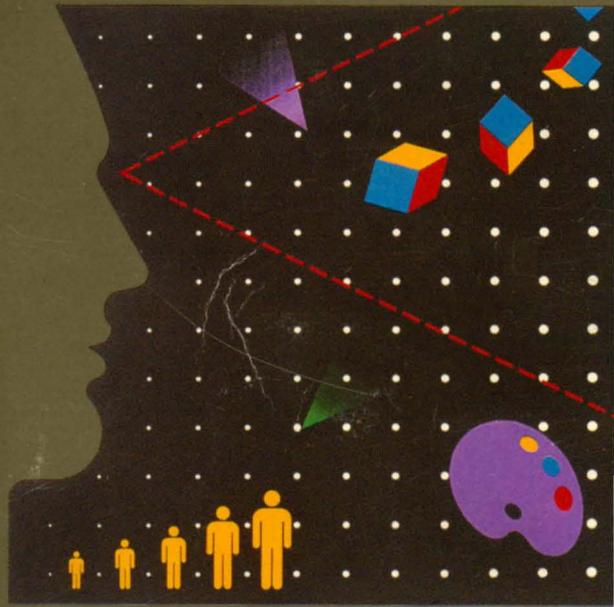


**MINDSET**

*L u m e n a™*



*User's  
Manual*

Lumena by John Dunn

Lumena menus by:

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PALET	John Dunn
FILLS	John Dunn, Robert Gotsch
DISK	John Dunn
PENS	John Dunn
BRUSH	John Dunn
SHAPE	Robert Gotsch, John Dunn
GRIDS	John Dunn
EDGES	John Dunn
CELLS	John Dunn
CEDIT	John Dunn
IEDIT	John Dunn
CSTOR	John Dunn
CYCLE	John Dunn
MOVES	Robert Gotsch, John Dunn
ROTAT	Robert Gotsch
SCALE	Robert Gotsch

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100294-001  
Printed in U.S.A.

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---

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# Introduction

Lumena is designed to allow you to begin making color graphics immediately, without having any knowledge of computer hardware or background in computer programming. The basic commands can be learned within a few minutes. The pen and brush modes allow you to do freehand drawing onscreen, using gestures similar to those you use for drawing on paper. Other Lumena commands enable you to easily and quickly manipulate images in complex ways, ways that would be tedious or impossible using traditional means.

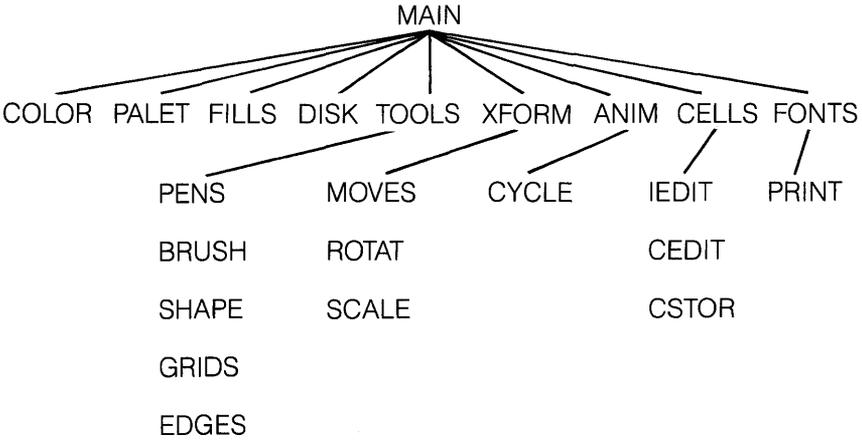
If this is your first time using Lumena, a good way to begin is to follow the Guided Tour, which directs you in using some of the basic commands.

The greater part of the manual has information on specific commands: Keyboard Commands, General Menu Commands (those that can be given from any menu), and commands in specific menus.

Lumena also has onscreen explanations for each menu command. For information on this feature, see the DOC command, in General Menu Commands.

---

## Menu Structure of Lumena



## Menus in Lumena

>MAIN <	COLOR	PALET	FILLS	DISK
TOOLS	XFORM	ANIM	CELLS	FONTS

†	>COLOR<	MIX	NEW	C/L	R/G/B
	-RCOL+	PUTCOL	GETCOL	XCHCOL	

†	>PALET<	SAVE	PUTMAP	ALTMAP	TINT
	-RMAP+	LOAD	GETMAP		COPY

††	>PALET<	SAVE	PUTMAP	ALTMAP	CHANGE
	-RMAP+	LOAD	GETMAP	SHIFT	XCHCOL

>FILLS<	FLOOD	CHANGE	REMOVE	STEPS
XB/LB	FILLTO	FILLIN	MIX/BX	GRAD

>DISK <	RSAVE	PSAVE		PUTMAP
XB/LB	LOAD	OVRLAY	FILTER	GETMAP

>TOOLS<	PENS	BRUSH	SHAPE	GRIDS
EDGES				

>PENS <	AIRBR	BRUSH	CHAR	ERASE
LINE	PEN	R-BAND	Q-LINE	GET/O

>BRUSH<	SYM	EDGE/X	CSTM/O	RING/X
XB/LB	P/W			

† This menu is accessible only with television display.

†† This menu is accessible only with monitor display.

---

 TOOLS MENU, *cont.*

>SHAPE<	CIRCLE	ELLIPS	BOX	
L-CNTR	F-CIRC	F-ELIP	F-BOX	

>GRIDS<	GRID	XY-GRD	GRDCOL	
NEW	GRAV	X/Y	GRVCOL	

†

>EDGES<	CIRCLE	ELLIPS	LINE	FADE
L-CNTR	F-CIRC	F-ELIP		

>XFORM<	MOVES	ROTAT	SCALE	

>MOVES<	COPY/O	DUP	ROT	REFL-X
XB/LB	MOVE	ZOOM	TRIM	REFL-Y

>ROTAT<	SHR/NW	OBLIQ	ROT/NW	TURN
XB/LB	L-CNTR	=/LANG	SQRBOX	

>SCALE<	XY-SCL	TAPER	PERSP	
XB/LB	L-CNTR			

>ANIM <	CYCLE			

>CYCLE<	MAP	BRUSH		GO

† This menu is accessible only with television display.

---

>CELLS<	IEDIT	SWAP		
CSTOR	CEDIT	VIEW		

>IEDIT<	MAKE	REFLCT	MOVE/\$	MRG/*
	NAME	DUP	COPY/\$	DEL/*

>CEDIT<	MAKE	REFLCT	MOVE/\$	MRG/*
	NAME	DUP	COPY/\$	DEL/*

>CSTOR<	PUTBUF	PUTCEL	TRIM	SAVE
	GETBUF	GETCEL	MARK	LOAD

>FONTS<				
PRINT				

>PRINT<	QJ-BIG	QJ-SML		

## Section 2

---

# General Information

---

### Floppy Disks

Floppy disks are magnetic storage media. Information on disks is stored in files.

#### Lumena System Disk

The Lumena System Disk is the disk which holds Lumena command, menu, and documentation files. That is, it contains all information necessary to run Lumena. Pictures you create should be stored on separate disks.

It is good practice to immediately make a backup copy of your System Disk. To do this, follow instructions in your DOS manual for formatting (or initializing) a disk and then for copying information from one disk to another. Put a write-protect tab on the copy and store the disk in a safe place.

#### General Care

Floppy disks must be handled with some care to protect the data stored on them. Keep disks away from magnetic fields, including the digitizing tablet, the RGB monitor, airport x-ray devices and telephones. Store disks in their envelopes to protect them from dirt, and keep them away from extreme heat or cold. Do not bend disks, touch their exposed surfaces, or write on disk labels except with a felt-tipped pen.

---

### Digitizing Pen and Tablet

The digitizing pen and tablet are electronic devices used together to draw on the screen, manipulate onscreen images, and initiate saving and loading functions.

---

For Lumena to run properly, the digitizing tablet must be properly configured. Before loading Lumena, follow directions in Appendix A.

## How the Pen and Tablet are Used

When touched to the tablet, the digitizing pen brings a spot of light, the cursor, to the screen of the color monitor. The tablet is a tactile equivalent to the screen: all movement of the pen on the tablet is indicated by a cursor in the corresponding area of the screen.

There are three gestures for using the pen and tablet:

- Use *brief pressure*—pressing down on the pen and immediately releasing pressure—to initiate a command, select a color or locate a point onscreen.
- Use *sustained pressure*—keeping the pen depressed while moving it—to draw onscreen or change the mode and size in the Status Box.
- Use a *gliding motion*—keeping the pen in contact with the tablet but not depressed—to move the cursor to another point on the screen without making a mark. It is always better to glide the pen to another place than to lift it off the tablet. Gliding is also the gesture for bringing a menu to the screen, removing a menu, and canceling a pending menu command.

## General Care

Keep magnets and floppy disks away from the digitizing tablet. The cord connecting the pen and tablet should be free from excessive tangling and strain. If the cursor moves erratically or if extraneous data appear onscreen, press the tablet's reset button or unplug and replug the tablet's power cord.

---

## Mouse

The mouse is an alternative device for drawing and manipulating onscreen images. It can be used with Lumena, but it does not allow as much ease of movement as the digitizing pen and the results may not be as satisfactory.

## How the Mouse is Used

The mouse has two buttons. The right button alternately displays or removes the cursor—a spot of light which orients you on the screen. Pressing once brings the cursor to the center of the screen; pressing the

---

next time makes the cursor disappear. If for any reason you are unable to locate the cursor, pressing this button once or twice will bring it to the center of the screen.

The left button is used for selecting commands, colors and points, and for drawing. To select a command, for example, press briefly on the button. To draw, press and hold the button down as you move the mouse. Releasing pressure lets you move the cursor without drawing.

To move the cursor on the screen, you must glide the mouse with the cursor visible. If you lift the mouse up and move it, the cursor will stay in position. If you move the mouse while the cursor is not visible, the position of the cursor is not affected since, when you next press the button on the right side of the mouse, the cursor will appear in the center of the screen.

## Terminology

Because the digitizing pen and tablet are the preferred means of input, this manual and the onscreen documentation use that terminology. If you are using a mouse: "pressing briefly on the pen" means pressing briefly on the left button of the mouse; "retaining pressure on the pen" means retaining pressure on the left button of the mouse; "gliding the pen" or "keeping the pen in contact with the tablet" means gliding the mouse with the cursor visible; "lifting the pen off the tablet" means pressing the right button so that the cursor disappears. With a mouse, pressing ESC will bring the cursor to the center of the screen.

---

## Monitor or Television

Lumena works with either a Monitor or a Television. The television set used should be one that takes a composite signal (rather than radio frequency that comes through an antenna), and it should be set to TV mode. If you use a standard TV set, the image quality will not be as good.

Because of differences in these two methods of display, commands that affect color are slightly different for each. Menus distinct to the Television mode are COLOR MENU (television), PALET MENU (television), and EDGES MENU (television). The menu distinct to the Monitor mode is PALET MENU (monitor). When you are running Lumena, only the menus appropriate to the mode you are in will be visible and accessible.

The D keyboard command allows you to alternate from one mode to the other. However, there is no reason to do this unless you have both a monitor and a television connected, as colors of images created in one mode will be distorted and unpleasant if displayed in the other mode.

An image saved on disk will always load in the mode your system is currently using. If colors appear distorted, it probably means the image was created (and must be displayed) in the alternate mode.

