0B54 2E3D03   333          ROL  XH
0B57 38       334          SEC
0B58 AD3C03   335          LDA  XL
0B5B ED3E03   336          SBC  YL
0B5E AA       337          TAX
0B5F AD3D03   338          LDA  XH
0B62 ED3F03   339          SBC  YH
0B65 9009     340          BCC  DIV3
0B67 8E3C03   341          STX  XL
0B6A 8D3D03   342          STA  XH
0B6D EE3A03   343          INC  QUOTL
0B70 88       344  DIV3  DFY
0B71 D0D8     345          BNE  DIV2
0B73 AD3B03   346          LDA  QUOTH          ;STORE QUOTIENT IN X-COORD
0B76 8D3503   347          STA  XTEXT
0B79 8D3303   348          STA  XLORES
0B7C AD3603   349          LDA  YTEXT
0B7F 20C1FB   350          JSR  BASCAL          ;GET THE CHARACTER OFF SCREEN
0B82 AC3503   351          LDY  XTFXT
0B85 B128     352          LDA  (BASE),Y
0B87 8D3703   353          STA  CHAR
0B8A FF3503   354          INC  XTFXT          ;TEXT COORD'S ARE RFLATIVE
0B8D FE3603   355          INC  YTEXT          ;TO ONE NOT ZERO SO INCREMENT
0B90 A506     356          LDA  OLDBAS          ;RFSTORF OLD TEXT BASE ADDRESS
0B92 8528     357          STA  BASE
0B94 A507     358          LDA  OLDBAS+1
0B96 8529     359          STA  BASE+1
0B98 60       360          RTS

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0B99      361          PAG
0B99      362      ;
0B99      363      ; *** EQUATFS
0B99      364      ;
0B99      365      HOME    EQU  $FC58
0B99      366      DONE    EQU  $C0D1          ;PEN DONF FLAG
0B99      367      START   EQU  $C0D0          ;START AT LINE Q
0B99      368      XOVFL   EQU  $C0D4          ;X > 255 FLAG
0B99      369      XCOORD  EQU  $C0D2          ;LOW X-COORD
0B99      370      YCOORD  EQU  $C0D3          ;Y-COORD
0B99      371      RING    EQU  $C0D6          ;TOUCH SWITCH FLAG
0B99      372      BASCAL   EQU  $FBC1          ;CALCULATE TEXT BASE ADDRESS AT BASE
0B99      373      BASE     EPZ  $28          ;TEXT LINE BASE ADDRESS
0B99      374      OLDBAS   EPZ  $06
0B99      375      XLOW     EQU  $330          ;X RETURN COORDINATE
0B99      376      XHIGH    EQU  $331          ;HIGH PART OF X
0B99      377      YLOW     EQU  $332          ;HIRES Y-COORD
0B99      378      XLORES   EQU  $333          ;LORES X-COORD
0B99      379      YLORES   EQU  $334          ;LORES Y-COORD
0B99      380      XTEXT    EQU  $335          ;X TEXT COORD
0B99      381      YTEXT    EQU  $336          ;Y TEXT COORD
0B99      382      CHAR     EQU  $337          ;CHARACTER AT TEXT COORD. X,Y
0B99      383      LINE     EQU  $338          ;SCAN LINE OF 'TEARDROP' WINDOW OF MI
0B99      384      RWAIT    EQU  $339          ;PARAMFTER TO WAIT FOR PEN SWITCH
0B99      385      QUOTL    EQU  $33A
0B99      386      QUOTH    EQU  $33B
0B99      387      XL       EQU  $33C
0B99      388      XH       EQU  $33D
0B99      389      YL       EQU  $33F
0B99      390      YH       EQU  $33F
0B99      8D8D      391      MESS    HEX  8D8D
0B9B      D0CFC9    392      ASC    "POINT TO FILF AND TOUCH RING TO RUN"
0B9E      CFD4A0
0BA1      D4CFA0
0BA4      C6C9CC
0BA7      C5A0C1
0BAA      CFC4A0
0BAD      D4CFD5
0BB0      C3C8A0
0BB3      D2C9CE
0BB6      C7A0D4
0BB9      CFA0D2
0BBC      D5CE
0BBE      8D8D      393      HEX  8D8D
0BC0      A0A0A0    394      ASC    " "
0BC3      100F09    395      INV    "POINT BELOW FILFS TO CONTINUE"
0BC6      0E1420
0BC9      02050C
0BCC      0F1720
0BCF      06090C
0BD2      051320
0BD5      140F20
0BD8      030F0E
0BDB      14090E
0BDE      1505
0BE0      00        396      HEX  00

```

