GENERAL COMPUTER
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I.M.A.G.E.

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I.M.A.G.E. was written to aid you in creating graphics drawings, charts, and to give you the necessaray routines needed for graphics. Within the editor are several subroutines useful for general purpose graphics. A description and instructions on these routines will be descused later in this text.

The editor takes control commands from the keyboard. These where chosen over regular keys for the followins reasons. Two fingers are required to complete a command, therefore erasing the screen by accident, after a lot of work, becomes much harder, also the possibility of conflictions with other languages is lessoned, leaving the entire ascii set available for other uses.

By using I.M.A.G.E. in conJunction with the save functions of audio,Phimon, or Diskmon you can save the pictures you draw with the editor. The vectors that you change for audio cassette saves are 001 052 #OCT, 012A #HEX (byte), and 001 055 #OCT, 012D #HEX (page). In Phimon and Diskmon you give the command- "SA name (FIRST PAGE)-(LAST PAGE)". You don't have to save all 8K if you know the beginning and ending address of your drawing, but to make it simpler you might as well save all 8K.

I.M.A.G.E. also has a menu selection facility which uses the light pen that comes with the Digital Group high resolution graphics board. Up to six functions can be activated simply by pointing the light pen to the desired box and pressing a button. Three of the funtions are already used. The block labeled "S" draws a single point where the crosshair is located. Choose the "D" to continually draw with the light pen. "U1" erases with the light pen. "U2 thru U4" are user selectable. When you load in the cassette "U2 thru U4" will vecter to the system monitor. To change these vectors to Jump to a program that you have written three Jump vectors have been provided. The spaces between the blocks vector to the main command loop. The addresses for these vectors are in appendix #3 along with the other important addresses for adding subroutines and interfaceing I.M.A.G.E. to other languages.

Another function of this editor is the ablity to have it execute multiple commands. This is acomplished by using a command buffer set aside for at the end of the code for I.M.A.G.E. In order for you to use this function you must first set a flag to let the command loop in the editor know which mode it is in. This is explained in detail further in the text.

I.M.A.G.E. uses a crosshair cursor. Full cursor commands are provided, with a software repeat key. After loading the cassette, the Digital Group Op System will appear with the regular menu commands. Number 7 will say I.M.A.G.E. Before going into I.M.A.G.E. you must let the program know where you have the graphics board located. You do this the same way it was done in the software supplied with the Digital Group Graphics board. You go to the address of "GRFST" and insert the address of the location you have your board, low order first, high order second. Return to the Op System and press number 7. On graphics monitor the menu will appear on the bottom of the screen. The buffer is not cleared when you enter the editor, permitting one to leave the editor and return to it without erasing what hase been previously drawn.To clear the screen press control C, then to display the menu press control G. You may then press the home

key to display the crosshair cursor. Before using the light pen calibrate it, (explained further in text), press Home and the crosshair cursor will follow the pen. Since the crosshair cursor is in the complementing mode after any routine clears the screen you must press Home or you will get multiple crosshairs. Option #8 enters I.M.A.G.E. in the macro mode.

SYSTEM REQUIREMENTS

4 K of system memory
One Digital Group Graphics Board and Light Pen.
Keyboard.
Monitor.
Z-80 CPU.

The capabilities of I.M.A.G.E. are shown in the following table:

Executive Commands:

Software repeat on all keyboard commands.

HOME — Centers the crosshair cursor.
Hex:9E, Octal:236

ARROW KEYS — Move the cursor - control keys can be used if your keyboard does not have arrows.
Control H: Moves the cursor left. Hex:88, Octal:210
Control I: Moves the cursor right.Hex:8C, Octal:214
Control Q: Moves the cursor down.Hex:8A, Octal:212
Control R: Moves the cursor up.Hex:8B, Octal:213
Control K: Homes the cursor.Hex:9E, Octal:236

CONTROL 'S": Turns on one dot at the center of the crosshair. Repressing Control 'S" will turn that dot off. The single point routine in the editor is different than in most point programs in that it is in the complimenting mode. This makes drawing with single dots easier, you don't have to keep changing the color flag, just position the cursor over the dot.
Hex:93, Octal:223

CONTROL 'E": First point of a line.
Hex:85, Octal:205

CONTROL 'D": End point of a line.
Hex:84, Octal:204

CONTROL 'A": Command to draw a line between the points given by the previous Control 'E" and 'D" commands. Can be used to draw lines with a common starting point and different ending point by moving the crosshair cursor and pressing control 'D" after pressing control 'A" to draw each line.
Hex:81, Octal:201

CONTROL 'B": Draws a box around the points given by the Control 'E" and 'D" commands.
Hex:82, Octal:202

After giving the control 'E' and 'P' commands you must move the crosshair cursor away from the area of the box or else the program will not draw over the area of the crosshair.

Control 'W": The editor will come up with this flag being one, and no color block displayed. Pressing control 'W" will display the color 0 block in the menu area To toggle press control 'W" and C=1 will be displayed.
Hex:97, Octal:227

CONTROL 'C": Clears the graphics buffer. Further decription on manipulation of this routine is mentioned later in the text.
Hex:83, Octal:203

CONTROL 'F": Calls the calibrate light pen routines. The message " CAL " and a dot positioned at the center of the screen will appear.
To calibrate the pen simply place the end of the pen over the dot and press the button on the pen. The screen will flash white once, and the program will return back to the command loop. At that point you must press Home before using the light pen or moving the crosshair. There is more information on calibrating the light pen in the manual supplied with the graphics board. These are basicly the same routines.
Hex:86, Octal:206

CONTROL 'G": Displays a menu of six blocks. If the menu area is overwritten, it can be redisplayed without erasing the graphics buffer by pressing Control 'G". To change the contents of a block displayed in the menu you must follow the decribed method in appendix #1.
Hex:87, Octal:207

CONTROL 'O": Toggles the menu enable flag. If you do not wish to use the menu, control 'O" will turn it off so you can use the entire graphics buffer for your image. Repressing control 'O" will turn it back on. This command is very nice to have when you wish for whatever reason to use the whole screen or wish not to use the light pen and menu.
Hex:8F, Octal:217

CONTROL 'R": Allows you to draw continually with the light pen. The light pen must have been calibrated before you enter this routine.
Hex:92, Octal:222

CONTROL 'X": Same as control 'R" except it erases.
Hex:98, Octal:230

CONTROL 'Q": Escapes from the control 'R" and 'X" commands and returns you to the command loop.
Hex:91, Octal:221

CONTROL 'T": Jumps back to the system monitor. Can be modified to return you anywhere you like by filling an exit vector with the address you want to Jump to.

The address is (072E).
Hex:94, Octal:224

A top down approach will be taken to explain some of the various subroutines in I.M.A.G.E. This approch is taken to assist you in understandins I.M.A.G.E. in conjuntion with readins the source code from the top down to the end if you wish.

I.M.A.G.E. besins with the lable "NOMAC". This code sets a flas called "STRING" which in turn is used by the command loop which checks to see if you are in the macro mode. To clear "strins" so you can use the editor in the macro mode, you enter I.M.A.G.E. at "MACRO" instead of "NOMAC". Option #8 in the Opsys is for this purpose.

The lable "START" loads the "HL" resister pair with the address of your macro buffer. This buffer may have up to 256 character entrys in it. It must also have as its first character the number of characters in your strins.
Each character is an eisht bit byte. For example the list of commands "09,83,9E,85,8A,8A,8A,8A,84,81"HEX would clear the screen,4 home the cross,set the first dot of a line,move the cross down four places,set the last dot of a line, draw the line between the dots,and then return. In the command list is also a list of the HEX and OCTAL eisht bit values of the commands.

This function can be used by itself or with a hish level lansuase such as Oasis basic with its "USR" strins function or a lansuase you may have.

"INIT" follows with the necessary code to initialize the sraphics board IO, set all the prosram flass,and to let the software know where the sraphics board is. The tape you reseived has the board located at 8000 HEX. To chanse it, use the opsystem to so to the address (0C85),chanse it from 00 80 to the address you have your board located. The lable for this address in your source code is "AUTO".

"MCROSS" draws the crosshair cursor. When "MCROSS" draws it is in the complimentins mode, therefore it can be moved over other drawinss without erasins them.

"COM1" is the main command loop. It looks for the keystrobe, the lisht pen button, and checks to see if the software is in the macro mode. If the lisht pen button comes true (pressed), the prosram jumps to "MENU0" which in turn looks to see if the pen is in the menu area, if not the software moves the crosshair to where the lisht pen is pointins. Otherwise "COM1" loops lookins for the keystrobe.

To place your own prosram in the menu table, put the address of your routine in the "USER#" you wish to use. The address of the user vectors are (09DF) for "USER2", (09E2) for "USER3", (09E5) for "USER4". The only restrictions for placins your own routines into the menu selector are that when they are finished you must jump to "CRL2" which takes care of the prosram flass. The address of "CRL2" is (0B65).

The sraphics board and the lisht pen use 1 input and 1 output port. This software uses port #7 for input and output. If you do not wish to use port #7 then you must reassemble I.M.A.G.E. or use the table in appendix #2 to chanse the addresses of the port accesses.

The Point and Plot routi.. s are similar to the ones supplied with your Disital Group Hish ..esolution Graphics Board, except these routines are not calle. through a menu like *"GETVAL" but are callable routines. For ex..mple to use Point in a Program of your own you would say: CALL POINT, and Point ends with a "RET"
*****BOTTOM OF PAGE TO SAY "SEE LISTING IN GRAPHICS BOARD MANUAL"****

The General Purpose routines available in I.M.A.G.E. are

Point: Draws a Point at the coordinates siven by "X" & "Y".

Plot: Draws a line between "X1", "Y1" & "X2", "Y2".

Both must have "COLOR" set to the appropriate number.

Clear: Clear the sraphics buffer. Can be chansed to clear only part of the screen by substitutins the amount you want cleared into the location "AMOUNT+1" which is in the subroutine "CLEAR".

APPENDIX 1

If you wish to chanse the appearance of one or more of the blocks in the menu to suit your own taste it is done by the followins method.

