

# For H-P Desktop Computers

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**CPRT45 Color Printer ROM**

**Instruction Manual**



**Infotek Systems**

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Infotek Systems' CPRT45 ROM allows color graphics created with the Hewlett Packard 9845C to be output to a color printer. The CRT screen can be dumped directly to the printer, or graphics arrays can be plotted to the printer. Additional commands allow the user to change the color translation table for the CRT and color printer, set hard clip limits in inches or Absolute Plotting Units, address the system comments area of the CRT, and determine the current last row of a plotter array.

The CPRT45 ROM is designed for use with any of the color printers listed below. The printers can be easily connected to the HP9845C with the Centronics-type GPIO interface provided with the CPRT45 ROM.

#### EQUIPMENT REQUIRED:

Hewlett Packard 9845C  
Hewlett Packard Graphics ROM  
Infotek Systems CPRT45 Color Printer ROM  
Infotek Systems Color Printer interface

#### Printers supported:

IDS Prism 132 Color Printer  
Canon A-1210 Color Printer  
Transtar 315 Color Printer  
ACT I and II Color Printers



#### INSTALLATION PROCEDURE

##### COLOR PRINTER INTERFACE

1. Be sure that power to both the HP9845C and the color printer is turned off.
2. With a small flat blade screwdriver, set the select code switch on the side of the interface to the desired select code. Be sure that the select code does not interfere with the select code for any other peripheral devices.
3. Insert the computer end of the interface into any available I/O slot in the back of the computer. Push the interface into the slot until the plastic latch on top of the interface locks into place.
4. Connect the printer end of the interface to your color printer.

##### CPRT45 COLOR PRINTER ROM

1. The CPRT45 ROM can be installed in any of the slots of the left hand ROM drawer. A plastic bar prevents the ROM from being installed backwards.



## SYNTAX CONVENTIONS

It is assumed that the user is already familiar with the concepts of basic graphics programming as described in the HP System 45 Color Graphics Manual.

color All items in color must appear exactly as shown.

[ ] Items within brackets are optional.

| When items are separated by a vertical bar, one item or the other may be used.

## ABBREVIATIONS and TYPING AIDS

The following abbreviations may be typed instead of the full keyword. The full keyword is always stored in the Basic program. Abbreviations always consist of the first two letters followed by a period if the keyword is a single word, or the first letter of each word, followed by a period, if the keyword consists of more than one word. Exceptions are PAL. and PLI.

### GRAPHICS ROM:

AC. AREA COLOR  
AI. AREA INTENSITY  
DI. DIGITIZE  
GR. GRAPHICS  
LT. LINE TYPE  
LU. LABEL USING  
PLI. PLOTTER IS  
PO. POLYGON  
RE. RECTANGLE  
EA. EXIT ALPHA  
EG. EXIT GRAPHICS

### COLOR PRINTER ROM:

CMI. CPRT MAT IPLOT  
CMP. CPRT MAT PLOT  
CMR. CPRT MAT RPLOT  
PAL. PRINT ALPHA  
PG. PRINT GRAPHICS  
PAI. PRINT ALPHA IS  
PGI. PRINT GRAPHICS IS  
PM. PRINT MSG





The color keywords BLACK, WHITE, RED, YELLOW, GREEN, CYAN, BLUE, and MAGENTA can be typed instead of the color values. These keywords return the following values:

	BLACK	WHITE	RED	YELLOW	GREEN	CYAN	BLUE	MAGENTA
AREA COLOR	error	error	0/6	1/6	2/6	3/6	4/6	5/6
All other statements	-1	1	2	3	4	5	6	7

Examples:

```

10 PLOTTER IS "GRAPHICS", RED
20 GRAPHICS
30 AREA COLOR YELLOW, .5, 1
40 PEN BLACK
50 ...
60 ...

```

When specifying the color printer type, either a keyword or a value can be used.