```

OBE1          397          PAG
OBE1 8D8D84   398  BRUN   HEX 8D8D84
OBE4 C2D2D5   399          ASC "BRUN "
OBE7 CEA0
OBE9 00       400          HEX 00
OBEA 8D8D84   401  RUN    HEX 8D8D84
OBED D2D5CE   402          ASC "RUN "
OBF0 A0
OBF1 00       403          HEX 00
OBF2 A0A0A0   404  ERR    ASC "      "
OBF5 A0A0A0
OBF8 A0
OBF9 43414E   405          BLK "CAN'T RUN A TEXT FILE"
OBFC 675460
OBFF 52554E
OC02 604160
OC05 544558
OC08 546046
OC0B 494C45
OC0E 00       406          HEX 00
OC0F 00       407  INDEX  HEX 00
OC10 00       408  COUNT  HEX 00
OC11 00       409  FOB    HEX 00          ;END OF BUFFFR FLAG
OC12 01       410  OLDX   HEX 01          ;OLD TEXT COORDINATES
OC13 01       411  OLDY   HFX 01
OC14 A0       412  TEMP   HFX A0          ;TEMP STORAGE
OC15 00       413  TEMPl  HEX 00
OC16         414  LINK   EQU $1          ;LINK DISPLACEMENT
OC16         415  FILE1  EPZ $B          ;FIRST FILE DISPLACMENT
OC16         416  CSRHRZ EPZ $24
OC16         417  POINT  EPZ $FA          ;FILE POINTER TO RUN
OC16         418  PMESS  EPZ $FC
OC16         419  GETIOB EQU $03E3
OC16         420  SETTXT  EQU $FB39
OC16         421  VTAB   EQU $FC24
OC16         422  FRFOL  EQU $FC9C
OC16         423  PUTC   EQU $FDED          ;CHARACTER OUTPUT ROUTINE
OC16         424  WAIT1  EQU $FCA8
OC16         425  BUFPTR FPZ $FE          ;BUFFER POINTER
OC34         426  PTRS   DFS 30          ;FILE POINTERS
OC34         427  ; INPUT/OUTPUT CONTROL BLOCK AS DESCRIBED IN THE APPLE DOS 3.2 M
OC34         428  ; PAGES 91-98, AND 123-138.
OC34 01       429  IOB    HFX 01
OC35 60       430  SLOT  HFX 60          ;SLOT 6
OC36 01       431  DRIVE  HFX 01          ;DRIVE 1
OC37 00       432  VOL    HEX 00          ;ANY VOLUME
OC38 11       433  TRACK  HFX 11          ;TRACK TO BE RFAD/WRITTEN
OC39 00       434  SECTOR  HFX 00          ;SFCTOR TO BE RFAD/WRITTEN
OC3A 450C     435  DCT    ADR DEVICE          ;POINTER TO DEVICE CHAR. TABLE
OC3C 490C     436  BUF    ADR BUFFER          ;POINTER TO BUFFFR ARFA.
OC3E 0000     437  UNUSED  HFX 0000
OC40 00       438  CMD    HEX 00          ;COMMAND CODE GOES HERE.
OC41 00       439  ERROR  HEX 00          ;ERROR CODE RETURNED HERE.
OC42 00       440  ACTVOL  HEX 00          ;ACTUAL VOLUME FOUND
OC43 60       441  PRVSLT  HEX 60          ;PREVIOUS SLOT
OC44 01       442  PRVDRV  HEX 01          ;PREVIOUS DRIVE
OC45 0001EF   443  DEVICE  HEX 0001EFD8          ;DEVICE CHARACTERISTICS TABLE
OC48 D8
OC49         444  BUFFER  EQU *
OC49         445  LENGTH  EQU *-CONTRL

```

0C49 446 PAG
 447 END

***** END OF ASSEMBLY