1. Go into the editor with the #7 command. Clear the screen. Home the cross. Display the menu. Move the cross to the block you wish to chanse. Alter the block to the way you want it,then home the cross. Press control "T' to Jump to the opsystem. Goto the address of "DISMEN" (0000). Referins to the sourse you will see the code:

```
DISMEN  LD      BC,607D
        LD      DE,MENBUF
        LD      HL,METEMP
        LDIR
        JP      COM1
```

Exchange the address in "MENBUF" with the address in "MENTEMP", example:

```
        Before  A2D4    11 A0 9C
                A2D7    21 1C A7

        After   A2D4    21 1C A7
                A2D7    11 A0 9C
```

Return to the opsystem, so into the editor, and press control "G'. No apparent chanse will be seen, but immediately save this core imase of the editor and it will now display your menu chanses.

APPENDIX 2
LIST OF ADDRESS TO CHANGE FOR DIFFERENT PORTS.

OPORT LABLES:	INIT+2:	(0632)
	CALP:	(09F2)
	CSTART+2:	(0A6B)
	BLKOFF+1:	(0A6E)
	L8NOT-1:	(0A88)
	INPOS+2:	(0A95)
	STAT2-4:	(0A9A)
	STAT+2:	(0A9F)
	STXCON+2:	(0AAC)
	LOADD:	(0B78)
IPORT LABLES:	PEN:	(069D)
	CALDO:	(0A20)
	DLOOP:	(0A44)
	LOCATE:	(0A74)
	L8CON+7:	(0A80)
	L8NOT:	(0A84)

APPENDIX 3
List of pertinent addresses

NOMAK: (0600)

MACRO: (0608)

FAKE: (1205)

INIT: (0630)

AUTO: (0647)

MCROSS: (0650)

COM1: (068E)

CRL2: (0B65)

MENU0: (093D)

PLOT: (0B7F)

POINT: (0BDC)

CLEAR: (0C66)

AMOUNT: (0C6C)

X: (0C7D)

Y: (0C7F)

X1: (0C81)

Y1: (0C82)

X2: (0C83)

Y2: (0C84)

GRFST: (0C85)

USER1: (09DF)

USER2: (09E2)

USER3: (09E5)

```
ASSM

885E                    0100 * IMAGE SOURCE   V 1.0  AUGUST 1979
885E                    0110 * GENERAL COMPUTER TECHNOLOGY
885E                    0120 *
0600                    0130        ST   0600H
0600                    0140 * THIS ENTRY POINT DOES NOT USE THE BUUFER COMMAND LOOP
0600 3E FF              0150        LD   A,0FFH
0602 32 93 0C           0160        LD   (STRING),A
0605                    0170 * JUMP TO INITILIZE
0605 C3 28 06           0180        JP   G01
0608                    0190 * SET STRING TO USE COMMAND BUFFER
0608 3E 00              0200        LD   A,0
060A 32 93 0C           0210        LD   (STRING),A
060D                    0220 * FALL INTO MACRO MODE
060D                    0230 *
060D                    0240 * LOAD HL WITH THE ADDRESS OF COMMAND BUFFER
060D                    0250 * ROUTINE TO EXECUTE COMMANDS FROM BUFFER "FAKE"
060D 21 05 12           0260 START  LD   HL,FAKE
0610 E5                 0270 STCOM  PUSH HL
0611 7E                 0280        LD   A,(HL)
0612 47                 0290        LD   B,A
0613 23                 0300 LOOP   INC  HL
0614 E5                 0310        PUSH HL
0615 C5                 0320        PUSH BC
0616 F5                 0330        PUSH AF
0617 7E                 0340        LD   A,(HL)
0618 C3 A9 06           0350        JP   COM2
061B F1                 0360 LOOP1  POP  AF
061C C1                 0370        POP  BC
061D E1                 0380        POP  HL
061E 10 F3              0390        DJNZ LOOP
0620                    0400 * GET NUMBER OF OPCODES BACK
0620 E1                 0410 RET    POP  HL
0621 77                 0420        LD   (HL),A
0622 CD 50 06           0430        CALL MCROSS
0625                    0440 * CHANGE THIS LOC TO JUMP WHERE YOU WANT TO
0625 C3 00 05           0450        JP   5000       ONCE IN BASIC WILL BE 'RET"
0628                    0460 * INITILIZE SEQUENCE
0628 3E 80              0470 G01    LD   A,80H
062A 32 03 12           0480        LD   (USTACK-1),A
062D 32 02 12           0490        LD   (USTACK-2),A
0630 3E FF              0500 INIT   LD   A,0FFH
0632 D3 07              0510        OUT  OPORT
0634 3E 02              0520        LD   A,2
0636 32 4E 0D           0530        LD   (COLOR),A
0639 3E 00              0540        LD   A,0
063B 32 8F 0C           0550        LD   (FLAG),A
063E 32 92 0C           0560        LD   (STX),A
0641 32 90 0C           0570        LD   (TOGGLE),A
0644 32 03 10           0580        LD   (COLORT),A
0647 21 00 80           0590 AUTO   LD   HL,8000H
064A 22 85 0C           0600        LD   (GRFST),HL
064D                    0610 * DONT CLEAR BUT DRAW MENU
064D C3 F7 08           0620        JP   DISMEN
0650                    0630 * DRAWS CROSS CURSOR
0650 3E 02              0640 MCROSS LD   A,2
0652 32 4E 0D           0650        LD   (COLOR),A
0655 ED 4B 02 12        0660        LD   BC,(USTACK-2)
0659 78                 0670        LD   A,B
065A 32 80 0C           0680        LD   (Y+1),A
065D 79                 0690        LD   A,C
065E D6 02              0700        SUB  2
```

```
0660 1E 05        0710         LD   E,5
0662 32 7E 0C     0720 CML2    LD   (X+1),A
0665 C5           0730         PUSH BC
0666 F5           0740         PUSH AF
0667 D5           0750         PUSH DE
0668 CD DC 0B     0760         CALL POINT
066B D1           0770         POP  DE
066C F1           0780         POP  AF
066D C1           0790         POP  BC
066E 3C           0800         INC  A
066F 1D           0810         DEC  E
0670 C2 62 06     0820         JP   NZ,CML2
0673 79           0830         LD   A,C
0674 32 7E 0C     0840         LD   (X+1),A
0677 78           0850         LD   A,B
0678 D6 02        0860         SUB  2
067A 1E 05        0870         LD   E,5
067C 32 80 0C     0880 CML3    LD   (Y+1),A
067F C5           0890         PUSH BC
0680 D5           0900         PUSH DE
0681 F5           0910         PUSH AF
0682 CD DC 0B     0920         CALL POINT
0685 F1           0930         POP  AF
0686 D1           0940         POP  DE
0687 C1           0950         POP  BC
0688 3C           0960         INC  A
0689 1D           0970         DEC  E
068A C2 7C 06     0980         JP   NZ,CML3
068D C9           0990         RET
068E              1000 * MAIN KEYBOARD COMMAND LOOP
068E DB 00        1010 COM1    IN   KEY
0690 E6 80        1020         AND  80H
0692 C2 A7 06     1030         JP   NZ,SERVIC
0695 3A 93 0C     1040         LD   A,(STRING)
0698 FE 00        1050         CP   0
069A CA 1B 06     1060         JP   Z,LOOP1
069D DB 07        1070 PEN     IN   IPORT
069F CB 67        1080         BIT  4,A
06A1 C2 8E 06     1090         JP   NZ,COM1
06A4 C3 3D 09     1100         JP   MENUO
06A7              1110 * COMPARE LOOP FOR CONTROL KEYS
06A7 DB 00        1120 SERVIC  IN   KEY
06A9 FE 85        1130 COM2    CP   85H          CNTL. 'E"
06AB CA 9C 07     1140         JP   Z,FDOT
06AE FE 8B        1150         CP   8BH           "UPARROW"
06B0 CA 49 07     1160         JP   Z,UARROW
06B3 FE 8A        1170         CP   8AH           "DARROW"
06B5 CA 56 07     1180         JP   Z,DARROW
06B8 FE 8C        1190         CP   8CH           "RARROW"
06BA CA 63 07     1200         JP   Z,RARROW
06BD FE 88        1210         CP   88H           "LARROW"
06BF CA 70 07     1220         JP   Z,LARROW
06C2 FE 84        1230         CP   84H          CNTL. "D"
06C4 CA B7 07     1240         JP   Z,LDOT
06C7 FE 93        1250         CP   93H          CNTL. "S"
06C9 CA 7D 07     1260         JP   Z,SDOT
06CC FE 9E        1270         CP   9EH          CNTL. "H" OR "HOME"
06CE CA 89 07     1280         JP   Z,CHOME
06D1 FE 81        1290         CP   81H          CNTL. "A"
06D3 CA D2 07     1300         JP   Z,DDOT
06D6 FE 82        1310         CP   82H           CNTL. "B":DRAW BOX
06D8 CA 03 08     1320         JP   Z,BOX
06DB FE 8F        1330         CP   8FH          CNTL. "O"
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```
06DD CA 21 07     1340        JP   Z,MTOG
06E0 FE 83        1350        CP   83H          CNTL. "C":CLEAR
06E2 CA 2C 09     1360        JP   Z,CLMEM
06E5 FE 92        1370        CP   92H          CNTL. "R":DRAW
06E7 CA BD 09     1380        JP   Z,DRAW
06EA FE 98        1390        CP   98H
06EC CA 0C 09     1400        JP   Z,UDRAW      CNTL. "X":JUMP TO UNDRAW
06EF FE 87        1410        CP   87H          CNTL. "G":DISPLAY MENU
06F1 CA F7 08     1420        JP   Z,DISMEN
06F4 FE 97        1430        CP   97H          CNTL. "W":TOGGLE COLOR FLAG
06F6 32 98 0C     1440        LD   (CKEY),A     TELL COLOR COMING FROM KEYBOARD
06F9 CA 9D 08     1450        JP   Z,COLORS
06FC FE 86        1460        CP   86H          CNTL. "F":CALIBRATE LIGHT PEN
06FE CA 31 07     1470        JP   Z,CALROU
0701 FE 94        1480        CP   94H          CNTL. "T":JUMP TO SYSTEM
0703 CA 2B 07     1490        JP   Z,ESCAPE
0706              1500 * SEE IF WERE DOING A BUFFER EXECUTION
0706 3A 93 0C     1510 ST?    LD   A,(STRING)
0709 FE 00        1520        CP   0
070B CA 1B 06     1530        JP   Z,LOOP1
070E C3 8E 06     1540        JP   COM1
0711              1550 * DRAW WITH LIGHT PEN FROM KEY COMMAND.
0711 CD F2 07     1560 DRAW1  CALL RFLAG
0714 3E 01        1570        LD   A,1
0716 32 8F 0C     1580        LD   (FLAG),A
0719 3E 01        1590        LD   A,1
071B CD 7B 01     1600        CALL DELAY
071E C3 8E 06     1610        JP   COM1
0721              1620 * TOGGLE MENU ENABLE
0721 3A 90 0C     1630 MTOG   LD   A,(TOGGLE)
0724 2F           1640        CPL
0725 32 90 0C     1650        LD   (TOGGLE),A
0728 C3 8E 06     1660        JP   COM1
072B              1670 * CLEAR CROSS AND JUMP TO MONITOR
072B CD F2 07     1680 ESCAPE CALL RFLAG
072E C3 00 05     1690        JP   5000
0731              1700 * CALIBRATE LIGHT PEN
0731 CD E8 09     1710 CALROU CALL CAL
0734 3E 05        1720        LD   A,5
0736 CD 7B 01     1730        CALL DELAY
0739 C3 8E 06     1740        JP   COM1
073C              1750 * LOAD POINT X & Y WITH LIGHT PEN X & Y
073C 3A 03 12     1760 ASSIGN LD   A,(USTACK-1)
073F 32 80 0C     1770        LD   (Y+1),A
0742 3A 02 12     1780        LD   A,(USTACK-2)
0745 32 7E 0C     1790        LD   (X+1),A
0748 C9           1800        RET
0749              1810 * MOVE CROSSHAIR UP ONE
0749 CD F2 07     1820 UARROW CALL RFLAG
074C 3A 03 12     1830        LD   A,(USTACK-1)
074F 3D           1840        DEC  A
0750 32 03 12     1850        LD   (USTACK-1),A
0753 C3 65 08     1860        JP   CRL2
0756              1870 * MOVE CROSSHAIR DOWN ONE
0756 CD F2 07     1880 DARROW CALL RFLAG
0759 3A 03 12     1890        LD   A,(USTACK-1)
075C 3C           1900        INC  A
075D 32 03 12     1910        LD   (USTACK-1),A
0760 C3 65 08     1920        JP   CRL2
0763              1930 * MOVE CROSSHAIR RIGHT ONE
0763 CD F2 07     1940 RARROW CALL RFLAG
0766 3A 02 12     1950        LD   A,(USTACK-2)
0769 3C           1960        INC  A,
```