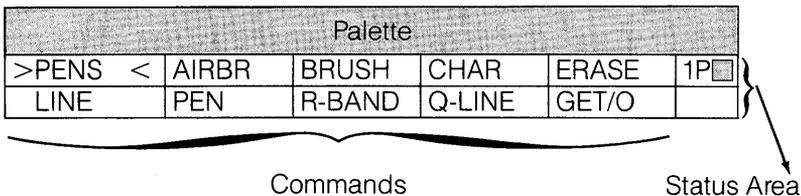
For a discussion of the palette in each mode, see COLOR in this section.

## Loading Lumena

We recommend that you put the Lumena system disk in drive A (the left drive) and an empty, formatted disk in drive B. The disk in drive B will be used for saving pictures.

Select drive B by typing **B:** followed by RETURN. Then load Lumena by typing **A:LUMENA** and RETURN. By loading Lumena in this way, you will not accidentally attempt to save a picture on your system disk.

## The Menu



A menu consists of a PALETTE, COMMANDS and a STATUS AREA.

### Calling Up a Menu

To bring the current menu to the screen, put the digitizing pen down in the middle of the tablet and glide it toward the bottom. When the cursor goes off the bottom of the screen, the menu will appear onscreen.

To keep the menu onscreen once it appears, keep the pen in contact with the tablet and the cursor in the menu area.

### Removing a Menu

To remove a menu from the screen, move the cursor up from the menu into the image area, keeping the digitizing pen in contact with the tablet. Images done on the lower part of the screen will return to the screen whenever the menu is not visible.

## Selecting Another Menu

>MAIN <	COLOR	PALET	FILLS	DISK	1P <input type="checkbox"/>
TOOLS	XFORM	ANIM	CELLS	FONTS	

The MAIN MENU is the first to appear whenever Lumena is loaded. It lists other available menus. Some of these are, like MAIN, menus of menus. The pages immediately preceding this section in the manual show the menu structure of Lumena.

To select another menu, press the appropriate box. The selected menu will come to the screen.

Pressing with the cursor in the Menu Label of any menu will bring to the screen the parent menu of the current menu.

## The Menu Label

The Menu Label, the upper left box, identifies the current menu.

documentation

previous menu

>PENS <	AIRBR	BRUSH	CHAR	ERASE	1P <input type="checkbox"/>
LINE	PEN	R-BAND	Q-LINE	GET/O	

## On-Line Documentation

For information on any command in the menu, press the angle bracket on the left of the Menu Label, then press the command in which you are interested. The image onscreen will be temporarily stored and documentation on the selected command will appear on the screen. To exit from the documentation and return your image to the screen, press the ESC key or press the pen anywhere on the tablet.

## Previous Menu

To return the previous menu to the screen, press the angle bracket on the right side of the Menu Label. This allows you to quickly alternate between two menus without having to go through the parent menu(s).

---

## Commands

In addition to the GENERAL MENU COMMANDS, which are common to all menus, each menu has up to nine commands. All commands are described in detail in this manual and briefly in the on-line documentation.

### Initiating a Command

Press briefly on the command. A bell or beep sounds and a patch of light flashes at the cursor, indicating the command has been activated.

### Exiting a Command

See directions under the specific command. For many commands, no exit procedure is necessary; the command simply completes execution and returns you to your last drawing mode.

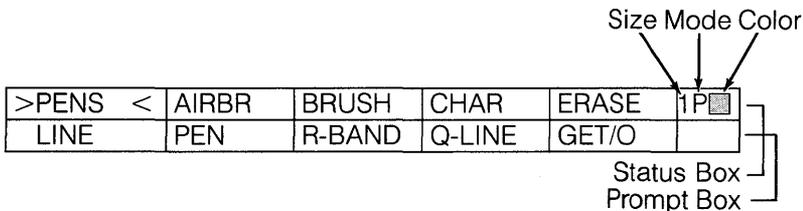
### Canceling a Command

Glide the pen to the right side of the tablet until the bell sounds. CANCEL exits a pending menu command before the command executes. To stop a command once it has begun executing, press the ESC key.

---

## Status Area

The STATUS AREA, to the right of the commands, identifies the current mode and color (upper box) and gives prompts for using certain commands (lower box).



### Status Box

The upper box of the STATUS AREA, the Status Box, identifies the size, mode and color that are active when the cursor is in the image area, the pen is depressed and no command is pending. In the example above, the size is 1, the active mode is Pen, and the current color is shown to the right of the P.

---

All modes of the PENS MENU are accessible through the Status Box of any menu, provided no command is pending. (See GENERAL MENU COMMANDS for directions on how to CHANGE MODE, CHANGE SIZE and CHANGE COLOR.)

### **Prompt Box**

In the lower box of the STATUS AREA, the Prompt Box, appear prompts that facilitate the execution of certain menu commands. Individual prompts are explained under the commands where they are relevant.

A message in this box indicates that a command is pending and must be either completed or canceled before another command can be initiated.

The Prompt Box is also used to define the entire screen as the designated area for a command. For example, if you initiate a command such as REFL-X, the prompt will ask for two points to define the image area to be reflected on its X axis. Putting the cursor in the Prompt Box and pressing once on the pen signifies that the entire screen is the designated area.

In loading to the screen a saved image, the prompt asks for one point to position the image. Pressing once with the cursor in the Prompt Box brings the image to the same area of the screen it occupied when it was saved.

---

## **Temporary Storage**

Just above the Status Box, and to the right of the palette, is the PSG command box, used for holding images in a temporary buffer. To store an image in the buffer, press P. To exchange images between the working screen and the buffer, press S. To bring to the screen an image from the buffer, press G. The temporary buffer stores only one image at a time. Storage is "temporary" because the image will be lost if replaced by another Put command or if you exit Lumena. (See the PSG command, in GENERAL MENU COMMANDS, for complete instructions in using this command.)

---

## **Clearing the Screen**

Put the cursor in the Prompt Box and press once on the pen; when the word ZAP appears, press again. The screen will fill with background

---

color. (To abort the ZAP command—and prevent the screen from clearing once ZAP has appeared as a prompt—press anywhere except in the Prompt Box.)

---

## Color

Unlike pigment colors, which are subtractive, video colors are additive. All colors on the graphics monitor are composed of red, green and blue. Red and green make yellow, blue and green make cyan, red and blue make magenta.

The palette of available colors is made more flexible through color mapping. In color mapping, a palette position does not contain an absolute color but refers to a location in a color look-up table existing in software. Locations in that table have numbers designating different combinations of red, green and blue. “Remapping” a color means changing the red, green and blue values in that color's location.

## Monitor Mode

The palette shows the colors available for imaging. To choose a color for drawing, press the desired color in the palette. The current drawing color is always indicated in the Status Box. The current color is also described in a line that appears on top of the screen whenever the menu is visible.

In the Monitor mode, the palette has two rows of 16 colors each. The lower row has the 16 basic colors; the upper row has mixes of the basic colors.

Because colors are mapped, any basic color in the bottom row of the palette can occupy any position in that row, and any pair of basic colors can be put together as a dithered mix into a position in the top row and used as a single color.

Colors composing the mixes in the top row are chosen through the M/S (make/select) command in any menu, which appears immediately to the right of the top row of palette colors. (See the M/S command, in GENERAL MENU COMMANDS, for complete instructions in using this command.)

## Television Mode

The palette shows the colors currently available for imaging. To choose a color for drawing, press the desired color in the palette. The current drawing color is always indicated in the Status Box.

---

In the Television mode, the palette has 16 colors simultaneously available. Color mapping greatly extends the palette, allowing you to choose these 16 colors from 512 possible colors. Colors are remapped through commands in the COLOR MENU (television) and PALET MENU (television).

The composition of the current color appears at the top of the screen whenever the menu is visible. The line gives the palette position of the current color, followed by the color's red, green and blue values, each of which can range from 0 to 7. This readout can serve as a guide for mixing colors or matching a color previously mixed.

## Section 3

---

# Guided Tour

To run Lumena, the hardware must be properly configured. For help in setting up your system, refer to instructions that accompany the hardware and to Appendix A in this manual. The Guided Tour assumes that the equipment is already properly set up and that this is your first experience using Lumena.

If you have not already done so, look through the GENERAL INFORMATION section in this manual. In particular, if you are using a mouse, read the discussion of the mouse in that section.

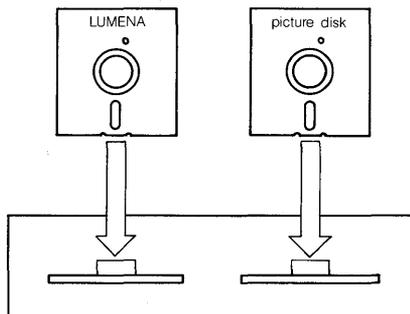
---

## Loading Lumena

Be sure that the computer and monitor or television are turned on and that the digitizing pen and tablet are connected.

Boot your system according to the procedure described in your DOS (Disk Operating System) manual.

You should have two disks—the Lumena system disk and an empty, formatted disk. (To format, or initialize, a disk, follow directions in your DOS manual.)



---

Put the Lumena system disk in drive A (the left drive) and the empty, formatted disk in drive B. The disk in drive B is for saving pictures.

Select Drive B by typing **B:** followed by RETURN. Then load Lumena by typing **A:LUMENA** and RETURN. By loading Lumena in this way, you will not accidentally attempt to save a picture on your system disk.

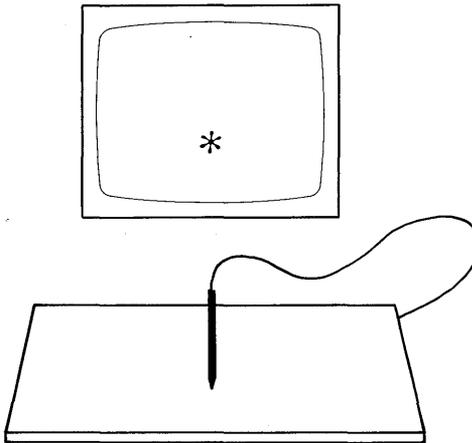
When Lumena is loaded, a message identifying Lumena appears on the screen.

To clear the screen for drawing, press ESC or press briefly with the pen anywhere on the tablet.

---

## The Cursor

Touching the digitizing pen to the center of the tablet will bring a spot of light, the cursor, to the center of the screen. The cursor is represented by \* in this manual. When selecting menu items, the cursor is placed over the characters in the menu diagrams. This cursor placement \* appears as an asterisk on top of the character.



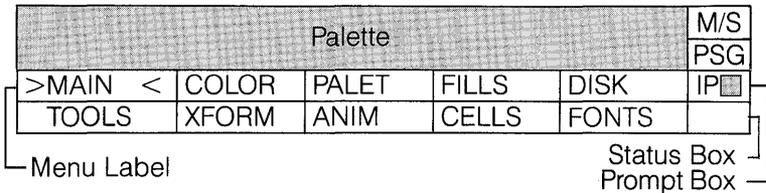
As soon as Lumena is loaded, the Pen mode is active and ready for use. If you can see the cursor on the screen, simply press down on the pen and move it around on the tablet. A continuous line will be drawn on the screen as long as the pen is depressed.

(If you *cannot* see a cursor when you glide the pen and if a line does not draw when you press the pen while moving it, check that cables and power cords are properly and firmly connected. Be sure the tablet has been configured according to directions in Appendix A.)