```
*****
*
* SYMBOL TABLE -- V 1.5 *
*
*****
```

LABEL. LOC. LABEL. LOC. LABEL. LOC.

** ZERO PAGE VARIABLES:

BASE 0028 OLDBAS 0006 FILE1 000B CSRHRZ 0024 POINT 00FA PMESS 00FC
BUFPTR 00FE

** ABSOLUTE VARIABLES/LABELS

CONTRL 0900	CTRLP 0919	CTR1 0934	CHANGE 094A	CTR2 0972					
BASIC 09AC	PFILE 09B3	PFLP 09B7	CTR3 09C6	CTREX 09D3	FILFRR 09D4				
CAT 09F3	CLOOP 0A07	GETCUR 0A17	CAT1 0A32	CATLP 0A44	CATLP2 0A52				
EXIT 0A6F	PRTFIL 0A70	PRT1 0A98	PRTX 0AAA	SETEOB 0AAB	PBUFF 0AB1				
PBLP 0AB7	PBEXIT 0AC5	LPEN 0AC6	LOOP 0ADC	WAIT 0AE5	DNT 0AF4				
NEWC 0B08	GREST 0B21	DIVIDE 0B3F	DIV2 0B4B	DIV3 0B70	HOME FC58				
DONE C0D1	START C0D0	XOVFL C0D4	XCOORD C0D2	YCOORD C0D3	RING C0D6				
BASCAL FBC1	XLOW 0330	XHIGH 0331	YLOW 0332	XLORES 0333	YLORES 0334				
XTEXT 0335	YTEXT 0336	CHAR 0337	LINE 0338	RWAIT 0339	QUOTL 033A				
QUOTH 033B	XL 033C	XH 033D	YL 033E	YH 033F	MFSS 0B99				
BRUN 0BF1	RUN 0BFA	FRR 0BF2	INDFX 0C0F	COUNT 0C10	FOB 0C11				
OLDX 0C12	OLDY 0C13	TEMP 0C14	TFMP1 0C15	LINK 0001	GETIOB 03F3				
SETTXT FB39	VTAB FC24	ERFOL FC9C	PUTC FDED	WAIT1 FCA8	PTRS 0C16				
IOB 0C34	SLOT 0C35	DRIVE 0C36	VOL 0C37	TRACK 0C38	SECTOR 0C39				
DCT 0C3A	BUF 0C3C	UNUSED 0C3E	CMD 0C40	ERROR 0C41	ACTVOL 0C42				
PRVSLT 0C43	PRVDRV 0C44	DEVICE 0C45	BUFFER 0C49	LFNGTH 0349					

SYMBOL TABLE STARTING ADDRESS:5800
SYMBOL TABLE LENGTH:033A

!PR#0
PR#0

```

30000 REM MAKE THIS STATEMENT
30010 REM PART OF A DIM STATEMENT
30020 REM AT THE BEGINNING OF
30030 REM YOUR PROGRAM
30040 DIM ZX(2),ZY(2)
30050 REM INITIALIZE MINIMUM
30060 REM VALUES FOR X COORD.
30070 Z1=512:ZQ=0
30080 REM NOW RUN THROUGH LIGHT
30090 REM PEN'S TEARDROP WINDOW
30100 REM AND LOOK FOR A MINIMUM
30110 REM X VALUE
30120 REM FIRST START THE PEN
30130 POKE -16176,ZQ
30140 REM NOW WAIT FOR THE PEN
30150 REM TO GET POINT AND GO
30160 REM DONE SO WE CAN GET
30170 REM THE COORDINATES
30180 IF PEEK (-16175)<128 THEN 30180
30190 REM NOW PULL COORDINATES
30200 REM OFF THE PEN CARD
30210 ZX(0)= PEEK (-16174)+256*( PEEK (-16172)>127): REM HI-RES X COORDINATE
30220 ZY(0)= PEEK (-16173): REM HI-RES Y COORDINATE
30230 IF ZX(0)>Z1 THEN 30330
30240 REM X WAS LOWER THAN THE
30250 REM PREVIOUS MINIMUM SO
30260 REM CHECK IF NEXT ONE IS
30270 REM LESS THAN THIS ONE
30280 Z1=ZX(0):Z2=ZY(0):ZQ=ZQ+1: GOTO 30130
30290 REM THIS IS TO WAIT FOR
30300 REM RING TO BE PRESSED
30310 REM SO THE USER CAN
30320 REM INDICATE HIS RESPONSE
30330 IF PEEK (-16170)<128 THEN 30330
30340 REM MINIMUM X VALUE WAS
30350 REM FOUND SO CALCULATE
30360 REM THE VALUES FOR THE
30370 REM LO-RES AND TEXT SCREENS
30380 ZX(0)=Z1:ZX(1)=Z1/7:ZX(2)=ZX(1)+1
30390 ZY(0)=Z2:ZY(1)=Z2/4:ZY(2)=Z2/8+1
30400 REM CALCULATE MEMORY LOC.
30410 REM FOR TEXT SCREEN
30420 ZU=1024+128*(ZY(1) MOD 8)+40*(ZY(0)/64)+ZX(1)
30430 REM GET CHAR FROM SCREEN
30440 POS=14:CMD= PEEK (ZU): GOSUB 30450: GOTO 30460
30450 LC1= PEEK (224):LC2= PEEK (225)-(LC1>244): POKF 81+POS+LC1-256*(LC2>
127)+(LC2-255*(LC2>127))*256,CMD: RFTURN
30460 ZN= PEEK (ZU):Z$="L"
30470 RFTURN
30480 REM
30490 REM *****
30500 REM * *
30510 REM * COPYRIGHT 1979 *
30520 REM * *
30530 REM * SYMTEC, INC. *
30540 REM * *
30550 REM *****

```