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076A 32 02 12      1970         LD   (USTACK-2),A
076D C3 65 08      1980         JP   CRL2
0770               1990 * MOVE CROSSHAIR LEFT ONE
0770 CD F2 07      2000 LARROW  CALL RFLAG
0773 3A 02 12      2010         LD   A,(USTACK-2)
0776 3D            2020         DEC  A
0777 32 02 12      2030         LD   (USTACK-2),A
077A C3 65 08      2040         JP   CRL2
077D               2050 * PLOT A SINGLE DOT WHERE CROSSHAIR IS
077D CD F2 07      2060 SDOT    CALL RFLAG
0780 CD 3C 07      2070         CALL ASSIGN
0783 CD DC 0B      2080         CALL POINT
0786 C3 65 08      2090         JP   CRL2
0789               2100 * HOME CROSSHAIR
0789 3E 02         2110 CHOME   LD   A,2
078B 32 4E 0D      2120         LD   (COLOR),A
078E CD F2 07      2130         CALL RFLAG
0791 3E 80         2140         LD   A,80H
0793 32 03 12      2150         LD   (USTACK-1),A
0796 32 02 12      2160         LD   (USTACK-2),A
0799 C3 65 08      2170         JP   CRL2
079C               2180 * PLOT AND SAVE FIRST DOT OF A LINE
079C CD F2 07      2190 FDOT    CALL RFLAG
079F 3A 02 12      2200         LD   A,(USTACK-2)
07A2 32 FA 0F      2210         LD   (LIBUF),A
07A5 32 7E 0C      2220         LD   (X+1),A
07A8 3A 03 12      2230         LD   A,(USTACK-1)
07AB 32 FB 0F      2240         LD   (LIBUF+1),A
07AE 32 80 0C      2250         LD   (Y+1),A
07B1 CD DC 0B      2260         CALL POINT
07B4 C3 65 08      2270         JP   CRL2
07B7               2280 * PLOT AND SAVE LAST DOT OF A LINE
07B7 CD F2 07      2290 LDOT    CALL RFLAG
07BA 3A 02 12      2300         LD   A,(USTACK-2)
07BD 32 FC 0F      2310         LD   (LIBUF+2),A
07C0 32 7E 0C      2320         LD   (X+1),A
07C3 3A 03 12      2330         LD   A,(USTACK-1)
07C6 32 FD 0F      2340         LD   (LIBUF+3),A
07C9 32 80 0C      2350         LD   (Y+1),A
07CC CD DC 0B      2360         CALL POINT
07CF C3 65 08      2370         JP   CRL2
07D2               2380 * PLOT THE LINE
07D2 CD F2 07      2390 DDOT    CALL RFLAG
07D5 2A FA 0F      2400         LD   HL,(LIBUF)
07D8 22 81 0C      2410         LD   (X1),HL
07DB 2A FC 0F      2420         LD   HL,(LIBUF+2)
07DE 22 83 0C      2430         LD   (X2),HL
07E1 3A 03 10      2440         LD   A,(COLORT)
07E4 32 4E 0D      2450         LD   (COLOR),A
07E7 CD 7F 0B      2460         CALL PLOT
07EA 3E 02         2470         LD   A,2
07EC 32 4E 0D      2480         LD   (COLOR),A
07EF C3 65 08      2490         JP   CRL2
07F2               2500 * ROUTINE TO KEEP CROSSHAIR CORRECT
07F2 3A 8F 0C      2510 RFLAG   LD   A,(FLAG)
07F5 FE 00         2520         CP   0
07F7 CA 02 08      2530         JP   Z,RFLAG1
07FA 3E 02         2540         LD   A,2
07FC 32 4E 0D      2550         LD   (COLOR),A
07FF CD 50 06      2560         CALL MCROSS
0802 C9            2570 RFLAG1  RET
0803               2580 * DRAW A BOX FROM THE VECTORS IN FDOT AND LDOT
0803 3A 03 10      2590 BOX     LD   A,(COLORT)
```

```
0806 32 4E 0D      2600          LD    (COLOR),A
0809 3E 01         2610          LD    A,1
080B 32 8F 0C      2620          LD    (FLAG),A
080E 2A FA 0F      2630 BOXST    LD    HL,(LIBUF)        GET X1 & Y1
0811 ED 5B FC 0F   2640          LD    DE,(LIBUF+2)      GET X2 & Y2
0815 42            2650          LD    B,D               B=X2
0816 4D            2660          LD    C,L               C=Y1
0817 ED 43 FE 0F   2670          LD    (BOXBUF),BC       STORE UPPER LEFT CORNER
081B 44            2680          LD    B,H               B=X1
081C 4B            2690          LD    C,E               C=Y2
081D ED 43 00 10   2700          LD    (BOXBUF+2),BC     STORE LOWER RIGHT CORNER
0821 22 81 0C      2710 BOXDRW   LD    (X1),HL           STORE FIRST VECTOR
0824 ED 4B FE 0F   2720          LD    BC,(BOXBUF)       GET SECOND VECTOR
0828 ED 43 83 0C   2730          LD    (X2),BC           STORE
082C CD 5D 08      2740          CALL  BOXDO             DRAW TOP LINE
082F 2A FC 0F      2750          LD    HL,(LIBUF+2)      GET X2 &Y2
0832 22 83 0C      2760          LD    (X2),HL           HL=LOWER LEFT CORNER
0835 ED 43 81 0C   2770          LD    (X1),BC           X1=UPPER LEFT CORNER
0839 CD 5D 08      2780          CALL  BOXDO             DRAW LEFT LINE
083C ED 4B 00 10   2790          LD    BC,(BOXBUF+2)     BC=LOWER RIGHT CORNER
0840 ED 43 83 0C   2800          LD    (X2),BC           X2=  "     "     "
0844 22 81 0C      2810          LD    (X1),HL           X1=LOWER LEFT CORNER
0847 CD 5D 08      2820          CALL  BOXDO             DRAW BOTTOM LINE
084A 2A FA 0F      2830          LD    HL,(LIBUF)        HL=UPPER RIGHT CORNER
084D 22 83 0C      2840          LD    (X2),HL           X2=  "     "     "
0850 ED 43 81 0C   2850          LD    (X1),BC           X1=LOWER RIGHT CORNER
0854 CD 5D 08      2860          CALL  BOXDO             DRAW RIGHT LINE
0857 CD F2 07      2870          CALL  RFLAG
085A C3 65 08      2880          JP    CRL2
085D E5            2890 BOXDO    PUSH  HL              SAVE REGISTERS
085E C5            2900          PUSH  BC
085F CD 7F 0B      2910          CALL  PLOT            PLOT THE LINE
0862 C1            2920          POP   BC              RESTORE THE REGISTERS
0863 E1            2930          POP   HL
0864 C9            2940          RET
0865               2950 * ERACE OLD CROSS AND SEE IF KEY IS STILL VALID
0865 CD 50 06      2960 CRL2     CALL  MCROSS
0868 3E 01         2970          LD    A,1
086A 32 8F 0C      2980          LD    (FLAG),A
086D               2990 * IF KEY IS STILL VALID THEN REPEAT
086D 3E 01         3000 ZZTEST   LD    A,1
086F 16 0C         3010          LD    D,0CH
0871 CD 7D 01      3020          CALL  DELAY+2
0874 DB 00         3030          IN    KEY
0876 CB FF         3040          SET   7,A
0878 CB 5F         3050          BIT   3,A
087A CA 8E 06      3060          JP    Z,COM1
087D F5            3070          PUSH  AF
087E 3E 01         3080          LD    A,1
0880 16 0C         3090          LD    D,0CH
0882 CD 7D 01      3100          CALL  DELAY+2
0885 F1            3110          POP   AF
0886 C3 A9 06      3120          JP    COM2
0889 3A 02 10      3130 OVERLY   LD    A,(BIT)
088C CB 6F         3140          BIT   5,A
088E CA 96 08      3150          JP    Z,BL1
0891 CB EF         3160          SET   5,A
0893 C3 98 08      3170          JP    BL2
0896 CB AF         3180 BL1      RES   5,A
0898 D3 07         3190 BL2      OUT   OPORT
089A C3 8E 06      3200          JP    COM1
089D               3210 * TOGGLE COLOR FLAG,AND CHANGE COLOR BLOCK
089D 3A 4E 0D      3220 COLORS   LD    A,(COLOR)
```