In general, the digitizing pen should be kept in contact with the tablet. Pressing firmly on the pen (when the cursor is not in the menu) activates the current drawing mode—in this case, Pen. Releasing pressure allows you to move to another area of the screen without making a line. It is always better to glide the pen to its new position than to lift it off the tablet.

## Calling Up a Menu

Glide the pen toward the bottom of the tablet. When the cursor goes off the bottom of the screen, the current menu will appear. Since Lumena has just been loaded, the MAIN MENU will come to the screen.



This is the initial menu, which offers access to other menus in the system. The upper left box, MAIN, is the menu label; the other boxes show other menus available.

Above any menu is the palette. It has one row of colors if you are using a television for display or two rows of colors if you are using a monitor. (See COLOR, in Section 2, GENERAL INFORMATION, for more details.)

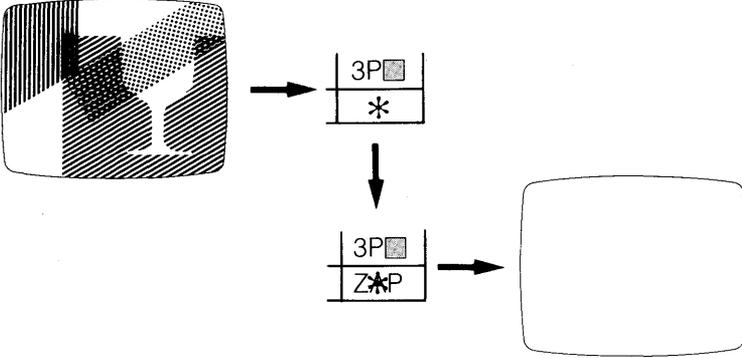
Gliding the pen up from the menu into the image area causes the menu to disappear from the screen. This allows you to use the area under the menu for drawing. If you glide the pen down on the tablet until the cursor goes off the bottom of the screen, the menu will return.

To keep the menu visible, keep the digitizing pen in contact with the tablet, with the cursor in the menu area.

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## Clearing the Screen

The Prompt Box—the empty box in the lower right corner of this or any menu—can be used at any time to clear the screen. Put the cursor there and press twice on the pen.




---

## Changing Color

Above the menu is the palette. The current color is shown in the Status Box. To change the current color, put the cursor over the desired color in the palette and press down. A soft beep will sound, indicating that a command has been carried out. Glide the pen up into the image area and try drawing with the new color.

---

## Changing Menus

All menus can be accessed from the MAIN MENU. As you can see from the diagram on page 1-2, several are, like MAIN, menus that give access to more menus.

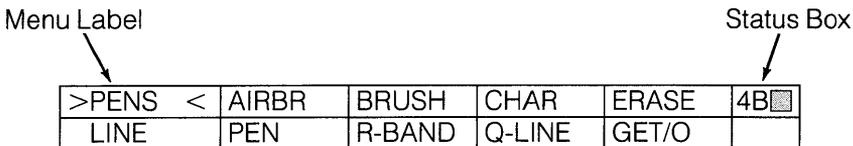
To call up the PENS MENU, move the cursor into the box marked TOOLS and press down briefly on the pen.

This brings to the screen the TOOLS MENU, which contains other menus.

>TOOLS<	PENS	BRUSH	SHAPE	GRIDS
EDGES				

Press in the box marked PENS.

The PENS MENU will appear, accompanied by a beep. The Menu Label reads PENS; the other boxes name commands in the menu.



Move the cursor into the box labeled BRUSH and press down briefly on the pen. The Brush mode is now active. Move the cursor into the image area and try drawing in Brush.

Notice that Brush deposits a rounded color patch, while the Pen patch is rectangular. Another difference is that if you move the digitizing pen very quickly, Brush will deposit a “dotted” line, whereas a Pen line will always be continuous—though it may be squared off, as the computer tries to catch up with the quick movement of the digitizing pen.

## Changing Brush Size

Above the Prompt Box is the Status Box. It contains three elements: a number indicating size or width of the drawing mode being used, the initial letter of the current drawing mode, and an indication of the current color.



To change the size of the brush line, put the cursor over the size number and press down. A caret (^) appears below the number, indicating that size is being changed. Retaining pressure, move the pen slowly to the left or right to increase or decrease brush size. Release pressure when you reach the size you want.

In all drawing modes, 1 is the smallest size and 8 is the largest, but the area covered by each number varies according to the mode. To get a feel for the difference, you may want to compare lines drawn by 2 Brush, 2 Pen and 2 Airbrush. (You will have to set the size for each of these drawing modes, but once you set it, that size is retained by that mode until you change it.)

---

The first position in the Status Box indicates size in all drawing modes except CHAR, character. If you press CHAR, the Status Box may read "aC" and the color indication. Pressing with the pen in the image area will deposit the letter "a". You can now draw with a brush that has the shape of the letter "a".

To change characters, follow the procedure for changing size: put the cursor over the character in the left of the Status Box, press down on the pen and move it left or right. All the letters of the alphabet will appear in upper and lower case, as well as numerals and other characters commonly found on the keyboard. When the desired character appears, release pressure.

Since characters go by quickly, you must move the pen very slowly to select one. If you happen to release pressure on the pen before reaching the character you want, press again over the character in the Status Box and the run of characters will continue from where it left off.

---

## Erasing

ERASE lets you remove from the image selected pixels of a chosen color. To appreciate this command, first draw on the screen with several colors, making the colors interweave and overlap.

Press the ERASE command. Then put the cursor over a color in the image and press down on the pen. Keeping the pen depressed, move it freely. Only the color initially under the cursor when you pressed down will be erased; all other colors will be unaffected. To erase a different color, release pressure on the pen, move the cursor to the new color and press down.

The size of ERASE, like that of the other drawing modes, can be changed through the Status Box. The ERASE command, in effect, draws background color over a selected color with a selected pen size.

---

## Airbrushing

AIRBR deposits a random spray of dots. Size 1 gives a rather small spray while size 8 is large enough to almost fill the screen. Trying out several sizes will give you a feel for the range.

The Airbrush spray is composed of the last four colors selected as the current color. Selecting the same color four times will give an Airbrush spray of only one color. You can choose the colors either before or after pressing AIRBR.

## Drawing Straight Lines

The LINE command draws a straight line between two given endpoints. Press LINE and move the cursor into the image area. Press down briefly on the pen to mark the beginning of the line; then, gliding the pen on the tablet, move the cursor some distance away and press again. After the second point is pressed, a line will join the two points. Glide the pen to a third position and press down, and a line will join the previous endpoint with the new point. To begin a new run of line segments, move the cursor down into the menu, then back into the image area.

R-BAND (rubber band) works much the same as LINE. After selecting the first point, glide the pen around on the tablet and notice how a temporary line connects the initial point and the cursor (with a rubber-band-like motion). Be sure to keep the pen in contact with the tablet, as lifting the pen up breaks the connection with the previous point. To set the line, press down on the pen.



LINE



Q-LINE

To draw lines that are exactly horizontal or vertical, use Q-LINE. This command quantizes the designated endpoints to 90 degrees before drawing a line. As with LINE and R-BAND, each time the pen is pressed, a line connects the new point with the previous point. To break a run of line segments, move the cursor into the menu.

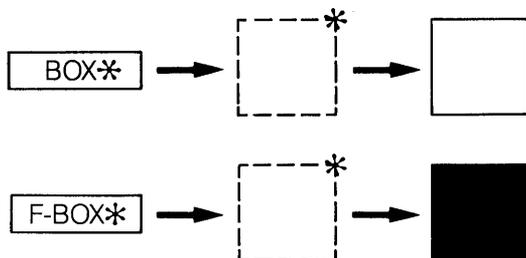
## Rectangles and Circles

Move the cursor to the middle of the Menu Label—the upper left box—and press down. This returns to the screen the TOOLS MENU. Now press SHAPE.

>SHAPE<	CIRCLE	ELLIPS	BOX	
L-CNTR	F-CIRC	F-ELIP	F-BOX	

Commands in the SHAPE MENU draw simple geometric figures.

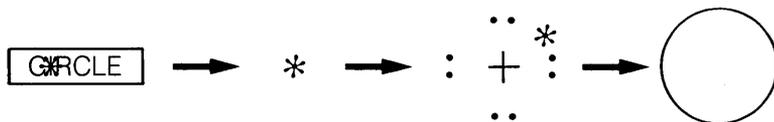
Press the BOX command. The prompt asks for two points (2P), the diagonal corners of the box. Move the cursor into the image area and press down briefly for one corner of the rectangle. Keeping the pen in contact with the tablet, glide it around. A temporary box connects the first corner with the cursor as you move the pen. To actually draw the box, press down briefly for the second corner.



The method just used for drawing a box is followed in many Lumena commands that require delineating an area of the image that you want to change. In all cases, it is necessary to keep the pen in contact with the tablet, gliding it from the first point pressed to the second point. If you lift the pen off the tablet, the first point will be lost and you will have to choose it again.

F-BOX draws a rectangle that is filled with color, rather than outlined. It works the same as BOX.

Press the CIRCLE command. The prompt asks for the center (CTR) of the circle. Move the cursor into the image area and press down. The prompt now asks for the radius (RAD). Put the cursor a short distance from the point chosen for the center and press down again. The command will draw a circle using your second point as the radius.



The width of the line used by CIRCLE is the size last selected for PEN. To make thinner or thicker circles, return to the PENS MENU, press PEN and change its size in the Status Box. Then return to the SHAPE MENU and try CIRCLE again.

F-CIRC gives a circle filled with color. Try making several boxes and circles of different sizes and colors. Leave several figures on the screen when you move on to the next section.

## Filling Enclosed Areas

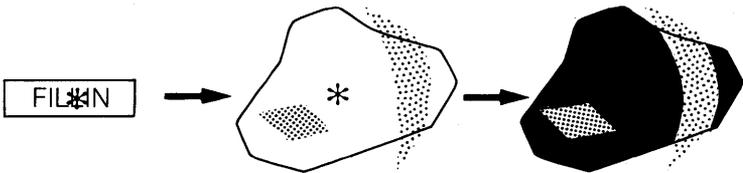
Move the cursor into the menu label (the upper left box, marked SHAPE) and press down to call up the TOOLS MENU. Then press its menu label (marked TOOLS) to get back to the MAIN MENU. Now press the box marked FILLS.

Commands in the FILLS MENU enable you to fill enclosed areas with a selected color.

>FILLS<	FLOOD	CHANGE	REMOVE	STEPS
XB/LB	FILLTO	FILLIN	MIX/BX	GRAD

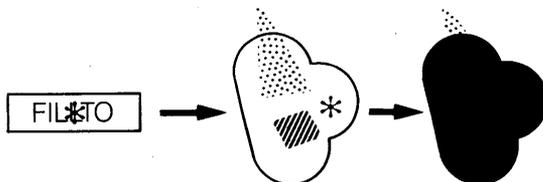
For variety, select as the current color a color not now on the screen. Then press FILLIN. The Prompt Box shows FIN, indicating that the FILLIN command is active.

Move the cursor into an enclosed area, such as a circle, and press down briefly on the pen. The current color will fill the enclosure until it is stopped by another color.



FILLIN covers any color, not only background. If you have made a solid-color box with the F-BOX command, press down with the cursor in that box and it will also fill with the current color. It is not necessary to press the FILLIN command again since FIN is still in the Prompt Box. The command remains active until it is exited. To exit, press FIN in the Prompt Box.