```

60000 REM MAKE THIS STATEMENT
60010 RFM PART OF A DIM STATEMENT
60020 REM AT THE BEGINNING OF
60030 REM YOUR PROGRAM
60040 DIM ZX(2),ZY(2)
60050 RFM INITIALIZE MINIMUM
60060 REM VALUES FOR X COORD.
60070 Z1 = 512:ZQ = 0
60080 REM NOW RUN THROUGH LIGHT
60090 REM PEN'S TEARDROP WINDOW
60100 REM AND LOOK FOR A MINIMUM
60110 REM X VALUE
60120 REM FIRST START THE PEN
60130 POKE - 16176,ZQ
60140 REM NOW WAIT FOR THE PEN
60150 REM TO GET POINT AND GO
60160 REM DONE SO WE CAN GET
60170 REM THE COORDINATES
60180 IF PEEK ( - 16175) < 128 THEN 60180
60190 REM NOW PULL COORDINATES
60200 REM OFF THE PEN CARD
60210 ZX(0) = PEEK ( - 16174) + 256 * ( PEEK ( - 16172) > 127): REM HI-R
    ES X COORDINATE
60220 ZY(0) = PEEK ( - 16173): RFM HI-RES Y COORDINATE
60230 IF ZX(0) > Z1 THEN 60330
60240 REM X WAS LOWER THAN THE
60250 REM PREVIOUS MINIMUM SO
60260 REM CHECK IF NEXT ONE IS
60270 REM LESS THAN THIS ONE
60280 Z1 = ZX(0):Z2 = ZY(0):ZQ = ZQ + 1: GOTO 60130
60290 REM THIS IS TO WAIT FOR
60300 REM RING TO BE PRESSED
60310 REM SO THE USER CAN
60320 RFM INDICATE HIS RESPONSE
60330 IF PEEK ( - 16170) < 128 THEN 60330
60340 REM MINIMUM X VALUE WAS
60350 RFM FOUND SO CALCULATE
60360 REM THE VALUES FOR THE
60370 REM LO-RES AND TEXT SCREENS
60380 ZX(0) = Z1:ZX(1) = INT (Z1 / 7):ZX(2) = ZX(1) + 1
60390 ZY(0) = Z2:ZY(1) = INT (Z2 / 4):ZY(2) = INT (Z2 / 8) + 1
60400 REM CALCULATE MEMORY LOC.
60410 REM FOR TEXT SCREEN
60420 ZU = 1024 + 128 * INT ((ZY(1) / 8 - INT (ZY(1) / 8)) * 8) + 40 *
    INT (ZY(0) / 64) + ZX(1)
60430 REM GET CHAR FROM SCREEN
60440 ZN = PEEK (ZU):Z$ = CHR$ (ZN)
60450 RETURN
60460 REM
60470 REM *****
60480 REM *   COPYRIGHT   1979 *
60490 REM *
60500 REM *   SYMTEC, INC.   *
60510 REM *
60520 REM *****