```
08A0 FE 00        3230          CP   0
08A2 CA C4 08     3240          JP   Z,CL1
08A5 3E 00        3250          LD   A,0
08A7 32 03 10     3260          LD   (COLORT),A
08AA 32 4E 0D     3270          LD   (COLOR),A
08AD 11 A2 9C     3280          LD   DE,COLADR
08B0 21 06 0D     3290          LD   HL,COLOR0
08B3 CD E3 08     3300          CALL WORPIC
08B6 3A 98 0C     3310          LD   A,(CKEY)
08B9 FE 00        3320          CP   0
08BB C2 8E 06     3330          JP   NZ,COM1
08BE CD 50 06     3340          CALL MCROSS
08C1 C3 8E 06     3350          JP   COM1
08C4 3E 01        3360 CL1      LD   A,1
08C6 32 03 10     3370          LD   (COLORT),A
08C9 32 4E 0D     3380          LD   (COLOR),A
08CC 11 A2 9C     3390          LD   DE,COLADR
08CF 21 2A 0D     3400          LD   HL,COLOR1
08D2 CD E3 08     3410          CALL WORPIC
08D5 3A 98 0C     3420          LD   A,(CKEY)
08D8 FE 00        3430          CP   0
08DA C2 8E 06     3440          JP   NZ,COM1
08DD CD 50 06     3450          CALL MCROSS
08E0 C3 8E 06     3460          JP   COM1
08E3 0E 24        3470 WORPIC   LD   C,36D
08E5 3E 1E        3480 L1       LD   A,30D
08E7 ED A0        3490          LDI
08E9 ED A0        3500          LDI
08EB 83           3510          ADD  E
08EC 5F           3520          LD   E,A
08ED D2 F1 08     3530          JP   NC,CL2
08F0 14           3540          INC  D
08F1 0D           3550 CL2      DEC  C
08F2 0C           3560          INC  C
08F3 C2 E5 08     3570          JP   NZ,L1
08F6 C9           3580          RET
08F7              3590 * DISPLAY MENU
08F7 01 5F 02     3600 DISMEN   LD   BC,607D
08FA 11 A0 9C     3610          LD   DE,MENBUF
08FD 21 50 0D     3620          LD   HL,METEMP
0900 ED B0        3630          LDIR
0902 C3 8E 06     3640          JP   COM1
0905 97           3650 CLBUMP   SUB  A
0906 32 98 0C     3660          LD   (CKEY),A
0909 C3 9D 08     3670          JP   COLORS
090C              3680 * UNDRAW WITH LIGHT PEN FROM KEY COMMAND
090C 3A 92 0C     3690 UDRAW    LD   A,(STX)
090F FE 00        3700          CP   0
0911 C2 17 09     3710          JP   NZ,STXL3
0914 32 4E 0D     3720          LD   (COLOR),A
0917 3E 00        3730 STXL3    LD   A,0
0919 32 4E 0D     3740          LD   (COLOR),A
091C 3E 05        3750          LD   A,5
091E CD 7B 01     3760          CALL DELAY
0921 CD 44 0A     3770          CALL DLOOP
0924 3E 00        3780          LD   A,0
0926 32 8F 0C     3790          LD   (FLAG),A
0929 C3 89 07     3800          JP   CHOME
092C              3810 * CLEAR MEMORY AND HOME CROSS
092C 3E 00        3820 CLMEM    LD   A,0
092E 32 8F 0C     3830          LD   (FLAG),A
0931 32 92 0C     3840          LD   (STX),A
0934 CD F2 07     3850          CALL RFLAG
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0937 CD 66 0C      3860          CALL CLEAR
093A C3 89 07      3870          JP   CHOME
093D               3880 * SEE IF PEN IS POINTED TO MENU, IF NOT PUT CROSS THERE
093D CD 50 06      3890 MENUO    CALL MCROSS
0940 CD 65 0A      3900          CALL LSTART
0943 3A 90 0C      3910          LD   A,(TOGGLE)
0946 FE 00         3920          CP   0
0948 C2 52 09      3930          JP   NZ,TOGDRA
094B 3A 03 12      3940          LD   A,(USTACK-1)
094E D6 E5         3950          SUB  0E5H
0950 30 03         3960          JR   NC,MENU1
0952 C3 11 07      3970 TOGDRA   JP   DRAW1
0955 3A 03 12      3980 MENU1    LD   A,(USTACK-1)
0958 D6 F7         3990          SUB  0F7H
095A 38 03         4000          JR   C,MENU2
095C C3 11 07      4010          JP   DRAW1
095F               4020 * TAKE X & Y, SHIFT TO FIND BLOCK PEN IS AT
095F 21 78 09      4030 MENU2    LD   HL,MTABLE
0962 3A 02 12      4040          LD   A,(USTACK-2)
0965 D6 08         4050          SUB  08D
0967 CB 3F         4060          SRL  A
0969 CB 3F         4070          SRL  A
096B CB 3F         4080          SRL  A
096D CB 3F         4090          SRL  A
096F CB 17         4100          RL   A
0971 85            4110          ADD  L
0972 6F            4120          LD   L,A
0973 D2 77 09      4130          JP   NC,TJUMP
0976 24            4140          INC  H
0977 E9            4150 TJUMP    JP   (HL)
0978               4160 * TABLE OF MENU OPTIONS
0978 18 1E         4170 MTABLE   JR   NOBLK
097A 18 89         4180          JR   CLBUMP
097C 18 1A         4190          JR   NOBLK
097E 18 23         4200          JR   DSDOT
0980 18 16         4210          JR   NOBLK
0982 18 39         4220          JR   DRAW
0984 18 12         4230          JR   NOBLK
0986 18 84         4240          JR   UDRAW
0988 18 0E         4250          JR   NOBLK
098A 18 53         4260          JR   USER1
098C 18 0A         4270          JR   NOBLK
098E 18 52         4280          JR   USER2
0990 18 06         4290          JR   NOBLK
0992 18 51         4300          JR   USER3
0994 18 02         4310          JR   NOBLK
0996 18 00         4320          JR   NOBLK
0998               4330 * IF NONVALID BLOCK JUMP TO COM1 AFTER A DELAY
0998 3E 02         4340 NOBLK    LD   A,2
099A CD 7B 01      4350          CALL DELAY
099D CD 50 06      4360          CALL MCROSS
09A0 C3 8E 06      4370          JP   COM1
09A3               4380 * PLOT SINGLE DOT WHERE CROSS IS
09A3               4390 *
09A3 3E 01         4400 DSDOT    LD   A,1
09A5 32 4E 0D      4410          LD   (COLOR),A
09A8 CD DC 0B      4420          CALL POINT
09AB 3E 02         4430          LD   A,2
09AD 32 4E 0D      4440          LD   (COLOR),A
09B0 3E 05         4450          LD   A,5
09B2 CD 7B 01      4460          CALL DELAY
09B5 3E 00         4470          LD   A,0
09B7 32 8F 0C      4480          LD   (FLAG),A
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09BA C3 89 07      4490          JP    CHOME
09BD               4500 * DRAW WITH LIGHT PEN FROM MENU
09BD 3A 92 0C      4510 DRAW     LD    A,(STX)
09C0 FE 00         4520          CP    0
09C2 C2 CA 09      4530          JP    NZ,STXL2
09C5 3E 01         4540          LD    A,1
09C7 32 4E 0D      4550          LD    (COLOR),A
09CA 3E 01         4560 STXL2    LD    A,1
09CC 32 4E 0D      4570          LD    (COLOR),A
09CF 3E 05         4580          LD    A,5
09D1 CD 7B 01      4590          CALL  DELAY
09D4 CD 44 0A      4600          CALL  DLOOP
09D7 3E 00         4610          LD    A,0
09D9 32 8F 0C      4620          LD    (FLAG),A
09DC C3 89 07      4630          JP    CHOME
09DF               4640 * ALL USER MENU SELECTIONS JUMP TO MONITOR
09DF               4650 * CHANGE IF YOU LIKE TO ANY ROUTINES YOU WRITE
09DF               4660 * ALWAYS HAVE THEM JUMP TO "COM1" WHEN FINISHED
09DF C3 00 05      4670 USER1    JP    5000
09E2 C3 00 05      4680 USER2    JP    5000
09E5 C3 00 05      4690 USER3    JP    5000
09E8               4700 *CALIBRATE LIGHT PEN ROUTINE*
09E8               4710 *THIS ROUTINE DISPLAYS THE MESSAGE " CAL " ON THE
09E8               4720 * SCREEN AND A DOT AT THE COORDINATES 80-80
09E8               4730 * THE MIDDLE OF THE SCREEN.*
09E8 3E 00         4740 CAL      LD    A,0
09EA 32 8B 0C      4750          LD    (YOFF),A
09ED 32 8D 0C      4760          LD    (XOFF),A
09F0 3E FF         4770          LD    A,0FFH
09F2 D3 07         4780 CALP     OUT   OPORT
09F4 CD 66 0C      4790          CALL  CLEAR
09F7 3E 01         4800          LD    A,01
09F9 32 4E 0D      4810          LD    (COLOR),A
09FC               4820 * DRAWS WHAT EVER X & Y 'S ARE IN XARRAY & YARRAY
09FC 21 99 0C      4830 PIC1     LD    HL,XARRAY
09FF 01 CF 0C      4840          LD    BC,YARRAY
0A02 7E            4850 PIC2     LD    A,(HL)
0A03 32 7E 0C      4860          LD    (X+1),A
0A06 0A            4870          LD    A,(BC)
0A07 32 80 0C      4880          LD    (Y+1),A
0A0A FE FF         4890          CP    0FFH
0A0C CA 1B 0A      4900          JP    Z,CALDO
0A0F E5            4910          PUSH  HL
0A10 C5            4920          PUSH  BC
0A11 CD DC 0B      4930          CALL  POINT
0A14 C1            4940          POP   BC
0A15 E1            4950          POP   HL
0A16 23            4960 INC      INC   HL
0A17 03            4970          INC   BC
0A18 C3 02 0A      4980          JP    PIC2
0A1B 3E 00         4990 CALDO    LD    A,0
0A1D 32 4E 0D      5000          LD    (COLOR),A
0A20 DB 07         5010 CALDO    IN    IPORT
0A22 CB 67         5020          BIT   4,A
0A24 C2 20 0A      5030          JP    NZ,CALDO
0A27 CD 65 0A      5040          CALL  LSTART
0A2A               5050 * CALIBRATION OFFSET ROUTINE
0A2A 3E 01         5060 IO       LD    A,1
0A2C 32 4E 0D      5070          LD    (COLOR),A
0A2F 3A 03 12      5080          LD    A,(USTACK-1)
0A32 C6 80         5090          ADD   80H
0A34 ED 44         5100          NEG
0A36 32 8B 0C      5110          LD    (YOFF),A
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0A39 3A 02 12      5120         LD   A,(USTACK-2)
0A3C C6 80         5130         ADD  80H
0A3E ED 44         5140         NEG
0A40 32 8D 0C      5150         LD   (XOFF),A
0A43 C9            5160         RET
0A44               5170 * CONTINUALLY DRAW WITH LIGHT PEN. EXIT ON CNTL. "Q"
0A44 DB 07         5180 DLOOP   IN   IPORT
0A46 CB 67         5190         BIT  4,A
0A48 C2 5D 0A      5200         JP   NZ,DLOOP1
0A4B CD 65 0A      5210         CALL LSTART
0A4E 3A 03 12      5220         LD   A,(USTACK-1)
0A51 32 80 0C      5230         LD   (Y+1),A
0A54 3A 02 12      5240         LD   A,(USTACK-2)
0A57 32 7E 0C      5250         LD   (X+1),A
0A5A CD DC 0B      5260         CALL POINT
0A5D DB 00         5270 DLOOP1  IN   KEY
0A5F FE 91         5280         CP   91H
0A61 C8            5290         RET  Z
0A62 C3 44 0A      5300         JP   DLOOP
0A65               5310 * START OF LOCATE LIGHT PEN ROUTINE
0A65 ED 73 95 0C   5320 LSTART  LD   (SSTACK),SP
0A69 3E FE         5330 CSTART  LD   A,0FEH       CLR FOUND,STROBE STATUS,WHITE
0A6B               5340 *                         OFF,LED OFF,BLACK ON
0A6B D3 07         5350         OUT  OPORT
0A6D 3C            5360 BLKOFF  INC  A            BLACK OFF
0A6E D3 07         5370         OUT  OPORT
0A70 3E 00         5380         LD   A,0
0A72 D3 00         5390         OUT  TV
0A74 DB 07         5400 LOCATE  IN   IPORT
0A76 CB 77         5410         BIT  6,A          LOCATE=1?
0A78 CA 74 0A      5420         JP   Z,LOCATE
0A7B 3E 7B         5430 L8CON   LD   A,7BH
0A7D 5F            5440         LD   E,A
0A7E 06 00         5450         LD   B,0          INITIALIZE COUNT
0A80 0E 07         5460         LD   C,IPORT
0A82 16 40         5470         LD   D,40H        L8 MASK
0A84 21 03 12      5480         LD   HL,USTACK-1
0A87 7B            5490         LD   A,E          REMOVE CLR,STROBE STATUS,WHITE
0A88               5500 *                         ON,LED ON,BLACK OFF
0A88 D3 07         5510         OUT  OPORT
0A8A               5520 ******** LOOK FOR RETRACE TIME *********
0A8A DB 07         5530 L8NOT   IN   IPORT
0A8C A2            5540         AND  D
0A8D C2 8A 0A      5550         JP   NZ,L8NOT
0A90 C3 9E 0A      5560         JP   STAT2
0A93               5570 ****** GET LIGHT PEN LOCATIONS ********
0A93 3E 78         5580 INPOS   LD   A,78H
0A95 D3 07         5590         OUT  OPORT
0A97 ED AA         5600         IND
0A99 3C            5610         INC  A            STROBE 01
0A9A D3 07         5620         OUT  OPORT
0A9C ED AA         5630         IND
0A9E 7B            5640 STAT2   LD   A,E          STATUS STROBE
0A9F D3 07         5650         OUT  OPORT
0AA1 ED 78         5660 STAT2X  IN   A,(C)
0AA3 FA 93 0A      5670         JP   M,INPOS       FOUND=1?
0AA6 A2            5680         AND  D             NO,L8=1?
0AA7 CA A1 0A      5690         JP   Z,STAT2X      NO
0AAA 3E 7F         5700 STXCON  LD   A,7FH
0AAC D3 07         5710         OUT  OPORT
0AAE 97            5720         SUB  A
0AAF B8            5730         CP   B
0AB0 CA 69 0A      5740         JP   Z,CSTART
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0AB3                    5750 ****** INITIALIZE TO COMPUTE DOT LOCATIONS ******
0AB3 21 03 12           5760         LD   HL,USTACK-1
0AB6 31 84 11           5770         LD   SP,USTACK-128D
0AB9 78                 5780         LD   A,B
0ABA 08                 5790         EX   AF,AF'              SAVE B
0ABB 16 00              5800         LD   D,0
0ABD CB 28              5810         SRA  B
0ABF                    5820 ********CHECK LINE VALUES*******************
0ABF 4E                 5830 NXTLIN  LD   C,(HL)              LOAD C WITH LOW LINE
0AC0 2B                 5840         DEC  HL
0AC1 2B                 5850         DEC  HL
0AC2 7E                 5860         LD   A,(HL)              LOAD A WITH HIGH LINE
0AC3 91                 5870         SUB  C
0AC4 D6 03              5880         SUB  3D
0AC6 F2 D3 0A           5890         JP   P,CHEK2
0AC9 79                 5900         LD   A,C
0ACA F5                 5910         PUSH AF                SAVE LOW LINE
0ACB 14                 5920         INC  D
0ACC 04                 5930         INC  B
0ACD C2 BF 0A           5940         JP   NZ,NXTLIN         NO
0AD0 C3 E0 0A           5950         JP   LINES           YES,PICK FOUR BEST VALUES
0AD3 04                 5960 CHEK2   INC  B
0AD4 CA DD 0A           5970         JP   Z,SAVLN
0AD7 7E                 5980         LD   A,(HL)
0AD8 F5                 5990         PUSH AF             SAVE HIGHER LINE
0AD9 14                 6000         INC  D
0ADA C3 BF 0A           6010         JP   NXTLIN
0ADD 79                 6020 SAVLN   LD   A,C
0ADE F5                 6030         PUSH AF             SAVE LOW LINE
0ADF 14                 6040         INC  D
0AE0                    6050 ****** GET BEST VALUES FOR AVERAGING ********
0AE0 42                 6060 LINES   LD   B,D
0AE1 14                 6070         INC  D
0AE2 15                 6080         DEC  D
0AE3 CA 69 0A           6090         JP   Z,CSTART
0AE6 21 00 00           6100         LD   HL,0
0AE9 4A                 6110         LD   C,D
0AEA 16 00              6120         LD   D,0
0AEC F1                 6130 SUML    POP  AF
0AED 5F                 6140         LD   E,A
0AEE 19                 6150         ADD  HL,DE
0AEF 05                 6160         DEC  B
0AF0 C2 EC 0A           6170         JP   NZ,SUML
0AF3 16 00              6180         LD   D,0
0AF5 ED 42              6190 AVGLIN  SBC  HL,BC
0AF7 FA FE 0A           6200         JP   M,LOADL
0AFA 14                 6210         INC  D
0AFB C3 F5 0A           6220         JP   AVGLIN
0AFE 3A 8B 0C           6230 LOADL   LD   A,(YOFF)
0B01 82                 6240         ADD  D
0B02 32 03 12           6250         LD   (USTACK-1),A
0B05                    6260 ********INITIALIZE FOR DOT LOCATIONS************
0B05 08                 6270 DOTLO   EX   AF,AF'
0B06 31 84 11           6280         LD   SP,USTACK-128D
0B09 CB 2F              6290         SRA  A
0B0B 47                 6300         LD   B,A
0B0C FD 21 04 12        6310         LD   IY,USTACK
0B10 1E 00              6320         LD   E,0
0B12 3C                 6330         INC  A
0B13                    6340 ********GET DOTS************
0B13 DD 21 02 12        6350 GETDOT  LD   IX,USTACK-2
0B17 4F                 6360         LD   C,A
0B18 26 00              6370         LD   H,0
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0B1A 16 00          4380          LD    D,0
0B1C FD 2B            FD          INC   IY
0B1E   7E             7E          LD    A,(IY+0)
                                  CP    (IY+0)
                                  JR    NZ,
                                  LD    E,A
                                  ADD   HL,DE
                                  DJNZ
                                  LD    A,(HL)
                                  LD    (IX+0),A
                                  INC   IX
                                  JR
                                  LD    A,(IY+0)
                                  LD    (IX+0),A
                                  INC   IX
                                  INC   IY
                                  DEC   BC
                                  LD    A,B
                                  OR    C
                                  JR    NZ,
                                  RET
0B2E 16 01                        LD    D,1