Printer type:	Color printer specifier:
IDS Prism 132	1 or IDS
Canon A-1210	2 or CANON
Transtar 315	3 or TRANSTAR
ACT I or II	

Example:

```

PLOTTER IS 3, "CPRT", CANON
PLOTTER IS 3, "CPRT", 2

```



## COLOR PRINTER STATEMENTS

### PLOTTER IS "CPRT"

#### Syntax:

PLOTTER IS [sel code , ] "CPRT" , printer type , [background color][C , code]

<u>Parameters</u>	<u>Meaning</u>	<u>Default</u>	<u>Range</u>
select code	color printer interface select code setting	3	1 thru 13
printer type	specifier for color printer type	none	1 or IDS 2 or CANON 3 or TRANSTAR 4 or ACT
background color	specifier for color printer background color	-1 (black)	
code	an optional printer control parameter.	none	0 or 1

This command activates the designated color printer as a graphics output device and creates a "plotter" for the printer. This "plotter" is only used to keep track of parameters for the CPRT MAT PLOT, CPRT MAT IPLOT, and CPRT MAT RPLLOT statements. The parameters used are:

<u>PARAMETER</u>	<u>COMMANDS WHICH SET THE PARAMETER</u>
hard clips	PLOTTER IS, LIMIT, ALIMIT, ILIMIT
soft clips	CLIP, LOCATE, LIMIT, ALIMIT, ILIMIT, PLOTTER IS
user units or graphics units	SETUU, SETGU, LOCATE, LIMIT, ALIMIT, ILIMIT
UDU scale	SCALE, SHOW, LIMIT, ALIMIT, ILIMIT, PLOTTER IS
IPLOT origin	any pen movement, LIMIT, ALIMIT, ILIMIT, PLOTTER IS
RPLLOT origin	any pen movement except RPLLOT; LIMIT, ALIMIT, ILIMIT
Plot direction	PDIR, LIMIT, ALIMIT, ILIMIT, PLOTTER IS
background color	PLOTTER IS
color printer type	PLOTTER IS
select code	PLOTTER IS
active plotter	PLOTTER IS OFF, PLOTTER IS ON, PLOTTER IS

The optional printer control code parameter sets the following conditions:





<u>Printer type</u>	<u>Code</u>	<u>Condition</u>
Transtar	0	single pass printing
	1	double pass printing
IDS	0	uni-directional printing
	1	bi-directional printing

For a description of the other conditions set by this statement, please refer to the PLOTTER IS statement in the HP9845 Color Graphics Manual:

### PRINT GRAPHICS IS

Syntax:

```
PRINT GRAPHICS IS select code , [HPiB address] ; printer type[ , code]
```

<u>Parameters</u>	<u>Meaning</u>	<u>Default</u>	<u>Range</u>
select code	color printer interface select code setting	3	1 thru 12
HPiB address	HPiB device address setting	none	0 thru 30
printer type	specifier for color printer type	none	1 or IDS 2 or CANON 3 or TRANSTAR 4 or ACT
code	optional printer control code	0	0 or 1

This statement designates a specific device as the system color printer. All subsequent PRINT GRAPHICS statements will be output to this printer.

The optional printer control code sets the following conditions:

<u>Printer type</u>	<u>Code</u>	<u>Condition</u>
Transtar	0	single pass printing
	1	double pass printing
IDS	0	uni-directional printing
	1	bi-directional printing

1000

## PRINT ALPHA IS

### Syntax:

PRINT ALPHA IS select code , [ HPiB address ]

Parameters	Meaning	Default	Range
select code	printer interface select code setting	0	0 thru 12
HPiB address	HPiB device address setting	none	0 thru 30

PRINT ALPHA IS designates a specific printer as the system alpha output device. All subsequent PRINT ALPHA statements are output to this printer.

## CPRT MAT PLOT

### Syntax:

CPRT MAT PLOT array name [ ( starting row : ending row ) ] [ , FILL ]

Parameters	Meaning	Default	Range
array name	specifier for the array containing the data	none	any dimensioned n by 3 array
starting row	begin plotting with elements in this row	first row	any valid row <= the ending row
ending row	stop plotting after plotting elements in this row	last row	any valid row >= the starting row
FILL	fills the plot with the currently specified AREA COLOR or AREA INTENSITY	no fill	FILL

CPRT MAT PLOT plots the contents of an array to the active color printer specified by the PLOTTER IS CPRT statement. The values for the array





elements can be found in the HP Graphics ROM manual under MAT IPLOT.

Colors are translated according to the current CPRT COLORS statement. The optional FILL parameter allows the plot to be filled with the current AREA COLOR or AREA INTENSITY color.