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35 DIM BO(5,5),SC(2),A$(2),CO(2),WX(6),WY(6),WN(6)
40 TEXT : HOME : VTAB 12
45 HTAB 16: PRINT "LIGHT PEN": PRINT
50 HTAB 14: PRINT "CONCENTRATION"
70 FOR T = 1 TO 2000: NEXT :CO(1) = 0:CO(2) = 0
80 GOTO 260
100 REM BOARD
105 RESTORE
110 FOR Q = 0 TO 4: FOR K = 0 TO 4: READ BO(Q,K): NEXT K,Q
170 FOR Q = 0 TO 4: FOR K = 0 TO 4
190 X3 = INT ( RND (1) * 5):X4 = INT ( RND (1) * 5)
200 Z = BO(X3,X4):BO(X3,X4) = BO(Q,K):BO(Q,K) = Z
230 NEXT K,Q:TURN = 0: GOTO 2000
260 HOME : VTAB 10
270 PRINT "HOW MANY PLAYERS ";: INPUT HG: PRINT : IF HG = 0 THEN 500
290 PRINT "WHAT IS PLAYER #1'S NAME ";: INPUT A$(1): IF HG = 1 THEN 600
310 PRINT "WHAT IS PLAYER #2'S NAME ";: INPUT A$(2): GOTO 1000
500 A$(1) = "APPLE I":CO(1) = 1
600 A$(2) = "APPLE II":CO(2) = 1
700 GOTO 1000
800 REM LIGHT PEN SUBROUTINE
810 Z1 = 512:ZQ = 0
820 POKE - 16176,ZQ
830 IF PEEK ( - 16175) < 128 THEN 830
840 ZX = PEEK ( - 16174) + 256 * ( PEEK ( - 16172) > 127)
850 ZY = PEEK ( - 16173)
860 IF ZX > Z1 THEN 890
870 Z1 = ZX:Z2 = ZY:ZQ = ZQ + 1: GOTO 820
890 ZX = Z1:ZY = Z2: RETURN
1000 TEXT : CALL - 936: GR : COLOR= 2
1005 FOR P = 0 TO 32 STEP 8: FOR L = 0 TO 6: FOR M = 1 TO 5
1040 HLIN (M - 1) * 8,(M - 1) * 8 + 6 AT P + L
1050 NEXT M,L,P:SC(1) = 0:SC(2) = 0: GOTO 100
2000 REM MAIN PROGRAM
2010 TURN = TURN + 1
2020 VTAB (22): PRINT " TURN #";TURN
2030 FOR TR = 1 TO 2
2040 PRINT A$(TR);"'S TURN"
2045 IF CO(TR) = 1 GOTO 2121
2050 GOSUB 800: IF PEEK ( - 16170) < 128 THEN 2050
2070 X = INT (ZX / 7):Y = INT (ZY / 4)
2075 IF X > 39 OR X < 0 OR Y > 39 OR Y < 0 GOTO 2050
2080 IF SCRN( X,Y) = 0 GOTO 2050
2090 X = INT (X / 8):Y = INT (Y / 8)
2100 IF BO(X,Y) > 0 GOTO 2125
2110 PRINT "ALREADY PICKED. TRY AGAIN."
2115 FOR H = 1 TO 100: NEXT H
2120 GOTO 2050
2121 GOSUB 25000
2125 MN = BO(X,Y)
2126 GOSUB 27000
2127 PRINT " ";
2130 ON MN GOSUB 11000,12000,13000,14000,15000,16000,17000,11500,12500,1
3500,14500,15500,16500
2140 FOR V = 1 TO 100: NEXT V
2150 A = X:B = Y
2155 IF CO(TR) = 1 GOTO 2261
2160 GOSUB 800: IF PEEK ( - 16170) < 128 THEN 2160
2180 X = INT (ZX / 7):Y = INT (ZY / 4)
2185 IF X > 39 OR X < 0 OR Y > 39 OR Y < 0 GOTO 2160
2190 IF SCRN( X,Y) = 0 GOTO 2160
2200 X = INT (X / 8):Y = INT (Y / 8)