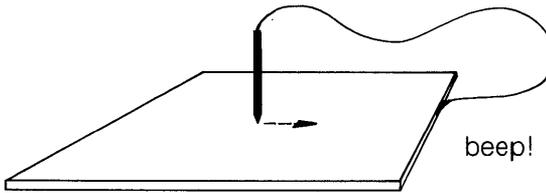
For comparison, FILLTO fills only an enclosure of the current color. It covers all colors within the enclosure (not just the color under the cursor when you pressed) and stops only when it comes to a boundary of the fill color. To exit, press in the Prompt Box.



You can also use FILLIN and FILLTO to fill freehand figures. Be sure the shapes are completely closed or the filling color will "leak out" and fill the next larger enclosure—possibly the entire screen. If such leaking does occur, press the ESC key to stop the command.

## Canceling a Command

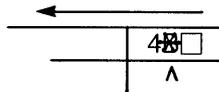
A prompt in the Prompt Box indicates that a command is pending. To cancel a pending menu command, glide the digitizing pen to the right side of the tablet, or press ESC.



## Changing Mode and Color Through the Status Box

If no command is pending (as indicated by a blank Prompt Box), the mode indicated in the Status Box will be active. This is the drawing mode you last used and you can continue to use it now.

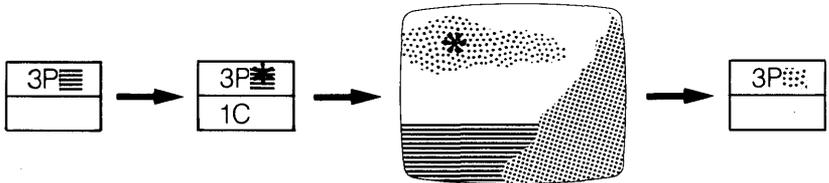
You can change drawing modes through the Status Box of any menu. The procedure for changing modes is like that used earlier for changing size. Position the cursor on the letter in the middle of the Status Box and press down. A caret will appear under the letter. Retaining pressure, move the pen left. Initials of all the drawing modes of the PENS MENU will appear in succession—Airbrush, Brush, Character, Erase, Line, Pen, Rubber-band, Quantized line, Getbrush.



When the initial of the desired drawing mode appears, release pressure on the pen.

This procedure can be followed whenever no command is pending—that is, when there is no message in the Prompt Box.

The current color also can be changed through the Status Box. Put the cursor over the color indication and press down briefly on the pen. The prompt asks for one color (1C). Put the cursor over a color in the image and press briefly on the pen. The color touched becomes the current color.



This procedure—rather than simply selecting a color from the palette—is useful when you want to match a particular color already in the image.

## Special Brushes

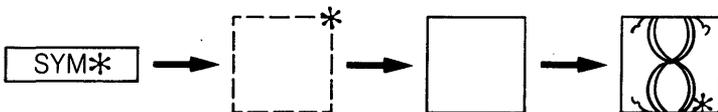
Return to MAIN by pressing the Menu Label (the upper left box of the menu). Then press TOOLS. When the TOOLS MENU appears, press BRUSH.

>BRUSH<	SYM	EDGE/X	CSTM/O	RING/X
XB/LB	P/W			

The BRUSH MENU offers various special-effects brushes.

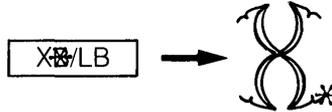
Before going on, clear the screen, if necessary, by pressing twice in the Prompt Box.

The SYM command allows you to draw in 4-way symmetry. Press SYM. The prompt asks for two points (2P) to define the screen area that will be active. Press down briefly for the first point, then glide the pen around, keeping it in contact with the tablet. As you glide the pen, a rubber-banding box will have one corner attached to the first point and its diagonal corner following the cursor. Press down for the second point.



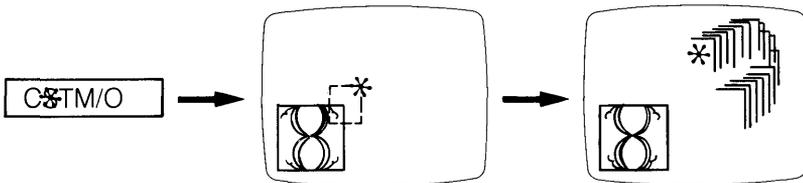
The area you've just defined will be surrounded by a box. All drawing done in this box will appear in 4-way symmetry, and the pen will not be active when the cursor is outside this box.

To remove the delineating box from the screen, press with the cursor over XB in the XB/LB command box.



SYM is still active in the designated area, even though the box is not visible. It will remain active until you exit SYM by changing the mode in the Status Box (notice there is now an s in the Status Box) or by initiating another command.

Leaving an image on the screen, press the left side of the box marked CSTM/O. The prompt asks for two points to define the image area to be used as a "custom brush". Choose a small part of the image, if possible an area with more than one color, and press down for the two corners of the box. This boxed image will now be deposited each time you press down on the pen. You can also draw with it and get a continuous line of overlapping images.



(If you pressed over the X in the CSTM/O command box, you activated a texture brush that changes color as it crosses other colors. For details, see the first page of the BRUSH MENU in this manual.)

## Saving Images

It is good practice to save images on a disk other than the Lumena system disk. To be sure you are accessing the appropriate disk, press **F** on the keyboard. At the top of the screen appears the message, "new file drive [x]".

If the letter in brackets names a drive that contains a blank, formatted disk, press RETURN. If not, press the letter of the appropriate drive for saving pictures. (If you followed the suggestion for loading Lumena at the beginning of this Tour, the letter in brackets will be B, the drive of your picture disk. You need only press RETURN.)

Press in the Menu Label to return to the TOOLS MENU. Then press in the Menu Label to return the MAIN MENU to the screen.

Press the box marked DISK.

>DISK <	RSAVE	PSAVE		PUTMAP
XB/LB	LOAD	OVRLAY	FILTER	GETMAP

The DISK MENU allows you to save images on disk and later call them back to the screen, either in their original form or altered in certain ways.

For this experiment, save whatever happens to be onscreen. (If you have recently ZAPPED and have a blank screen, quickly draw something!)

To name the file under which the image will be saved, type **1** followed by a name of up to six characters. For example,

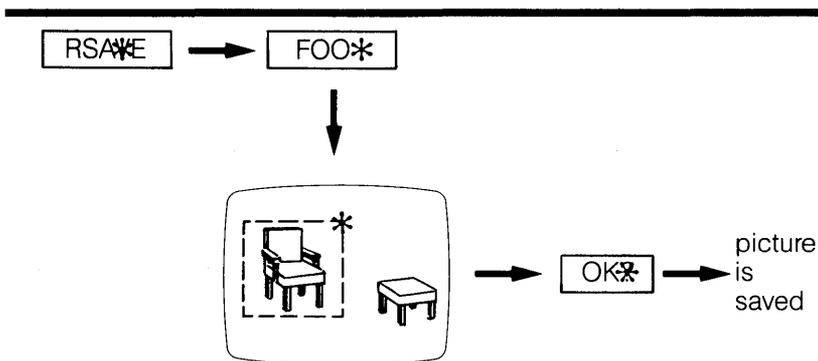
**1FOO**

Then press RETURN.

Press RSAVE. The menu will be replaced by a menu of up to nine filenames. The name you typed should appear in the second box of the top line.

DFAULT	FOO	FILE2	FILE3	FILE4
FILE5	FILE6	FILE7	FILE8	FILE9

Press this filename. The prompt asks for two points to define the image area to be saved. When the points are selected the area is enclosed in a box and the prompt asks OK? The OK? prompt is always your last chance to change your mind. If the box is not where you want it, cancel the command (by gliding the pen to the right side of the tablet) and begin again. If you are ready to save the enclosed image, press OK?.



The menu disappears from the screen and the digitizing pen and tablet are inactive while the computer is saving the image. When the menu returns, the image is saved and the pen and tablet are again ready for use.

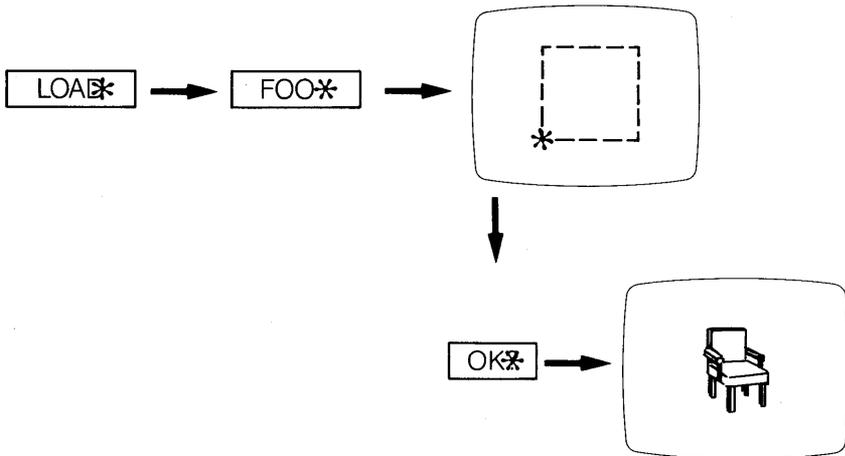
Although the image is now saved on disk, it also remains on the screen and you can continue to work on this picture. However, any changes you make will not appear in the image on disk unless you save the image again after making the changes.

---

## Loading Images

Clear the screen by pressing twice in the Prompt Box.

To bring the saved image back to the screen, press LOAD. The menu of filenames will appear. Press the name of the file containing the image. The prompt asks for one point. Put the cursor where you want the lower left corner of the image to be and press down. Pressing with the cursor in the Prompt Box will load the image to the same screen area where it was saved. The area to be occupied by the image is outlined with a box. Press OK? in the Prompt Box and the image will come to the screen in the the selected location.



You may also want to look at the picture that was included on your system disk. To do so, press the **F** key and, in response to the prompt at the top of the screen, "new file drive [x]" press the letter of the drive in which the Lumena system disk is found. (If you followed the suggestion at the beginning of the Tour the system disk is in drive A, so type **A**.)

Then type **P** for a list of picture files on disk. There should appear on the screen one or more files with the extension ".PIX".

Add this name to the filename's menu by pressing a number from 1 to 9 and typing in the name. (Do not type the .PIX extension, as this is automatically added by Lumena.)

Then press **LOAD** in the DISK MENU. When the menu of filenames appears, press the name. When the prompt asks for 2 points, press in the Prompt Box (to select the same area of the screen where the picture was saved). Then press **OK?** in the Prompt Box.

After loading the pictures and before going on, press **F**. In response to the prompt, press the letter of the drive in which you were saving files (probably B). It is important to do this, so that you don't attempt to save pictures on your system disk.

---

## Moving Images Onscreen

Clear the screen by pressing twice with the cursor in the Prompt Box. Press the Menu Label to call up the MAIN MENU.

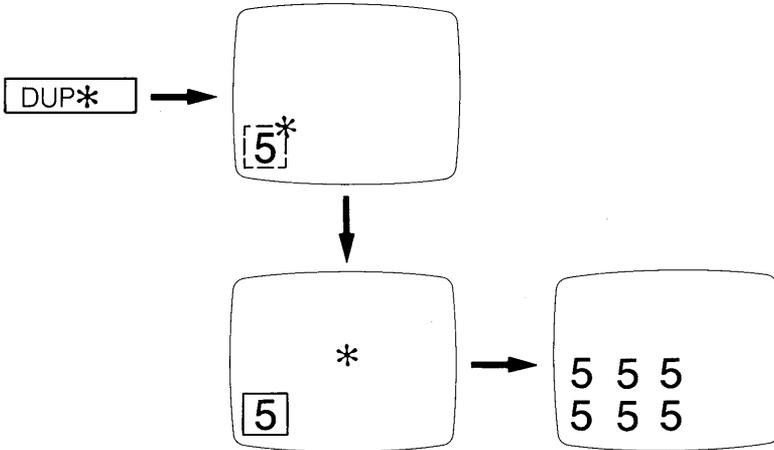
Press XFORM. When the XFORM MENU appears, press MOVES.