                                  LD    A,(IY+0)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+1)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+2)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+3)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+4)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+5)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+6)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+7)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+8)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+9)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+10)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+11)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+12)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+13)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+14)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+15)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+16)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+17)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+18)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+19)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+20)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+21)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+22)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+23)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+24)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+25)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+26)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+27)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+28)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+29)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+30)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+31)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+32)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+33)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+34)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+35)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+36)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+37)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+38)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+39)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+40)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+41)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+42)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+43)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+44)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+45)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+46)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+47)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+48)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+49)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+50)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+51)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+52)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+53)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+54)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+55)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+56)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+57)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+58)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+59)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+60)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+61)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+62)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+63)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+64)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+65)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+66)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+67)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+68)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+69)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+70)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+71)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+72)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+73)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+74)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+75)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+76)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+77)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+78)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+79)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+80)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+81)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+82)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+83)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+84)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+85)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+86)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+87)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+88)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+89)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+90)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+91)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+92)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+93)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+94)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+95)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+96)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+97)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+98)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+99)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+100)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+101)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+102)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+103)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+104)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+105)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+106)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+107)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+108)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+109)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+110)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+111)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+112)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+113)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+114)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+115)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+116)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+117)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+118)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+119)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+120)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+121)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+122)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+123)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+124)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+125)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+126)
                                  CP    0
                                  JR    NZ,
                                  LD    A,(IY+127)
                                  CP    0
                                  JR    NZ,
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0B8D 4F          7010 L2     LD   C,A          FIXED DELTA Y+1
0B6E 3A 83 0C    7020        LD   A,(X2)
0B91 67          7030        LD   H,A          PUT IT IN H REG
0B92 3A 81 0C    7040        LD   A,(X1)
0B95 94          7050        SUB  H            SUBTRACT X2 FROM X1
0B96 57          7060        LD   D,A          PUT X DIS/256 IN DELTA X
0B97 3E 00       7070        LD   A,0          CLEAR ACCUMULATOR
0B99 30 01       7080        JR   NC,L3        JUMP IF THERE WAS NO BORROW
0B9B 2F          7090        CPL               CORRECT SIGN OF HB IF NEGITIVE
0B9C 5F          7100 L3     LD   E,A          FIXED DELTA X+1
0B9D 21 00 00    7110        LD   HL,0         START COUNTER ANEW
0BA0 22 7D 0C    7120        LD   (X),HL       THIS IS TO CLEAR THE LOW BYTE
0BA3 22 7F 0C    7130        LD   (Y),HL       ONLY,TO SAVE BYTES CLEAR BOTH
0BA6 3A 84 0C    7140        LD   A,(Y2)
0BA9 32 80 0C    7150        LD   (Y+1),A      TO THE FIRST POINT WE PLOT
0BAC 3A 83 0C    7160        LD   A,(X2)
0BAF 32 7E 0C    7170        LD   (X+1),A      SAME HERE
0BB2 C5          7180 JPOINT PUSH BC           SAVE DELTA Y
0BB3 D5          7190        PUSH DE           SAVE DELTA X
0BB4 C5          7200        PUSH HL           SAVE THE COUNTER
0BB5 CD DC 0B    7210        CALL POINT        GO PLOT THE POINT
0BB8 E1          7220 PPOINT POP  HL
0BB9 D1          7230        POP  DE           RESTORE DELTA X
0BBA C1          7240        POP  BC           RESTORE DELTA Y
0BBB 3A 7F 0C    7250 FADD   LD   A,(Y)        GET Y
0BBE 80          7260        ADD  B            MOVE Y BY ONE BY ADDING 1/256
0BBF 32 7F 0C    7270        LD   (Y),A        PUT IT BACK IN Y
0BC2 3A 80 0C    7280        LD   A,(Y+1)      GET Y+1
0BC5 89          7290        ADC  C           ADD DELTA Y+1
0BC6 32 80 0C    7300        LD   (Y+1),A       PUT RESULT BACK IN Y+1
0BC9 3A 7D 0C    7310 SEADD  LD   A,(X)         GET X
0BCC 82          7320        ADD  D            MOVE X BY ONE BY ADDING 1/256
0BCD 32 7D 0C    7330        LD   (X),A        PUT RESULT BACK IN X
0BD0 3A 7E 0C    7340        LD   A,(X+1)      GET X+1
0BD3 8B          7350        ADC  E           ADD DELTA X+1
0BD4 32 7E 0C    7360        LD   (X+1),A       PUT RESULT BACK IN X+1
0BD7 2D          7370        DEC  L            START THE COUNT
0BD8 C2 B2 0B    7380        JP   NZ,JPOINT    PLOT 256 POINTS TO SAVE CODE
0BDB C9          7390 RETURN RET
0BDC 2A 85 0C    7400 POINT  LD   HL,(GRFST)   BEGINING OF POINT ROUTINE
0BDF ED 5B 80 0C 7410 YCOUNT LD   DE,(Y+1)     FIRST GET GRAFICS BUFFER
0BE3 16 00       7420        LD   D,0          THEN Y+1.NOW CLEAR D REG.
0BE5 B7          7430        OR   A            CLEAR CARRY FLAG
0BE6 CB 13       7440        RL   E            MULTIPLY THE DE REG.
0BE8 CB 12       7450        RL   D            BY 32 TO GIVE US OUR
0BEA CB 13       7460        RL   E            LINE COUNT.THIS SUBR.
0BEC CB 12       7470        RL   D            MOVES THE COUNT BY 32
0BEE CB 13       7480        RL   E            WHICH IS THE NUMBER OF
0BF0 CB 12       7490        RL   D            BYTES IN A LKNE
0BF2 CB 13       7500        RL   E
0BF4 CB 12       7510        RL   D
0BF6 CB 13       7520        RL   E
0BF8 CB 12       7530        RL   D           NOW ADD GRFST TO NUMBER
0BFA 19          7540        ADD  HL,DE       LINES TO GET Y
0BFB E5          7550 XCOUNT PUSH HL          BEGIN X COUNT ROUTINE
0BFC 3A 7E 0C    7560        LD   A,(X+1)     GET X
0BFF 4F          7570        LD   C,A         STORE IT IN C REG.
0C00 E6 07       7580        AND  07H         GET LAST 3 BITS
0C02 21 75 0C    7590        LD   HL,TABLE    GET ADDR. OF TABLE
0C05 85          7600 XLOOP  ADD  L           ADD L TO A TO GET OFFSET
0C06 6F          7610        LD   L,A        PUT OFFSET IN L REG.
0C07 D2 0B 0C    7620        JP   NC,MORE    IF CARRY WE KNOW THE BIT
0C0A 24          7630        INC  H
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0C0B 46          7640 MORE   LD   B,(HL)      LOAD B REG. BYTE
0C0C 79          7650        LD   A,C         GET OLD X
0C0D 0F          7660        RRCA             DIVIDE IT BY 8
0C0E 0F          7670        RRCA
0C0F 0F          7680        RRCA
0C10 E6 1F       7690        AND  1FH         GET LAST 5 BITS
0C12 E1          7700        POP  HL          GET LINE COUNT
0C13 85          7710        ADD  L           ADD LOW LINE COUNT TO A
0C14 6F          7720        LD   L,A         PUT ADDR. IN L REG.
0C15 7E          7730        LD   A,(HL)      PUT ADDR. IN A
0C16 32 87 0C    7740        LD   (HANDLE),A PUT IT IN A TEMP
0C19 22 89 0C    7750 GETVAL LD   (NHAN),HL  PUT ADDR. IN A TEMP
0C1C 21 2D 0C    7760        LD   HL,TAB      THIS ROUTINE IS TO FIND
0C1F 3A 4E 0D    7770        LD   A,(COLOR)         OUT IF WE WANT THE DOT
0C22 E6 07       7780        AND  07H         ON,OFF,COMP.,OR TESTED
0C24 CB 17       7790        RL   A           GET VALUE,MULTIPLY BY 2
0C26 85          7800        ADD  L          ADD TO TABLE
0C27 6F          7810        LD   L,A        PUT TABLE ADDITION IN L
0C28 D2 2C 0C    7820        JP   NC,MTAB
0C2B 24          7830        INC  H
0C2C E9          7840 MTAB   JP   (HL)
0C2D 18 0B       7850 TAB    JR   OFF         0 IN VALUE,POINT OFF
0C2F 18 13       7860        JR   ON          1 IN VALUE,POINT ON
0C31 18 17       7870        JR   CPL         2 IN VALUE,POINT COMPLIMENT
0C33 18 1B       7880        JR   TEST        3 IN VALUE,POINT TEST
0C35 18 02       7890        JR   LOFF        4 IN VALUE,LINE OFF
0C37 18 0A       7900        JR   LON         5 IN VALUE,LINE ON
0C39 00          7910 LOFF   NOP                LINE OFF NOP NEEDED
0C3A 3A 87 0C    7920 OFF    LD   A,(HANDLE)  GET BIT OF DOT
0C3D 4F          7930        LD   C,A         PUT IT IN C REG.
0C3E 78          7940        LD   A,B         GET LINE COUNT
0C3F 2F          7950        CPL              COMPLIMENT ACC.
0C40 A1          7960        AND  C           AND IT WITH BIT TO TURN OFF
0C41 18 1B       7970        JR   FINISH      WERE DONE
0C43 00          7980 LON    NOP              LINE ON NOP NEEDED
0C44 3A 87 0C    7990 ON     LD   A,(HANDLE)  GET BIT OF DOT
0C47 B0          8000        OR   B           TURN IT ON
0C48 18 14       8010        JR   FINISH      WERE DONE
0C4A 3A 87 0C    8020 CPL    LD   A,(HANDLE)  GET BIT OF DOT
0C4D A8          8030        XOR  B           COMPLIMENT IT
0C4E 18 0E       8040        JR   FINISH      WERE DONE
0C50 3A 87 0C    8050 TEST   LD   A,(HANDLE)  GET BIT OF DOT
0C53 A0          8060        AND  B           AND WITH BYTE IN GRFST
0C54 21 00 00    8070        LD   HL,0         CLEAR HL REGS.
0C57 CA 65 0C    8080        JP   Z,FINYT       WAS THE BIT OFF?
0C5A 2C          8090        INC  L              NO! THEN PUT A 1 IN L
0C5B C3 65 0C    8100        JP   FINYT          GO SEE IF ITS A PLOT
0C5E 2A 89 0C    8110 FINISH LD   HL,(NHAN)      GET BIT TO HANDLE
0C61 77          8120        LD   (HL),A         TURN IT ON,OFF,TEST,CPL
0C62 2A 4E 0D    8130 FINNT  LD   HL,(COLOR)       IF NO TEST THEN RETURN VAL.
0C65 C9          8140 FINYT  RET
0C66             8150 *ROUTINE TO CLEAR THE SCREEN*
0C66 ED 5B 85 0C 8160 CLEAR  LD   DE,(GRFST)   GET ADDR. OF GRAPHICS BUFF.
0C6A 62          8170        LD   H,D
0C6B 6B          8180        LD   L,E
0C6C 01 FF 1F    8190 AMOUNT LD   BC,8191D     NUMBER OF BYTES TO CLEAR
0C6F 97          8200        SUB  A
0C70 12          8210        LD   (DE),A
0C71 13          8220        INC  DE
0C72 ED B0       8230        LDIR
0C74 C9          8240        RET
0C75             8250 TABLE  DB   80H           TABLE FOR BIT MASKS FOR POINT
  80
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0C76                    8260            DB      40H             ROUTINE
  10
0C77                    8270            DB      20H
  20
0C78                    8280            DB      10H
  10
0C79                    8290            DB      08H
  08
0C7A                    82A0            DB      04H
  04
0C7B                    82B0            DB      03H
  02
0C7C                    82C0            DB      01H
  01
0C7D                    82D0 X          DB      02
0C7F                    82E0 Y          DB      12
0C81                    82F0 X1         DB      3
0C82                    8300 Y1         DB      1
0C83                    8310 X2         DB      4
0C84                    8320 Y2         DB      1
0C85                    8330 GRFST      DB      2
0C87                    8400 HANDLE     DW      2
0C89                    8410 NHAN       DB      2
0C8B                    8420 YOFF       DB      0
0C8D                    8430 XOFF       DB      2
0C8F                    8440 FLAG       DB      1
0C90                    8450 TOGGLE     DB      1
0C91                    8460 DPORT      EQU     2
0C91                    8470 IPORT      EQU     1
0C91                    8480 KEY        EQU     0
0C91                    8490 TV         EQU     3
0C91                    8500 ICON       DB      1
0C92                    8510 STX        DB      7
0C93                    8520 STRING     DB      .
0C94                    8530 IPOS       DB      1
0C95                    8540 GSTACK     DW      1
0C97                    8550 EXFON      DB      1
0C98                    8560 ONEY       DB      1
0C99                    8570 XARRAY     DB      85H,84H,83H,82H
  85    84    83    82
0C9D                    8580            DB      01H,80H,80H,80H,80H,85H,80H
  81    80    80    80    80
  80    80
0CA4                    8590            DB      81H,82H,83H,84H,85H
  81    82    83    84    85
0CA9                    8600            DB      86H,87H,88H,89H,8AH,8BH
  88    88    88    88    89
  89
0CAF                    8610            DB      8AH,8BH,8CH,8DH,8EH
  8A    8B    8C    8D    8E
0CB4                    8620            DB      8EH,8EH,8EH,8EH,89H,8AH
  8E    8E    8E    8E    89
  8A
0CBA                    8630            DB      8BH,8CH,8DH,91H,91H,91H
  8B    8C    8D    91    91
  91
0CC0                    8640            DB      91H,91H,91H,91H,91H,91H
  91    91    91    91    91
  92
0CC6                    8650            DB      92H,93H,94H,95H,96H,97H
  93    94    95    96    97
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  99
0CCC                  8660          DC    9AH,9AH,80H
  9A    9A    80
0CCF                  8670 YARRAY   DC    30H,30H,30H,30H,30H
  30    30    30    30    30
0CD4                  8680          DC    31H,32H,33H,34H,35H,36H
  31    32    33    34    35
  36
0CDA                  8690          DC    37H,37H,37H,37H,37H,37H
  37    37    37    37    37
  37
0CE0                  8700          DC    36H,35H,34H,33H,32H,31H,30H
  36    35    34    33    32
  31    30
0CE7                  8710          DC    31H,32H,33H,34H,35H,36H,37H
  31    32    33    34    35
  36    37
0CEE                  8720          DC    34H,34H,34H,34H,34H
  34    34    34    34    34
0CF3                  8730          DC    30H,31H,32H,33H,34H,35H,36H
  30    31    32    33    34
  35    36
0CFA                  8740          DC    37H,37H,37H,37H,37H,37H
  37    37    37    37    37
  37
0D00                  8750          DC    36H,37H,36H,37H,80H
  36    37    36    37    80
0D05                  8760          DC    0FFH
  FF
0D06                  8770 COLADR   EQU   9CA2H
0D06                  8780 COLOR0   DC    55H,55H,0,0,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH
  55    55    00    00    FF
  FF    FF    FF    FF    FF
0D10                  8790          DC    0C3H,0E3H,0BFH,0DDH,0BFH,0DDH,0B8H,59H
  C3    E3    BF    DD    BF
  DD    B8    59
0D18                  8800          DC    0BFH,0D5H,0B8H,4DH,0BFH,0DDH,0BFH,0DDH
  BF    D5    B8    4D    BF
  DD    BF    DD
0D20                  8810          DC    0C3H,0E3H,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH
  C3    E3    FF    FF    FF
  FF    FF    FF
0D28                  8820          DC    0FFH,0FFH
  FF    FF
0D2A                  8830 COLOR1   DC    55H,55H,0,0,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH
  55    55    00    00    FF
  FF    FF    FF    FF    FF
0D34                  8840          DC    0C3H,0FBH
  C3    FB
0D36                  8850          DC    0BFH,0F3H,0BFH,0FBH,0BCH,3BH,0BFH,0FBH
  BF    F3    BF    FB    BC
  3B    BF    FB
0D3E                  8860          DC    0BCH,3BH,0BFH,0FBH,0BFH,0FBH,0C3H,0F1H
  BC    3B    BF    FB    BF
  FB    C3    F1
0D46                  8870          DC    0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH,0FFH
  FF    FF    FF    FF    FF
  FF    FF    FF
```
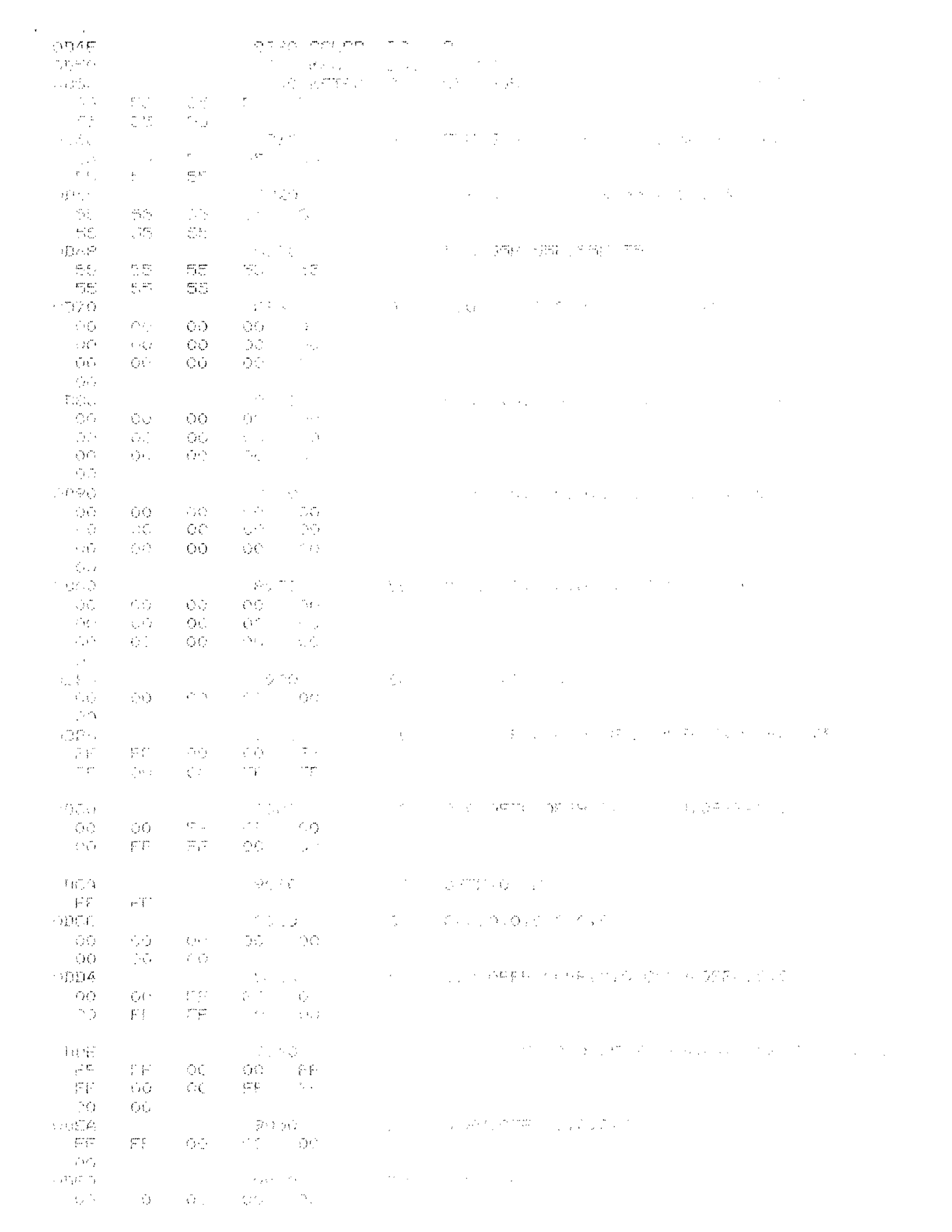
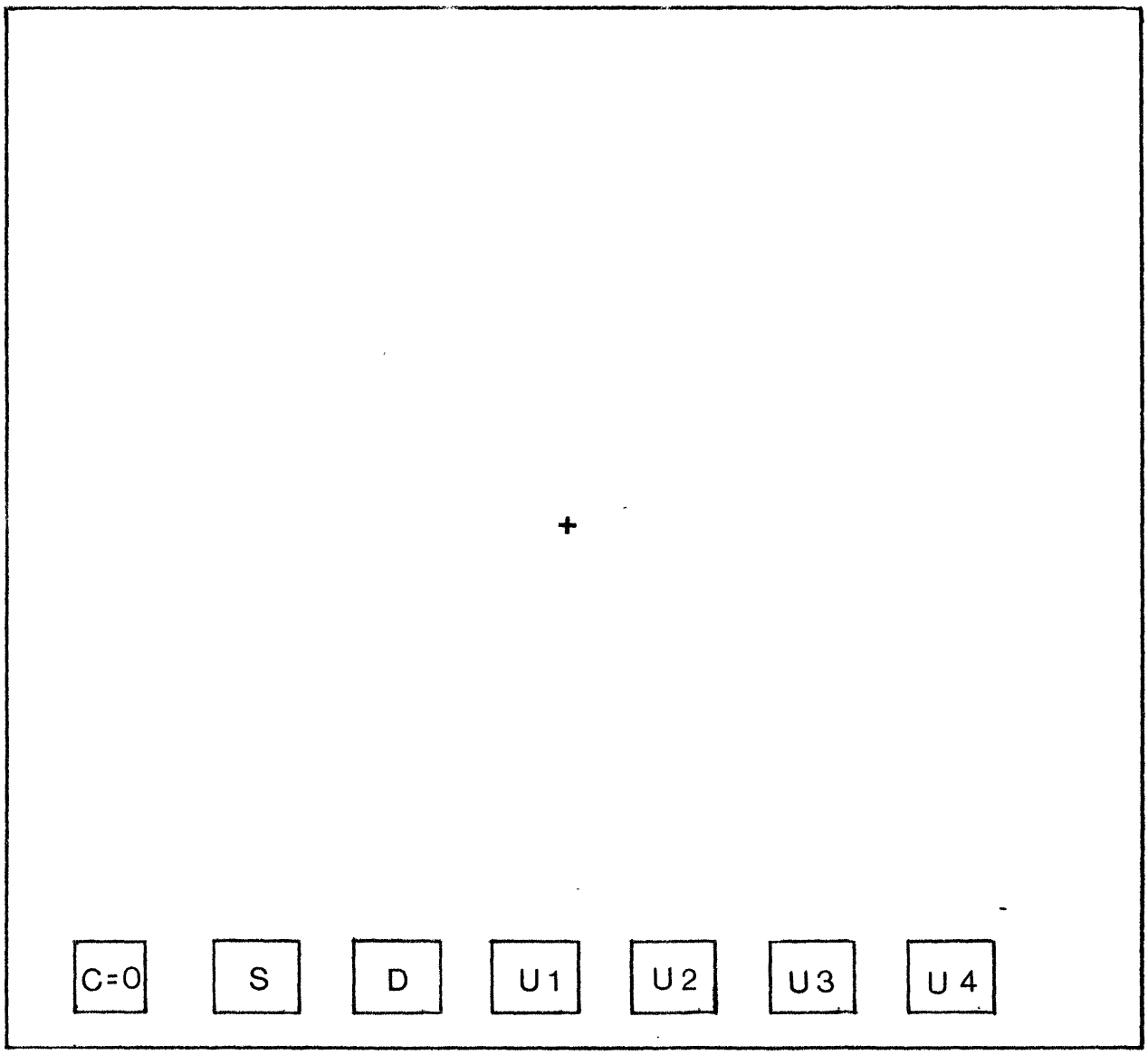