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2210 IF BO(X,Y) > 0 GOTO 2240
2220 PRINT "ALREADY PICKED. TRY AGAIN."
2230 GOTO 2160
2240 IF X < > A OR Y < > B GOTO 2265
2250 PRINT "YOU JUST PICKED THAT. TRY AGAIN."
2260 GOTO 2160
2261 GOSUB 26000
2265 MN = BO(X,Y)
2267 GOSUB 27000
2268 PRINT "";
2270 ON MN GOSUB 11000,12000,13000,14000,15000,16000,17000,11500,12500,1
3500,14500,15500,16500
2280 IF BO(X,Y) = BO(A,B) OR BO(A,B) = 7 OR BO(X,Y) = 7 GOTO 3000
2290 PRINT : PRINT "SORRY, NO MATCH."
2300 FOR KP = 1 TO 500: NEXT
2320 COLOR= 2
2330 FOR M = 0 TO 6: HLIN X * 8,X * 8 + 6 AT Y * 8 + M: HLIN A * 8,A * 8
+ 6 AT B * 8 + M: NEXT M
2390 GOTO 4000
3000 PRINT : PRINT "A MATCH !!!"
3005 IF BO(A,B) = 7 THEN WI = BO(X,Y)
3007 IF BO(X,Y) = 7 THEN WI = BO(A,B)
3010 SC(TR) = SC(TR) + 1
3020 BO(A,B) = 0:BO(X,Y) = 0
3030 HN = 0
3040 FOR V = 1 TO 5: FOR I = 1 TO 5: IF BO(V,I) > 0 THEN HN = HN + 1
3050 NEXT I,V
3090 IF HN < 2 THEN 30000
3095 GOTO 2040
4000 HOME : NEXT TR
4030 PRINT " THE SCORES ARE : "
4040 PRINT A$(1);": ";SC(1)
4050 PRINT A$(2);": ";SC(2)
4060 FOR N = 1 TO 1000: NEXT : HOME : GOTO 2000
11000 COLOR= 12: GOSUB 20000
11010 COLOR= 14
11020 HLIN X * 8 + 1,X * 8 + 5 AT Y * 8 + 1
11030 HLIN X * 8 + 1,X * 8 + 5 AT Y * 8 + 5
11040 VLIN Y * 8 + 1,Y * 8 + 5 AT X * 8 + 1
11050 VLIN Y * 8 + 1,Y * 8 + 5 AT X * 8 + 5
11060 RETURN
11500 COLOR= 4: GOSUB 20000
11510 COLOR= 10: GOTO 14020
12000 COLOR= 11: GOSUB 20000
12010 COLOR= 7: GOTO 11020
12500 COLOR= 13: GOSUB 20000
12510 COLOR= 14: GOTO 16020
13000 COLOR= 8: GOSUB 20000
13010 COLOR= 5: GOTO 11020
13500 COLOR= 8: GOSUB 20000
13510 COLOR= 6: GOTO 16020
14000 COLOR= 13: GOSUB 20000
14010 COLOR= 3
14020 HLIN X * 8 + 1,X * 8 + 5 AT Y * 8 + 3
14030 VLIN Y * 8 + 1,Y * 8 + 5 AT X * 8 + 3
14040 RETURN
14500 COLOR= 3: GOSUB 20000
14510 COLOR= 11
14520 FOR M = 1 TO 5 STEP 2
14530 HLIN X * 8 + 1,X * 8 + 5 AT Y * 8 + M
14540 VLIN Y * 8 + 1,Y * 8 + 5 AT X * 8 + M
14550 NEXT M
14560 RETURN
15000 COLOR= 14: GOSUB 20000
15010 COLOR= 9: GOTO 14020
15500 COLOR= 7: GOSUB 20000