>MOVES<	COPY/O	DUP	ROT	REFL-X
XB/LB	MOVE	ZOOM	TRIM	REFL-Y

Commands in the MOVES MENU enable you to replicate and rearrange onscreen images.

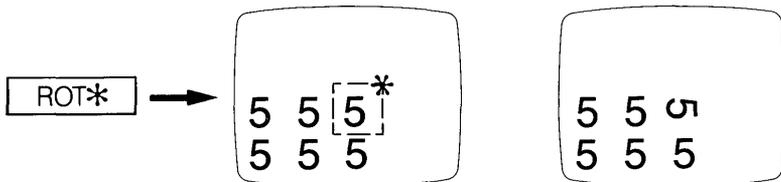
Using the Pen or Brush mode, make a small figure, say the number 5, in the lower left corner of the screen.

Then press DUP. The prompt asks for three points. For the first two, select diagonal corners so that your 5 is enclosed in a box. For the third point, which designates the screen area for duplication, put the cursor in the middle of the screen and press down on the pen.

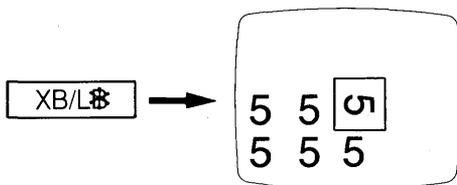


The command will make duplicates of the 5 from its present position toward the right and top of the screen until it reaches the limit set by the third point. In this case, the duplicated image will fill the lower left quarter of the screen.

Press ROT, for Rotate. The prompt asks for two points, diagonal corners defining the image to be rotated. Select one corner and press down. Since a rotated image must have the same number of pixels horizontally as vertically, the box that follows the cursor as you select the second corner will be approximately square. Move the pen diagonally to enlarge or reduce the size of the box. Pressing down for the second point will cause the image to rotate 90 degrees clockwise.

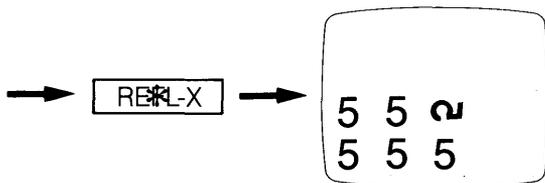


Leaving the rotated image onscreen, press LB (for Last Box) in the XB/LB command box.



This makes visible the last box used and activates it for the next command. This means that whatever command you next select will not ask for 2P to define a screen area but will use the box shown.

Now press REFL-X. The image just rotated will reflect on its X axis—that is, turn upside down.



Clear the screen by pressing twice in the Prompt Box.

## Animation

Press the Menu Label to return to the XFORM MENU, then press its Menu Label to return to MAIN.

Press ANIM. When the ANIMATION MENU comes to the screen, press CYCLE.

>CYCLE<	MAP	BRUSH		GO

---

The CYCLE MENU lets you draw with a brush that uses a sequence of colors and allows you to animate an image.

Press MAP. The prompt asks for two colors. Choose colors that are some distance apart in the palette, say color 2 and color 10, and press down once on each color. (If your palette has two rows of colors, choose from the bottom row.) Do not include the first color in your selection.

Now press BRUSH and draw something. BRUSH in this menu uses as its paint color the sequence of colors selected under MAP. If you draw with a quick movement, you will see separate patches of the palette colors; if you draw slowly, the patches will overlap.

After drawing a few lines or figures, press GO. Lines drawn with this BRUSH appear to move as the composing colors shift to the next position on the palette. To stop the cycling, press down briefly anywhere on the tablet.

The restrictions given above on selecting colors in MAP were only for this first experiment, so you could see what the command does. Now that you have the general idea, try these commands with different MAP colors.

Lines drawn with BRUSH in the CYCLE MENU appear to move in the direction in which drawing occurred. A spiral drawn from the outside in will seem to move inward. Lines spraying out from a common point can have a fountain effect. The number of colors selected through MAP, the choice of colors, the size of BRUSH and the speed with which the line is drawn all affect the appearance of movement in the cycled line.

---

## On-Line Documentation

Information on using any of the menu commands is always available from any menu (as well as from this manual). To call up documentation on a command, press the > on the left side of the Menu Label. When the word DOC appears in the Prompt Box, press the command for which you want information.

The information will appear on the screen, while your picture is stored in a temporary buffer. When you finish reading, return your image to the screen by pressing the ESC key or by pressing the pen anywhere on the tablet.

---

## Exploring

You now have some experience with the techniques for using Lumena and some idea of the system's possibilities. Explore more manipulations by using other commands.

Before going further, it would be a good idea to glance through the sections

- Keyboard Commands
- General Menu Commands
- the Appendixes

to acquaint yourself with what information is there.

For directions on using a specific command, refer to the the on-line documentation or to the individual command page in this manual.

## Section 4

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# Keyboard Commands

A	Alternate palette.
B	Turn bell on or off.
C	List cell files.
D	Change display mode.
ESC	Escape a command or a text screen.
F	Change file disk drive.
H	Display help list of prompts.
I	Install.
K	Display keyboard commands.
L	List all files on current disk.
M	List map files.
P	List picture files.
S	Change system disk drive.
T	Type.
U	Change input device.
W	Change tablet size.
X	Exchange background color.
1-9	Name a file.
^E	Erase filenames from menu.
^X	Exit Lumena.

In the list of keyboard commands brought to the screen by pressing **K**, certain commands give information on the current state of the system.

The message for **D** gives the current display mode and tells what the mode will change to when you press **D**.

The message for **W** gives the tablet width currently set and tells what the setting will change to when you press **W**.

**COMMAND:** A (alternate)

**PURPOSE:**

Exchange color map onscreen with map stored in buffer.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press **A**.

**EFFECTS:**

The current color map, or palette, is stored in the buffer, and the map in the buffer comes to the screen. The two maps change places each time **A** is pressed.

This command is identical to **ALTMAP** in the **PALET MENU**.

---

**COMMAND:** B (bell)

**PURPOSE:**

Turn bell on or off.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press **B**.

**EFFECT:**

This command alternately enables or disables the bell which can accompany the selection of colors and points and the initiation and completion of commands. (The temporary white patch at the position of the cursor, which visually marks these events, continues whether the bell is on or off.)

---

**COMMAND:** C (cell files)

**PURPOSE:**

List cell files on the current file disk.

**PROMPTS:**

none

**EXIT:**

Press ESC or press the pen anywhere on the tablet.

**PROCEDURE:**

1. Press **C**.

**EFFECT:**

A list of cell files on the current disk appears on the screen, while your image is held in a temporary buffer. When you exit, your image returns to the screen.

**RELATED COMMANDS:**

L, P, M (KEYBOARD COMMANDS)

The L command lists all files on the current disk. The P command lists only picture files. The M command lists only color map files.

---

**COMMAND:** D (display)

**PURPOSE:**

Change display mode.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press **D**.

**EFFECTS:**

Each press of the key toggles the display mode: monitor, television, television in black and white, television with dithered colors.

NOTE: Because of differences in these means of display, using Lumena in the inappropriate display mode may produce colors that are distorted and text that may be illegible.

**COMMAND:** ESC (escape)

**PURPOSE:**

Halt an executing menu command; or, return from text screen to graphics screen.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press ESC.

**EFFECT:**

An executing command stops before completion. If text was onscreen, pressing ESC returns your picture to the screen.

---

**COMMAND:** F (file disk drive)

**PURPOSE:**

Change the disk drive used for storing picture and color map files.

**PROMPTS:**

New file drive [x]

**EXIT:**

Enter the letter of the new storage disk drive, or press RETURN to keep the drive shown in brackets.

**PROCEDURE:**

1. Press F.

A message appears at the top of the screen: "new file drive", followed by a letter in square brackets.

2. Type the letter of the new drive for storing files, or press RETURN to select the drive in brackets.

**EFFECT:**

This command sets the drive for saving picture, color map and cell files. It allows you to save these files on a disk other than the one on which Lumena documentation and menu files are stored.

**RELATED COMMANDS:**

L (KEYBOARD COMMANDS)

The disk drive set by F is the drive that is read by the L command. You can, therefore, use F followed by L to read any drive. (Be sure to return to the appropriate disk before saving or loading picture, map or cell files.)

S (KEYBOARD COMMANDS)

To change the disk drive from which the system reads Lumena documentation and menu files, use the S Keyboard Command.

**COMMAND:** H (help)

**PURPOSE:**

Display the list of prompts.

**PROMPTS:**

none

**EXIT:**

Press ESC or press the pen anywhere on the tablet.

**PROCEDURE:**

1. Press **H**.

**EFFECTS:**

The list of prompts appears on the screen.

---

**COMMAND:** I (install)

**PURPOSE:**

Install new Lumena menu.

**PROMPTS:**

various

**EXIT:**

none needed

**PROCEDURE:**

If you purchase optional Lumena menus, installation instructions will be provided.

**EFFECT:**

A new Lumena menu is installed.

---

**COMMAND:** K (keyboard commands)

**PURPOSE:**

Display the list of keyboard commands.

**PROMPTS:**

none

**EXIT:**

Press ESC or press the pen on the tablet.

**PROCEDURE:**

1. Press **K**.

**EFFECT:**

A list of the keyboard commands appears on the screen.

---

**COMMAND:** L (list)

**PURPOSE:**

List all files on the current disk.

**PROMPTS:**

none

**EXIT:**

Press ESC or press the pen anywhere on the tablet.

**PROCEDURE:**

1. Press **L**.

**EFFECT:**

A list of all files on the current file disk appears on the screen.

**RELATED COMMANDS:**

F (KEYBOARD COMMANDS)

Use the F command to set the drive of the disk read by the L command.

**COMMAND:** M (map files)

**PURPOSE:**

List color map files on the current disk.

**PROMPTS:**

none

**EXIT:**

Press ESC or press the pen anywhere on the tablet.

**PROCEDURE:**

1. Press **M**.

**EFFECT:**

A list of color map files on the current disk appears on the screen.

---

**COMMAND:** P (picture files)

**PURPOSE:**

List picture files on the current disk.

**PROMPTS:**

none

**EXIT:**

Press ESC or press the pen anywhere on the tablet.

**PROCEDURE:**

1. Press **P**.

**EFFECT:**

A list of all picture files on the current disk appears on the screen.

---

**COMMAND:** S (system disk drive)

**PURPOSE:**

Change the disk drive in which the system looks for Lumena command, menu and documentation files.

**PROMPTS:**

New system drive [x]

**EXIT:**

Enter the letter of the new system disk drive, or press RETURN to keep the drive shown in brackets.

**PROCEDURE:**

1. Press **S**.

The message appears at the top of the screen: "system drive", followed by the current system disk drive in square brackets.

2. Type the letter of the new system disk drive, or press RETURN to select the drive in brackets.

Lumena command, menu and documentation files must be on the same disk.

**EFFECTS:**

The designated drive is where the system reads Lumena command, documentation and menu files.