Plotting is done in the current units of measure (User Defined Units or Graphic Display Units). The size and position of the plotting area can be changed with the LIMIT, ALIMIT, or ILIMIT statements.

The time required for the color printer to complete a plot can be reduced significantly if the plot size is limited 560 APU's or less in width.

This command uses the graphics memory of the CRT. When CPRT MAT PLOT is executed, the CRT's graphics memory is erased.



CPRT MAT IPLOT

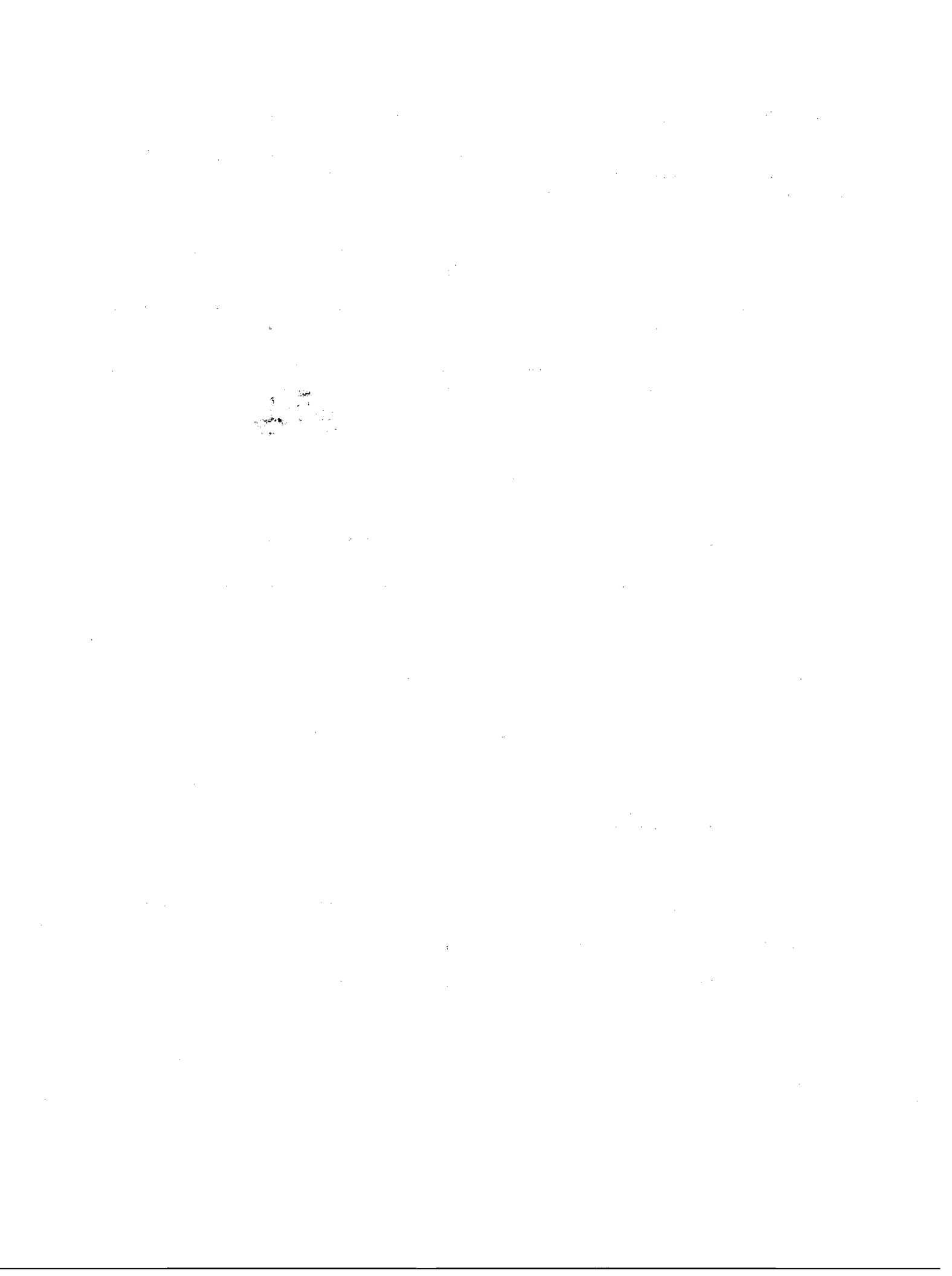
Syntax: CPRT MAT IPLOT array name [ ( starting row : ending row ) ] [ , FILL ]