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15510 COLOR= 4: GOTO 14520
16000 COLOR= 1: GOSUB 2000
16010 COLOR= 15
16020 FOR S = 1 TO 5
16030 PLOT X * 8 + S, Y * 8 + S
16040 PLOT X * 8 + (S * - 1) + 6, Y * 8 + S
16050 NEXT S
16060 RETURN
16500 COLOR= 1: GOSUB 20000
16510 COLOR= 6: GOTO 14520
17000 COLOR= 5: GOSUB 20000
17010 COLOR= 9
17020 FOR R = 1 TO 5 STEP 2
17030 VLIN Y * 8 + 1, Y * 8 + 5 AT X * 8 + R
17040 NEXT R
17050 PLOT X * 8 + 2, Y * 8 + 5: PLOT X * 8 + 4, Y * 8 + 5
17060 VTAB (24): PRINT " THE WILD CARD !!!
17070 RETURN
20000 FOR D = 0 TO 6
20010 HLINE X * 8, X * 8 + 6 AT Y * 8 + D
20020 NEXT D
20030 RETURN
25000 FOR K = 1 TO 5: FOR B = K + 1 TO 6
25020 IF WN(K) = WN(B) THEN 25100
25030 NEXT B, K
25050 X = INT ( RND (1) * 5): Y = INT ( RND (1) * 5)
25060 IF BO(X, Y) = 0 GOTO 25070
25061 IF BO(X, Y) = WI GOTO 25070
25062 IF TURN > 1 AND HN < 5 GOTO 25068
25063 FOR LT = 1 TO 6
25064 IF X = WX(LT) AND Y = WY(LT) GOTO 25050
25066 NEXT LT
25068 RETURN
25070 X = X + 1: IF X > 4 THEN Y = Y + 1
25080 IF X > 4 THEN X = 0: IF Y > 4 THEN Y = 0
25090 GOTO 25060
25100 IF BO(WX(K), WY(K)) = 0 GOTO 25030
25101 IF K = B GOTO 25030
25105 IF WX(1) = WX(3) AND WY(1) = WY(3) GOTO 25030
25110 IF BO(WX(B), WY(B)) = 0 GOTO 25030
25120 X = WX(B): Y = WY(B): RETURN
26000 FOR FV = 1 TO 6
26010 IF WN(FV) = BO(A, B) GOTO 26040
26020 NEXT FV
26030 GOSUB 25050
26032 IF X = A AND Y = B GOTO 26030
26035 RETURN
26040 IF BO(WX(FV), WY(FV)) = 0 GOTO 26020
26045 IF A = WX(FV) AND B = WY(FV) GOTO 26020
26050 X = WX(FV): Y = WY(FV): RETURN
27000 FOR PL = 5 TO 1 STEP - 1
27010 WX(PL + 1) = WX(PL)
27020 WY(PL + 1) = WY(PL)
27030 WN(PL + 1) = WN(PL)
27040 NEXT PL
27050 WX(1) = X: WY(1) = Y: WN(1) = BO(X, Y)
27060 RETURN
30000 TEXT : HOME : VTAB 9: PRINT " FINAL SCORES"
30020 PRINT : PRINT A$(1); " : "; SC(1); " : "; A$(2); " : "; SC(2)
30030 PRINT : SZ = 1: IF SC(2) > SC(1) THEN SZ = 2
30060 IF SC(2) = SC(1) THEN PRINT " A TIE !!!!!!!": GOTO 30100
30070 PRINT A$(SZ); " WINS !!!!!!"
30100 IF CO(1) = 0 OR CO(2) = 0 THEN 30109
30105 FOR Q = 1 TO 1000: NEXT : GOTO 1000
30109 PRINT : INPUT "DO YOU WANT TO PLAY AGAIN? "; X$
30118 IF LEFT$(X$, 1) = "Y" THEN 1000

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30120 VTAB 20: PRINT " BYE !": VTAB 22
30150 DATA 1,2,3,4,9,8,7,6,5,10,11,12,13,1,2,3,4,5,6,8,9,10,11,12,13
60000 END

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The responsibility for the failure of the Symtec Inc. Light Pen product, or component thereof, which at the discretion of Symtec Inc., shall have resulted from accident, abuse, or misapplication of the product, shall be assumed by the customer, and Symtec Inc. shall assume no liability as a consequence of such events under the terms of this warranty. Further, the limited warranty provided with this Symtec Inc. product also shall be void if customer causes or permits the Symtec product to be repaired or modified by anyone other than the Symtec Inc. warranty service center.

While every effort on the part of Symtec Inc. has been made to provide clear and accurate technical information on the application of its products, Symtec Inc. assumes no liability in any events which may arise from the use of said technical information.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

This warranty is in lieu of all other express warranties which now or hereafter might otherwise arise with respect to this product. Any and all implied warranties, including the warrantids of mercantability and fitness for particular purpose, shall have no greater duration than the duration period for the express written warranty applicable to this product, as shown above, and shall terminate automatically at the expiration of such duration period. Some states do not allow limitations on how long an implied warranty lasts, so the

above limitation may not apply to you. No action shall be brought for breach of any implied or express warranty after one year subsequent to the expiration of the duration period of the express written warranty.

Incidental and consequential damages caused by malfunction, defect or otherwise, and with respect to breach of any express or implied warranty, are not the responsibility of Symtec Inc. and, to the extent permitted by law, are hereby excluded both for property damage and, to the extent not unconscionable, for personal injury damage. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Send Warranty Registration Card To:

Symtec Inc.
P.O. Box 462
Farmington, Michigan 48024

For Service on SYMTEC products
call (313) 272-2952

SYMTEC LIGHT PEN WARRANTY REGISTRATION CARD

Serial Number _____ Model Number _____

Purchased From _____
(Name of Store)

(Address)

Name _____

Address _____

City, State, Zip _____

Telephone Number _____ Purchase Date _____