Note that, even though Lumena command, documentation and menu files are on the disk in the current drive, this command can be used to direct the system to look for them on another disk—for example, on a hard disk.

**RELATED COMMANDS:**

F (KEYBOARD COMMANDS)

The S command governs only the drive where Lumena system files are sought. It does not affect where pictures, color maps and cell files are stored. Use the F command to set the drive for saving pictures, maps and cells.

---

**COMMAND:** T (type)

**PURPOSE:**

Display on the graphics screen characters typed from the keyboard.

**PROMPTS:**

none

**EXIT:**

Press ESC on the keyboard.

**PROCEDURE:**

1. Position the cursor where the typed characters should begin and, keeping the digitizing pen in contact with the tablet, press **T** on the keyboard.
2. Type text.
3. To exit the type mode and return to the graphics mode, press the ESC key on the keyboard.

**EFFECTS:**

Text typed from the keyboard begins at the cursor position. The cursor remains onscreen, marking your place as you type. (The digitizing pen is inactive while Lumena is in the type mode.) A RETURN brings the cursor to the next line of type, beginning directly below the starting point.

In the type mode:

- ^W moves the cursor up
- ^X moves the cursor down
- ^A moves the cursor left
- ^D moves the cursor right

NOTE: ^W means pressing the W key while holding down the CTRL key.

Typed characters appear in the current color. To change the current color, return to the graphics mode, select another color, and enter the type mode again.

The DELETE key moves the cursor left and deletes a character by depositing a block of the color that is under the cursor.

NOTE: All other keyboard commands and menu commands are inaccessible while Lumena is in the type mode. To return to the graphics mode and gain access to other commands, press the ESC key on the keyboard.

*continued on next page*

---

T (type), *cont.*

**RELATED COMMANDS:**

P/W (BRUSH MENU)

It might be desirable to have isolated characters of a text appear in different colors—say, an occasional yellow word in a passage of red type. Rather than changing the current color as you type, which necessitates leaving the type mode and reentering, use P/W (mask brush), in the BRUSH MENU, after the text is completed.

To do this, first type the entire text in red and exit the type mode. Then press W in the P/W command, and designate red as the color to be written over. You may now choose any color from the palette and selectively recolor words in the text.

CHAR (PENS MENU)

For depositing characters in a brush mode, use CHAR in the PENS MENU.

MOVES, ROTAT, SCALE MENUS

Characters in the type mode appear in only one size but their dimensions and orientation can be altered through commands in the MOVES, ROTAT and SCALE MENUS.

---

**COMMAND:** U (change input device)

**PURPOSE:**

Use different input device.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press **U**.

The message, "Press pen to continue" appears at the top of the screen.

2. Press down with new input device.

**EFFECTS:**

This command is used to change input devices—to go from a digitizing pen to a mouse, for example.

**COMMAND:** W (change tablet size)

**PURPOSE:**

Change tablet width.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press **W**.

**EFFECTS:**

This command is used to direct the system to accept data from a different sized tablet. The screen of Keyboard Commands always shows, next to W, the current setting.

---

**COMMAND:** X (exchange background color)

**PURPOSE:**

Change the background color to dark or light and return the menu to its default color.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press **X**.

**EFFECTS:**

The background turns to dark or light and the menu returns to its default color. Repeatedly striking the **X** key causes the background to alternate between dark and light, but the menu remains in the default color.

This command is useful when, because of changes in color mapping, the menu has become difficult to distinguish from the background color. Note, however, that it returns to default color all instances of menu color in the image.

**RELATED COMMANDS:**

COLOR and PALET MENUS

To change the background to a selected color, use the commands in the COLOR MENU or PALET MENU.

---

**COMMAND:** 1-9

**PURPOSE:**

Write a filename into the filenames menu, in preparation for saving or loading.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

The filenames menu, which appears whenever you save or load a file, has nine boxes for names under which pictures, color maps or cell information can be stored.

To type a name into one of the boxes:

1. Press a number from **1** to **9**.
2. Type a name of up to six characters, and press RETURN.

**EFFECTS:**

The filename you typed appears in its designated box whenever the filenames menu appears onscreen—that is, whenever you save or load a file through Lumena. The name will remain in the box until you write a different name there or until you exit Lumena.

It is absolutely irrelevant which box of the menu contains which name, and overwriting the name of a saved image does not remove that image from the disk. To access an image saved on the disk, simply type its name into any box of the filenames menu and load it as usual.

The menu of filenames is the same, whether it is called to the screen through the DISK MENU, used for saving and loading pictures; through the PALET MENU, used for saving and loading color maps; or through the CSTOR MENU, used for saving and loading cells. A picture, a color map, and the contents of the cell buffer may be saved under the same name, since each type of file has a different extension.

(For example, a file saved through the DISK MENU would appear in the directory as FOO.PIX, a file saved through the PALET MENU would appear as FOO.MAP, a file saved through the CSTOR MENU would appear as FOO.CEL.)

---

The box marked DFAULT can also be used for storing pictures, maps or cells, but this box cannot be renamed. If you store a color map under DFAULT, that map will come to the screen whenever Lumena is loaded.

Note that, while the 1-9 command allows flexibility in naming files, it is not necessary for storing files. You can also save files under "FILE 1", etc.

**RELATED COMMANDS:**

L, C, M, P (KEYBOARD COMMANDS)

Press L, C, M or P to list files on disk. It's a good idea to list files on disk before saving a file, since a file saved under a name already used would replace (destroy) the previous file.

^E (KEYBOARD COMMANDS)

Use the ^E command to erase all names from the menu of filenames.

---

**COMMAND:** ^E

**PURPOSE:**

Erase filenames from menu.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press **E** while holding down the CTRL key.

**EFFECT:**

Names are erased from the menu of filenames.

**NOTE:** It is not necessary to erase filenames in order to type in new names using the 1-9 command. Also, erasing names from the menu does not in any way affect the pictures, maps, or cells stored on disk under those names.

**RELATED COMMANDS:**

1-9 (KEYBOARD COMMANDS)

Use the 1-9 command to write names into the filenames menu.

---

**COMMAND:** ^X

**PURPOSE:**  
Exit Lumena.

**PROMPTS:**  
none

**EXIT:**  
none needed

**PROCEDURE:**  
1. Press **X** while holding down the CTRL key.

**EFFECT:**  
Lumena is exited.

## Section 5

---

# General Menu Commands

BORDER	Select border color.
CANCEL	Cancel any pending menu command.
CHANGE COLOR	Change current drawing color.
CHANGE MODE	Change current drawing mode.
CHANGE SIZE	Change width of current pen or brush.
DOC	Call up onscreen explanation of a command.
M/S	Make/Select a mix (in monitor display only).
PARENT MENU	Call to the screen the parent menu of the current one.
PSG	Put image into buffer/Swap image in buffer with image onscreen/Get image from buffer.
PREVIOUS MENU	Return to the screen the previous menu.
ZAP	Clear the screen.

GENERAL MENU COMMANDS are commands that can be given from any menu.

---

**COMMAND:** BORDER

**PURPOSE:**

Select border color.

**PROMPT:**

1C (1 color)

**EXIT:**

none needed

**PROCEDURE:**

1. Press the area of color between the rightmost palette color and the PSG box. (This area has the current border color.)

The prompt asks for 1 color.

2. Press the desired border color.

**EFFECTS:**

The selected color becomes the border color of the graphics screen.

---

**COMMAND:** CANCEL

**PURPOSE:**

Cancel a pending menu command.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Glide the digitizing pen to the right side of the tablet until the bell sounds.

**EFFECTS:**

The bell sounds and the prompt disappears from the Prompt Box, indicating that the pending command has been canceled.

This command can be used at any time to cancel a pending menu command.

---

**COMMAND:** CHANGE COLOR

**PURPOSE:**

Change the current color to a selected color.

**PROMPTS:**

1C (1 color)

**EXIT:**

none needed

**PROCEDURE:**

1. Press the desired color in the palette.

OR

1. Press the color patch in the Status Box. The prompt asks for one color.

2. Press the desired color in the image.

**EFFECT:**

The selected color becomes the current color and is so indicated in the Status Box.

The second method—choosing the color from the image—is preferable when several colors in the palette are similar and you want to use a particular color already in the image.

**RELATED COMMANDS:**

COLOR and PALET MENU

Use commands in the COLOR and PALET MENU to remap colors.

FILLS MENU

Use commands in the FILLS MENU to replace one color with another in a selected area of the image.

---

**COMMAND:** CHANGE MODE

**PURPOSE:**

Change the active mode for drawing on the screen.

**PROMPTS:**

^ (caret)

**EXIT:**

Release pressure on the pen.

**PROCEDURE:**

The letter in the middle of the Status Box is the initial of the current drawing mode. To change to another mode:

1. Put the cursor over this letter and press down on the pen. A caret (^) under the letter indicates that the drawing mode is being changed.
2. Keeping the pen firmly depressed, move it slowly to the left. The initials of all the drawing modes in the PENS MENU will appear in sequence.
3. When the initial of the desired mode appears, release pressure.

**EFFECT:**

The selected drawing mode will be active when the cursor is in the image area, the pen is depressed and no command is pending.

Whenever a drawing mode is called up it will have the size it last used, so it is easy to alternate between modes of different sizes by changing only the mode.

**RELATED COMMANDS:**

Various brushes

Drawing modes from other menus are *indicated* in the Status Box, but only the modes of the PENS MENU can be *called up* through the Status Box. Modes from the PENS MENU appear in upper-case letters in the Status Box, while modes from other menus appear in lower-case letters.

---

**COMMAND:** CHANGE SIZE

**PURPOSE:**

Change the size of the current drawing mode.

**PROMPTS:**

^ (caret)

**EXIT:**

Release pressure on the pen.

**PROCEDURE:**

1. Put the cursor over the size number in the left of the Status Box and press down on the pen. A caret (^) under the number indicates that size is being changed.
2. Keeping the pen firmly depressed, move it slowly to the left to change size. Sizes vary from 1 to 8.
3. When the desired size appears, release pressure.

**EFFECTS:**

The drawing mode indicated in the Status Box will be active in the selected size.

For all drawing modes, size 1 is the smallest and size 8 is the largest. However, the measured size for each number is not the same in all modes. 8 Brush, for example, covers a broader area of the screen than 8 Pen.

**RELATED COMMANDS:**

CHAR (PENS MENU)

When C is the active mode in the Status Box, the leftmost position in the Status Box indicates the character to be deposited, rather than size. To change characters, follow directions for changing size.

If the character next to C in the Status Box is the name of a cell, the image in that cell will be deposited whenever the pen is pressed. (See CELLS MENU.)

---

**COMMAND:** DOC

**PURPOSE:**

Call up documentation on the current menu.

**PROMPTS:**

DOC

**EXIT:**

none needed

**PROCEDURE:**

1. Press the left bracket in the menu label (the upper left name on any menu). DOC appears in the Prompt Box.
2. Press the command for which you want information. Information on the command appears onscreen.
3. To exit, press ESC or press the pen anywhere on the tablet.

**EFFECT:**

Information on the selected command appears onscreen, while your image is stored in a temporary buffer. When you exit, your image returns to the visible screen.

---

**COMMAND:** M/S (make/select)

**PURPOSE:**

Make a mix to use as a color.

OR

Select a mix to use as a color.

**PROMPTS:**

3C (3 colors) [MAKE]

OR

2C (2 colors) [SELECT]

**EXIT:**

none needed

NOTE: This command is available in monitor displays only.