Parameters	Meaning	Default	Range
array name	specifier for the array containing the data	none	any dimensioned n by 3 array
starting row	begin plotting with elements in this row	first row	any valid row <= the ending row
ending row	stop plotting after plotting elements in this row	last row	any valid row >= the starting row
FILL	fills the plot with the currently specified AREA COLOR or AREA INTENSITY		FILL

CPRT MAT IPLOT incrementally plots the contents of an array to the active color printer specified by the PLOTTER IS CPRT statement. The values for the array elements can be found in the HP Graphics ROM manual under MAT IPLOT.

Colors are translated according to the current CPRT COLORS statement. The optional FILL parameter allows the plot to be filled with the current AREA COLOR or AREA INTENSITY color.

Plotting is done in the current units of measure (UDU's or GDU's). The size and position of the plot can be changed with the LIMIT, ILIMIT, or ALIMIT statements. The time required for the color printer to complete a plot can be



reduced significantly if the plot size is limited to 560 APU's or less in width. This command uses the graphics memory of the CRT. When CPRT MAT IPLOT is executed, the CRT's graphics memory is erased.

CPRT MAT RPLOT

Syntax:

```
CPRT MAT RPLOT array name [ ( starting row : ending row ) ] [ , FILL ]
```

Parameters	Meaning	Default	Range
array name	specifier for the array containing the data	none	any dimensioned n by 3 array
starting row	begin plotting with elements in this row	first row	any valid row <= the ending row
ending row	stop plotting after plotting the elements in this row	last row	any valid row >= the starting row
FILL	fills the plot with the currently specified AREA COLOR or AREA INTENSITY		

CPRT MAT RPLOT Rplots the contents of an array to the active color printer specified by the PLOTTER IS CPRT statement. The values for the array elements can be found in the HP Graphics ROM Manual under MAT IPLOT.

Colors are translated according to the current CPRT COLORS statement. The optional FILL parameter allows the plot to be filled with the current AREA COLOR or AREA INTENSITY color.

Plotting is done in the current units of measure (UDU's or GDU's). The size and position of the plot can be changed with the LIMIT, ILIMIT, or ALIMIT statements. The time required for the color printer to complete a plot can be reduced significantly if the plot size is limited to 560 APU's or less.

This command uses the graphics memory of the CRT. When CPRT MAT RPLOT is executed, the CRT graphics memory is erased.



## PRINT GRAPHICS

### Syntax:

```
PRINT GRAPHICS [ CRT y min [ , CRT y max ] ]
```

Parameters	Meaning	Default	Range
CRT y min	lowest y axis point to be copied	y min value	dependent on current scaling
CRT y max	highest y axis point to be copied	y max value	dependent on current scaling

The PRINT GRAPHICS statement copies the current graphics area of the CRT screen to the system graphics printer as designated in the most recent PRINT GRAPHICS IS statement. The colors are translated according to the most recent CPRT COLORS statement.

## PRINT ALPHA

### Syntax:

```
PRINT ALPHA [ CRT top line [ , CRT bottom line ] ]
```

Parameters	Meaning	Default	Range
CRT top line	the first CRT line to be printed	none	1 to 20
CRT bottom line	the last CRT line to be printed	none	1 to 20

PRINT ALPHA prints the CRT's alphanumeric raster to the system alpha printer. The alpha printer is designated by the PRINT ALPHA IS statement.



## PRINT MSG

### Syntax:

```
PRINT MSG [ list ]
```

The PRT MSG statement allows text and variables to be output to the 25th line of the CRT (system comments area). PRT MSG is identical to the DISP statement in all other respects.



## CRT COLORS

### Syntax:

```
CRT COLORS color TO | EX color [ ; color TO | EX color [ ; ... ]]
```

Parameters	Meaning	Default	Range
color	numeric or keyword for CRT color	none	-1, 1 thru 7

The CRT COLORS statement changes the colors on the CRT. When the TO delimiter is used, the first CRT color is changed to the second CRT color. When the EX delimiter is used, the two colors are exchanged.