```
  61    00    00    DF    5D
  00    00
0EAE                  9250          DC    0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00
0EB6                  9260          DC    0FCH,3FH,0,0,0FBH,0DFH,0,0,0DFH,77H,0,0
  FC    3F    00    00    FB
  DF    00    00    DF    77
  00    00
0EC2                  9270          DC    0DFH,7BH,0,0,0DFH,7DH,0,0,0DFH,61H,0,0
  DF    7B    00    00    DF
  7D    00    00    DF    61
  00    00
0ECE                  9280          DC    0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00
0ED6                  9290          DC    0FFH,0DFH,0,0,0FBH,0DFH,0,0,0DFH,77H,0,0
  FF    DF    00    00    FB
  DF    00    00    DF    77
  00    00
0EE2                  9300          DC    0DFH,77H,0,0,0DFH,7DH,0,0,0DFH,7DH,0,0
  DF    77    00    00    DF
  7D    00    00    DF    7D
  00    00
0EEE                  9310          DC    0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00
0EF6                  9320          DC    0FFH,0DFH,0,0,0FBH,0DFH,0,0,0DFH,77H,0,0
  FF    DF    00    00    FB
  DF    00    00    DF    77
  00    00
0F02                  9330          DC    0DFH,6FH,0,0,0DFH,7DH,0,0,0DFH,7DH,0,0
  DF    6F    00    00    DF
  7D    00    00    DF    7D
  00    00
0F0E                  9340          DC    0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00
0F16                  9350          DC    0FBH,0DFH,0,0,0FBH,0DFH,0,0,0DFH,77H,0,0
  FB    DF    00    00    FB
  DF    00    00    DF    77
  00    00
0F22                  9360          DC    0DFH,5FH,0,0,0DFH,7DH,0,0,0DFH,7DH,0,0
  DF    5F    00    00    DF
  7D    00    00    DF    7D
  00    00
0F2E                  9370          DC    0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00
0F36                  9380          DC    0FCH,3FH,0,0,0F0H,3FH,0,0,0E0H,0E3H,0,0
  FC    3F    00    00    F0
  3F    00    00    E0    E3
  00    00
0F42                  9390          DC    0E0H,0C1H,0,0,0E0H,0C3H,0,0,0E0H,0FDH,0,0
  E0    C1    00    00    E0
  C3    00    00    E0    FD
  00    00
0F4E                  9400          DC    0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00
0F56                  9410          DC    0FFH,0FFH,0,0,0FFH,0FFH,0,0,0FFH,0FFH,0,0
  FF    FF    00    00    FF
  FF    00    00    FF    FF
```