**PROCEDURE:**

To make a color:

1. Press M.

The prompt asks for three colors.

2. Press, in the bottom row, the two colors that will make up the mix.
3. Press a position in the top row of the palette where the mix will be put.

OR

To select a color:

1. Press S.

Any image onscreen is temporarily stored, while an array of mixes is displayed. The prompt asks for 2 colors.

2. Press the mix that you want.

This mix is now your brush color.

- 
3. Press a position in the top row of the palette, which will make this selected mix a palette color.

OR

3. Press anywhere in the image area of the screen, to retain the selected mix as a brush color but not put it into the palette.

**EFFECTS:**

The selected mix is retained as your drawing color until you select another color. If you put the color into the palette, it is retained in the selected palette position.

After step 3 is completed, the image formerly onscreen returns to the screen.

---

**COMMAND:** PARENT MENU

**PURPOSE:**

Call to the screen the parent menu of the current menu.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press inside the menu label (the upper left name on any menu).

**EFFECTS:**

The parent of the current menu comes to the screen. For example, if you are in the PENS MENU, pressing the menu label calls up the TOOLS MENU; pressing the menu label of the TOOLS MENU, calls up the MAIN MENU.

---

**COMMAND:** PSG (put/swap/get)

**PURPOSE:**

Put an image into the temporary buffer.

OR

Swap images between the screen and the buffer.

OR

Get an image in the buffer to the working screen.

**PROMPTS:**

PUT or SWP or G/O

**EXIT:**

none needed

**PROCEDURE:**

To store an image in the buffer:

1. Press P.

PUT appears in place of PSG.

2. Press PUT.

OR

To exchange images between the working screen and the buffer:

1. Press S.

SWP appears in place of PSG.

2. Press SWP.

OR

To bring to the working screen the image in the buffer:

1. Press G.

G/O appears in place of PSG.

2. Press G to bring to the screen the image exactly as it was stored in the buffer.

OR

2. Press O.

*continued on next page*

---

PSG (put/swap/get), *cont.*

The menu is replaced by a menu of options.

RESET	BRUSH	XOR	OR	AND
FLIP	BLOCK	NXOR	NOR	NAND

BRUSH does not carry background, so the image from the buffer will appear to be on top of the image onscreen.

FLIP turns the buffer image upside down.

XOR, NXOR, OR, NOR, AND and NAND cause color changes when the image from the buffer crosses the image onscreen.

RESET and BLOCK give the same effect as pressing G.

Press one of the options.

**EFFECTS:**

If you pressed P, the onscreen image is copied into the buffer, and the picture formerly in the buffer is lost. (There is no change in the image onscreen.)

If you pressed S, the images in the buffer and onscreen change places, and neither image is lost.

If you pressed G, the image from the buffer is copied onto the working screen according to the selected option, and the picture formerly onscreen is lost.

XOR, NXOR, OR, NOR, AND and NAND in the menu of options give a variety of color changes. How the color changes are determined is explained in Appendix C, but the effects of these commands are best discovered through experimentation.

---

**COMMAND:** PREVIOUS MENU

**PURPOSE:**

Return to the screen the previous menu.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press the right bracket in the menu label (the upper left name on any menu).

**EFFECTS:**

The previously used menu returns to the screen. This command allows you to quickly alternate between two menus without going through the parent menus.

**COMMAND:** ZAP

**PURPOSE:**

Clear the screen.

**PROMPTS:**

ZAP

**EXIT:**

none needed

**NOTE:** To abort the command—and prevent the screen from clearing once ZAP has appeared in the Prompt Box—press anywhere except in the Prompt Box.

**PROCEDURE:**

1. Press in the Prompt Box.

The word ZAP appears as a prompt.

2. Press again in the Prompt Box.

**EFFECTS:**

The screen fills with background color.

## Section 6

---

# Main Menu

>MAIN <	COLOR	PALET	FILLS	DISK
TOOLS	XFORM	ANIM	CELLS	FONTS

The MAIN MENU gives access to other Lumena menus.

## Section 7

---

# Color Menu

>COLOR<	MIX	NEW	C/L	R/G/B
-RCOL+	PUTCOL	GETCOL	XCHCOL	

The COLOR MENU contains commands to change the mapping of individual colors. Commands in this menu alter the appearance of the color—its Red, Green and Blue composition. They do not change the color's identity (which, for practical purposes, you can associate with the palette position from which the color came). For this reason, whenever a given color is remapped, all occurrences of the color throughout the image are altered.

For the same reason, different colors remain distinct, even if their maps are changed to make the colors appear the same. For example, a bright yellow drawing on the screen may be darkened, through the C/L command, so that it is indistinguishable from the background color. Yet if the background color is then lightened, the originally yellow drawing will remain dark because it was done in a different color.

This makes possible certain animation effects. For instance, four similar figures can be drawn side by side, with four adjacent palette colors. If three of the colors are then remapped to background color (through the C/L command), and the four colors are activated through the CYCLE MENU, it will appear that a single figure is moving across the screen.

### Related Menus

#### PALET MENU

The PALET MENU has commands for remapping several colors at a time, such as by tinting a range of colors. These commands, like those in the COLOR MENU, change only the appearance of the colors, not the memory contents of the frame buffer.

---

## FILLS MENU

By contrast with commands in the COLOR and PALET MENUS, commands in the FILLS MENU do change the memory contents of the screen buffer. For a further explanation, see the first page of the FILLS MENU.

---

**COMMAND:** MIX

**PURPOSE:**

Change the current color by mixing it with any other color.

**PROMPT:**

MIX

**EXIT:**

Press MIX in the Prompt Box.

**PROCEDURE:**

1. Press MIX.

The menu will lock on, and MIX will appear in the Prompt Box.

2. Put the cursor over any color, either in the palette or in the image, and press down on the pen. The chosen color will be added to the current color as long as the pen is depressed.

Any number of colors can be successively mixed into the current color.

To keep a color as mixed, release pressure on the pen.

To return the current color to its original state, CANCEL the command by gliding the pen to the right side of the tablet.

To exit, press MIX in the Prompt Box.

**EFFECTS:**

The current color will gradually change toward the selected color as long as the pen is pressed. If the pen is held down long enough, the map of the current color will become identical with that of the selected color.

**RELATED COMMANDS:**

MIX/O (FILLS MENU)

Use MIX/O, in the FILLS MENU, to fill a selected image area with a mixture of colors that remain distinct.

**COMMAND:** NEW

**PURPOSE:**

Signal the next C/L or R/G/B selection to start with a new color.

**PROMPTS:**

NEW

**EXIT:**

Initiate the C/L or R/G/B command.

**PROCEDURE:**

1. Press NEW.

**EFFECTS:**

NEW is considered a prefix. It has no independent effect, but it affects a subsequent C/L or R/G/B command. If NEW is followed by the C/L command, the current color changes to mid-white. If NEW is followed by the R/G/B command, the current color changes to pure Red, Green or Blue at mid level. This new color can immediately be altered, as described under the C/L and R/G/B commands, or it can be retained as it first appears.

To cancel the command, glide the pen to the right side of the tablet.

**RELATED COMMANDS:**

C/L (COLOR MENU)

R/G/B (COLOR MENU)

NEW is considered a prefix to C/L and R/G/B; except for CANCEL, only those two commands are allowed after NEW has been selected.

C/L and R/G/B can, of course, be used without the NEW prefix. In that case these commands alter the current color as it already exists.

---

**COMMAND:** C/L (color/luminance)

**PURPOSE:**

Change the current color by altering its Color value or its Luminance value.

**PROMPTS:**

C; L

**EXIT:**

Press C or L in the Prompt Box.

**PRELIMINARY COMMANDS:**

NEW (COLOR MENU)

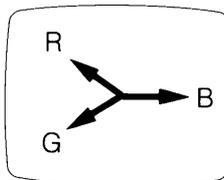
To develop a color from a neutral shade rather than from an existing color, press NEW before pressing C/L. This changes the current color to mid-white.

**PROCEDURE:**

1. Press C or L.

The menu will lock on and C or L will appear in the Prompt Box, indicating the active mode. Each time the pen is pressed and released, the alternate C/L mode becomes active.

2. If the prompt is C you can change the red, green and blue composition of the current color. Put the cursor in the middle of the screen and depress the pen. Keeping pressure on the pen, move the cursor toward the upper left of the screen to blend toward red, toward the lower left of the screen to blend toward green, and toward the center right of the screen to blend toward blue.

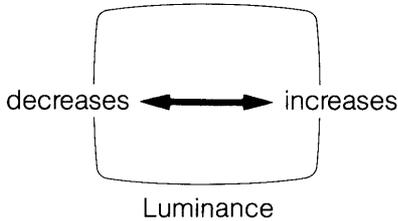


Color

---

C/L (color/luminance), *cont.*

When the prompt is L, you can change Luminance. Put the cursor in the center of the screen and depress the pen. Keeping pressure on the pen, move the cursor toward the left to decrease Luminance and toward the right to increase Luminance.



To retain a color as altered, release pressure on the pen.

To restore the current color to its original state, cancel the C/L command by gliding the pen off the right side of the tablet.

**EFFECTS:**

When the active mode is Color, moving the pen on the tablet according to the pattern described above alters the composition of the current color.

Areas of the screen between the three cardinal points give mixes of red, blue and green.

Blend toward yellow by moving the cursor toward the left center of the screen (midway between red and green, and maximum distance from blue); blend toward magenta by moving the cursor toward the upper right corner of the screen; blend toward cyan by moving the cursor toward the lower right corner.

When the active mode is Luminance, moving the pen left or right on the tablet alters the brightness of a color. Any color will become black at the extreme left and white at the extreme right.

---

**COMMAND:** R/G/B (red, green, blue)

**PURPOSE:**

Change the current color by selectively changing the Red, Green or Blue component.

**PROMPTS:**

R; G; B

**EXIT:**

Press R, G or B in the Prompt Box.

**PRELIMINARY COMMANDS:**

NEW (COLOR MENU)

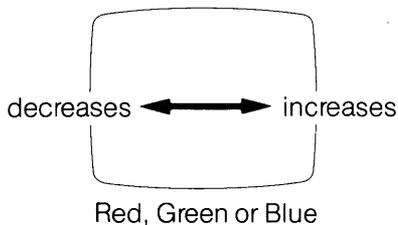
To quickly remap a color to pure red, green or blue, select NEW, then press R/G/B. The current color will immediately change to red, green or blue at mid level.

**PROCEDURE:**

1. Press over R, G or B.

The menu will lock on and R, G or B, whichever was selected, will appear in the Prompt Box. Each time the pen is pressed and released, the active color component changes: Red, then Green, then Blue, then Red again.

2. To change a color component, put the cursor in the center of the screen and press down on the pen. Keeping pressure on the pen, move it toward the left to decrease the active color component and toward the right to increase it.



To retain a color as altered, release pressure on the pen and exit by pressing in the Prompt Box.

To return the current color to its original state, glide the pen to the right side of the tablet.

---

R/G/B (red/green/blue), *cont.*

**EFFECTS:**

Moving the pen to the left increases and to the right decreases the red, green or blue component of the current color.

---

**COMMAND:** –RCOL+ (random color)

**PURPOSE:**

Select a random color for the current color.

**PROMPTS:**

none

**EXIT:**

Release pressure on the pen.

**PROCEDURE:**

1. Press –RCOL+. Holding the pen down causes the current color to change randomly and continuously. Selecting the + or – side of the command box causes the color selections to reverse directions.