The CRT COLORS statement only affects the graphics that are currently on the screen. All subsequent graphics statements will be plotted with standard colors.

### Examples:

```
CRT COLORS RED TO CYAN <execute>
```

All reds will be changed to cyan on the CRT screen.

```
CRT COLORS 3 EX GREEN; MAGENTA TO WHITE
```

All yellows (color value 3) will become green and all greens will become yellow. Magenta will become white.

## CPRT COLORS





**Syntax:**

```
CPRT COLORS [ crt color TO | EX printer color [ ; ... ] ]
```

The CPRT COLORS statement defines a color translation table used in PRINT GRAPHICS, CPRT MAT PLOT, CPRT MAT RPLOT, and CPRT MAT IPLOT. All colors printed by the color printer will be changed according to this table until another CPRT COLORS statement is executed. CRT colors remain unchanged. When the TO delimiter is used, the first color is changed to the second color. When the EX delimiter is used, the first color is exchanged with the second color. If no parameters follow the CPRT COLORS statement, all previous CPRT COLORS translations are cancelled, and the color translation table is set to the default values.

**Example:**

```
CPRT COLORS RED EX CYAN
```

All reds will be printed as cyan. All cyans will be printed as red.

**EOPLOTTER**

**Syntax:**

```
EOPLOTTER array (*), return variable
```

Syntax	Meaning	Default	Range
array	the active plotter array	none	any n by 3 array
return variable	a numeric variable	none	any numeric variable

EOPLOTTER returns the last row number of a plotter array that contains data elements. The last row number is assigned to the return variable. This information can be used to conserve mass storage space when the actual array size is unknown.

**Example:**

```
10 OPTION BASE 1
20 DIM Array (1000,3)
```



```

30 PLOTTER IS Array (*)
40 !
50 !   plot
60 !
500 PLOTTER Array (*) IS OFF
510 EOPLOTTER Array (*), End   ! last row of Array is returned in End
320 REDIM Array (End, 3)
530 ASSIGN #1 TO "File"
540 MAT PRINT #1; Array
550 END

```

### ALIMIT

Syntax:

ALIMIT [ x minimum value , x maximum value , y minimum value , y maximum value ]

Parameters	Meaning	Default	Range
x minimum value	value assigned in APU's to the left limit of the plotting device	none	device dependent
x maximum value	value assigned in APU's to the right limit of the plotting device	none	device dependent
y minimum value	value assigned in APU's to lower limit of plotting device	none	device dependent
y maximum value	value assigned in APU's to upper limit of plotting device	none	device dependent

The ALIMIT statement defines the hard clip area of a graphics device in Absolute Plotter Units (APU's). The statement is identical to the LIMIT statement, except that the LIMIT statement uses millimeters as units of measure.

APU values are dependent upon the graphics device. The HP9872 Plotter, for example, has a plotting area that is 16000 by 11400 APU'S.

The ALIMIT statement can be executed without parameters, allowing you to digitize the values for the hard clip area.

Hard clip default values in APU's:



Printer type	x minimum	x maximum	y minimum	y maximum
CRT	-.4999999	559.4999999	-.4999999	454.4999999
IDS	-.4999999	1103.4999999	-.4999999	926.4999999
CANON	-.4999999	639.4999999	-.4999999	926.4999999

ILIMIT

Syntax:

```
ILIMIT [ x minimum , x maximum , y minimum , y maximum ]
```

Parameters	Meaning	Default	Range
x minimum value	value assigned in inches to the left limit of the plotting device	none	device dependent
x maximum value	value assigned in inches to the right limit of the plotting device	none	device dependent
y minimum value	value assigned in inches to the upper limit of the plotting device	none	device dependent
y maximum value	value assigned in inches to the lower limit of the plotting device	none	device dependent

The ILIMIT statement defines the hard clip area of a graphics device in inches. The statement is identical to the LIMIT statement in all other respects.



## ADDITIONAL MEMORY CAPABILITY

With the COLOR ROM installed, HP9845 models B and C manufactured before January, 1982 can access up to 1.5 megabytes of RAM memory if additional memory boards are installed. For more information concerning additional memory for the HP9845, please contact Infotek Systems.







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