```
  00    00
0F62                9420          DC    0FFH,0FFH,0,0,0FFH,0FFH,0,0,0FFH,0FFH,0,0
  FF    FF    00    00    FF
  FF    00    00    FF    FF
  00    00
0F6E                9430          DC    0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00
0F76                9440          DC    0FFH,0FFH,0,0,0FFH,0FFH,0,0,0FFH,0FFH,0,0
  FF    FF    00    00    FF
  FF    00    00    FF    FF
  00    00
0F82                9450          DC    0FFH,0FFH,0,0,0FFH,0FFH,0,0,0FFH,0FFH,0,0
  FF    FF    00    00    FF
  FF    00    00    FF    FF
  00    00
0F8E                9460          DC    0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00
0F96                9470          DC    0FFH,0FFH,0,0,0FFH,0FFH,0,0,0FFH,0FFH,0,0
  FF    FF    00    00    FF
  FF    00    00    FF    FF
  00    00
0FA2                9480          DC    0FFH,0FFH,0,0,0FFH,0FFH,0,0,0FFH,0FFH,0,0
  FF    FF    00    00    FF
  FF    00    00    FF    FF
  00    00
0FAE                9490          DC    0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00    00    00
  00    00    00    00    00
  00    00    00    00
0FC1                9500          DC    0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00    00    00
  00    00    00    00    00
  00    00    00    00
0FD4                9510          DC    0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00    00    00
  00    00    00    00    00
  00    00    00    00
0FE7                9520          DC    0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
  00    00    00    00    00
  00    00    00    00    00
  00    00    00    00    00
  00    00    00    00
0FFA                9530 LIBUF    DS    4
0FFE                9540 BOXBUF   DS    4
1002                9550 DELAY    EQU   017BH
1002                9560 BIT      DS    1
1003                9570 COLORT   DS    1
1004                9580 STACK    DS    512D
1204 00             9590 USTACK   NOP
1205                9600 *    USERS STACK FOR LIGHT PEN ROUTINE  *
1205                9610 FAKE     DC    1DH,83H,87H,97H,97H,9EH,85H
  1D    83    87    97    97
  9E    85
120C                9620          DC    8AH,8AH,8AH,8AH,8AH,8AH,8AH,8AH
  8A    8A    8A    8A    8A
  8A    8A    8A
1214                9630          DC    8CH,8CH,8CH,8CH,8CH,8CH,8CH,8CH
  8C    8C    8C    8C    8C
```

```
  8C    8C    8C
121C                9640          DC    84H,8AH,8AH,8AH,8AH,8AH,82H
  84    8A    8A    8A    8A
  8A    82

NO ERRORS FOUND

FILE  3000  885D
READY
LTABL
ALL     0B48    AMOUNT  0C6C    ASSIGN  073C    AUTO    0647
AVGDOT  0B66    AVGLIN  0AF5    BIT     1002    BL1     0896
BL2     0898    BLKOFF  0A6D    BOX     0803    BOXBUF  0FFE
BOXDO   085D    BOXDRW  0821    BOXST   080E    CAL     09E8
CALDO   0A20    CALDO   0A1B    CALF    09F2    CALROU  0731
CHEK2   0AD3    CHOME   0789    CKEY    0C98    CL1     08C4
CL2     08F1    CLBUMP  0905    CLEAR   0C66    CLMEM   092C
CML2    0662    CML3    067C    COLADR  9CA2    COLOR   0D4E
COLOR0  0D06    COLOR1  0D2A    COLORS  089D    COLORT  1003
COM1    068E    COM2    06A9    CPL     0C4A    CRL2    0865
CSTART  0A69    DARROW  0756    DDOT    07D2    DELAY   017B
DISMEN  08F7    DLOOP   0A44    DLOOP1  0A5D    DONE    0B3A
DOTLO   0B05    DOTS    0B4E    DRAW    09BD    DRAW1   0711
DSDOT   09A3    ESCAPE  072B    EXCON   0C97    FADD    0BBB
FAKE    1205    FDOT    079C    FINISH  0C5E    FINNT   0C62
FINYT   0C65    FLAG    0C8F    GETDOT  0B13    GETVAL  0C19
G01     0628    GRFST   0C85    HANDLE  0C87    ICON    0C91
INC     0A16    INIT    0630    INPOS   0A93    IO      0A2A
IPORT   0007    IPOS    0C94    JPOINT  0BB2    KEY     0000
L1      08E5    L2      0B8D    L3      0B9C    LSCON   0A7B
LSNOT   0A8A    LARROW  0770    LDOT    07B7    LIBUF   0FFA
LINES   0AE0    LOADD   0B6F    LOADL   0AFE    LOCATE  0A74
LOFF    0C39    LON     0C43    LOOP    0613    LOOP1   061B
LSTART  0A65    MCROSS  0650    MENBUF  9CA0    MENUO   093D
MENU1   0955    MENU2   095F    METEMP  0D50    MORE    0C0B
MTAB    0C2C    MTABLE  0978    MTOG    0721    NHAN    0C89
NOBLK   0998    NXTDOT  0B20    NXTLIN  0ABF    OFF     0C3A
ON      0C44    OPORT   0007    OVERLY  0889    PEN     069D
PIC1    09FC    PIC2    0A02    PLOT    0B7F    POINT   0BDC
PPOINT  0BB8    RARROW  0763    RET     0620    RETURN  0BDB
RFLAG   07F2    RFLAG1  0802    SAVLN   0ADD    SDOT    077D
SEADD   0BC9    SERVIC  06A7    SSTACK  0C95    ST?     0706
STACK   1004    START   060D    STAT2   0A9E    STAT2X  0AA1
STCOM   0610    STRING  0C93    STX     0C92    STXCON  0AAA
STXL2   09CA    STXL3   0917    SUB     0B39    SUMD    0B5B
SUML    0AEC    TAB     0C2D    TABLE   0C75    TEST    0C50
TJUMP   0977    TOGDRA  0952    TOGGLE  0C90    TV      0000
UARROW  0749    UDRAW   090C    USER1   09DF    USER2   09E2
USER3   09E5    USTACK  1204    WINDOW  0B30    WORPIC  08E3
X       0C7D    X1      0C81    X2      0C83    XARRAY  0C99
XCOUNT  0BFB    XLOOP   0C05    XOFF    0C8D    Y       0C7F
Y1      0C82    Y2      0C84    YARRAY  0CCF    YCOUNT  0BDF
YOFF    0C8B    ZZTEST  086D
FILE  3000  885D
READY
```


C=0
S
D
U1
U2
U3
U4