**EFFECTS:**

A random color replaces all occurrences of the current color onscreen. Thus this command provides a way to quickly test a number of colors in the context of the image.

The command also provides one way of developing an interesting palette. When a desirable color appears, select a different color as the current color and continue using –RCOL+.

**RELATED COMMANDS:**

–RMAP+ (PALET MENU)

The –RMAP+ command remaps several colors at a time with random colors.

**COMMAND:** PUTCOL

**PURPOSE:**

Store the current color for later recall with GETCOL.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press PUTCOL.

**EFFECTS:**

The current color is stored in the buffer for later recall. This command allows you to store colors you have altered.

Up to four colors at a time can be held in PUTCOL. When a fifth color is put in, the color least recently saved is lost.

**RELATED COMMANDS:**

GETCOL (COLOR MENU)

Use GETCOL to load a stored color to the screen.

PUTMAP (PALET MENU)

Use PUTMAP to store temporarily the entire palette.

---

**COMMAND:** GETCOL

**PURPOSE:**

Recall to current color status the color most recently stored by PUTCOL.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press GETCOL.

**EFFECTS:**

The color last saved by PUTCOL replaces the current color wherever it occurs in the image and in the palette.

If more than four GETCOL commands are given with no intervening PUTCOL commands, the colors stored in PUTCOL will be repeated.

The color replaced by the GETCOL color will be lost from the palette and from the image. To avoid inadvertently changing a color in the image, make the current color one that is not used in the image, then press GETCOL.

**COMMAND:** XCHCOL (exchange colors)

**PURPOSE:**

Exchange the last two current colors.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press XCHCOL.

**EFFECTS:**

The two colors last selected as current color exchange places in the palette and in the image. Press again, and they return to their former positions.

**RELATED COMMANDS:**

C/L (COLOR MENU)

XCHCOL can be used for simple animation. For example, make a small circle with any color. Around it, draw a larger circle in another color. Remap the second color to match the background color, using the C/L command. Then press the XCHCOL command repeatedly and the circle will appear to expand and contract.

For more complex animation effects of this kind, use the CYCLE MENU.

## Section 8

---

# Palet Menu

---

### Television

>PALET<	SAVE	PUTMAP	ALTMAP	TINT
-RMAP+	LOAD	GETMAP		COPY

The PALET MENU contains commands for changing several colors at a time and for saving and loading color palettes in a temporary buffer or on disk.

### Related Menu

COLOR MENU (television)

Commands in the COLOR MENU, like those in the PALET MENU, alter only the "maps" of the colors, not the actual memory contents of the frame buffer. See the first page of the COLOR MENU for more information on color mapping.

---

**COMMAND:** SAVE

**PURPOSE:**

Save the current palette to a map file on disk.

**PROMPT:**

SAV

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

To name a map file before saving, use the 1-9 command.

**PROCEDURE:**

1. Press SAVE.

The menu of filenames is displayed and SAV appears in the Prompt Box.

2. Press the name under which the file is to be saved.

**EFFECTS:**

The palette onscreen is saved in the selected disk map file. Previous contents of the file, if any, will be lost.

This command is useful for saving specially arranged palettes you may need again in the future, such as skin tones, tints or fades done for use with the EDGES MENU.

It is also handy for saving alternative color maps for an image. In such a case, use RSAVE or PSAVE in the DISK MENU to save the picture with its current map; then change the colors and save the new palette through SAVE in this menu.

A map saved under DFAULT will come to the screen whenever Lumena is loaded. (This is the only box in the filenames menu that cannot be renamed through the 1-9 command.)

**RELATED COMMANDS:**

M (KEYBOARD COMMAND)

Press M for a list of map files on disk.

---

**RSAVE, PSAVE (DISK MENU)**

RSAVE and PSAVE save the current palette along with the image. Use SAVE in the PALET MENU only to save a map you will want to call up independently of an image.

**COMMAND:** PUTMAP

**PURPOSE:**

Save the current color map in a temporary buffer file.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press PUTMAP.

**EFFECTS:**

The current color map is stored in the temporary buffer file. Previous contents, if any, will be lost.

Only one map at a time can be saved in the temporary file. A buffer file is "temporary" because its contents are lost if you replace them with another PUTMAP or load a picture from disk (in which case Lumena stores in PUTMAP the map previously onscreen) or exit Lumena or reboot your computer.

**RELATED COMMANDS:**

LOAD, OVLAY, FILTER (DISK MENU)

Whenever you load an image to the screen through commands in the DISK MENU, the color map that was onscreen is put into the temporary buffer so that the loaded image can appear with its original map. That is, any LOAD command carries an automatic PUTMAP command.

GETMAP (PALET MENU or other menus)

Use GETMAP to load the color map from the temporary buffer file.

SAVE (PALET MENU)

Use SAVE to save colormap files on disk.

---

**COMMAND:** ALTMAP (alternate maps)

**PURPOSE:**

Exchange color map onscreen with map stored in buffer.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press ALTMAP.

**EFFECTS:**

The current color map, or palette, is stored in the buffer, and the map in the buffer comes to the screen. The two maps change places each time the command is pressed.

**RELATED COMMANDS:**

A (KEYBOARD COMMANDS)

Pressing the A key has the same effect as pressing the ALTMAP command. It can be used when you want to exchange maps without the menu being visible, as for animation.

**COMMAND:** TINT

**PURPOSE:**

Tint the colors between two selected colors.

**PROMPT:**

2C (2 colors)

**EXIT:**

none needed

**PROCEDURE:**

1. Press TINT.
2. Press the two colors to be tinted between.

You may select the colors from the palette or from the image, but selecting from the palette lets you see exactly which colors will be included in the tint.

**EFFECTS:**

The command tints all colors between the two chosen colors. Color changes occur both in the palette and in the image.

To make a grey scale with this command, choose black as the first color and max white as the second color. The colors in between will shade from black to white.

---

**COMMAND:** – RMAP + (random map)

**PURPOSE:**

Select random colors for the current palette.

**PROMPTS:**

none

**EXIT:**

Release pressure on the pen.

**PROCEDURE:**

1. Press – RMAP + .

Keeping the pen depressed with the cursor in this command box brings to the screen a stream of randomly mapped colors. Pressing the + or – side of the command will cause the color selections to reverse direction. Releasing pressure on the pen stabilizes the color map.

**EFFECTS:**

Randomly mapped colors replace the colors onscreen.

**RELATED COMMANDS:**

– RCOL + (COLOR MENU)

To randomly change the map of the current color only, use – RCOL + .

---

**COMMAND:** LOAD

**PURPOSE:**

Load a color map from a disk map file.

**PROMPT:**

LOD

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

Use the 1-9 command to type in the name under which the file was saved.

**PROCEDURE:**

1. Press LOAD.

The menu changes to display the menu of filenames and LOD appears in the Prompt Box.

2. Press the name of the file to be loaded.

**EFFECTS:**

The selected color map appears onscreen. The color map previously onscreen is lost unless it was saved before the new map was loaded.

**RELATED COMMANDS:**

LOAD (DISK MENU)

To load a saved image along with its color map, use LOAD in the DISK MENU.

M (KEYBOARD COMMANDS)

Press the M key to list map files on disk.

---

**COMMAND:** GETMAP

**PURPOSE:**

Load a color map from the temporary buffer file.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press GETMAP.

**EFFECTS:**

The color map in the temporary buffer file loads onto the screen, replacing the current map.

**RELATED COMMANDS:**

SAVE (PALET MENU)

The color map replaced onscreen will be lost unless it is saved on disk beforehand through SAVE.

PUTMAP (PALET MENU)

Use PUTMAP to store a map in the temporary buffer.

**COMMAND:** COPY

**PURPOSE:**

Copy any segment of the palette to another area of the palette.

**PROMPTS:**

3C (3 colors)

**EXIT:**

none needed

**PROCEDURE:**

1. Press COPY.
2. Press the first and last colors in the series of colors to be copied, selecting the colors from the palette.
3. Press the position in the palette where the copied series of colors should begin.

(If only one color is being copied, press twice in that color, then press the palette position where it should be copied.)

**EFFECTS:**

The changed mapping will appear in the palette and in the image.

---

## Monitor

>PALET<	SAVE	PUTMAP	ALTMAP	CHANGE
- RMAP +	LOAD	GETMAP	SHIFT	XCHCOL

The PALET MENU has commands for changing the appearance, or mapping, of colors. A color's *identity*—which may be thought of as its position in the palette—is not changed by these commands. This means that if you draw something using a blue from position 1, and then make the color in position 1 red, your drawing on the screen will also change to red.

This makes it easy to try out various combinations of colors in an image even after it is drawn. Mapping colors also makes possible certain animation effects. For example, draw four similar figures side by side, using four adjacent colors in the bottom row of the palette. Then, using the CHANGE command, make three of those colors the same as the background color. If you then activate the four colors, through the CYCLE MENU, it will appear that a single figure is moving across the screen.

In the monitor mode, Lumena has two rows of colors available for imaging. The lower row has the 16 basic colors; the upper row has dithers of the available colors. A dithered color is composed of pixels of two colors in a regular arrangement.

The dithered colors in the top row can be created directly from the bottom row of colors, through the MAKE command; or, they can be chosen from an onscreen array of combinations displayed by the SELECT command. Since colors in the top row are created from the basic colors in the bottom row, changing one of those basic colors will also change the appearance of any top row colors that use it.

---

**COMMAND:** SAVE

**PURPOSE:**

Save the current palette to a map file on disk.

**PROMPTS:**

SAV

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

To name a file before saving it, use the 1-9 command.

1. Press SAVE.

The menu of filenames is displayed and SAV appears in the Prompt Box.

2. Press the name under which the file is to be saved.

**EFFECTS:**

The colors currently onscreen are saved in the selected disk map file. Previous contents of the file, if any, will be lost.

This command is handy for saving alternative color maps for an image. In such a case, use RSAVE or PSAVE in the DISK MENU to save the picture with its current map; then change the colors and save the new arrangement through SAVE in this menu.

A map saved under DFAULT will come to the screen whenever Lumena is loaded. (This is the only entry in the filenames menu that cannot be renamed.)

**RELATED COMMANDS:**

M (KEYBOARD COMMANDS)

Press M for a list of map files on disk.

RSAVE, PSAVE (DISK MENU)

RSAVE and PSAVE save the current colors along with the image. Use SAVE in this menu only for a map you will want to call up independently of an image.

---

**COMMAND:** PUTMAP

**PURPOSE:**

Save the current color map in a temporary buffer file.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press PUTMAP.

**EFFECTS:**

The current color map is stored in the temporary buffer file. Previous contents, if any, will be lost.

Only one map at a time can be saved in the temporary file. A buffer file is "temporary" because its contents are lost if you replace them with another PUTMAP or load a picture from disk (in which case Lumena stores in PUTMAP the map previously onscreen) or exit Lumena or reboot your computer.

**RELATED COMMANDS:**

LOAD, OVRLAY, FILTER (DISK MENU)

Whenever you load an image to the screen through commands in the DISK MENU, the color map that was onscreen is put into the temporary buffer so that the loaded image can appear with its original map. That is, any LOAD command carries an automatic PUTMAP command.

GETMAP (PALET MENU or other menus)

Use GETMAP to load the color map from the temporary buffer file.

SAVE (PALET MENU)

Use SAVE to save colormap files on disk.

---

**COMMAND:** ALTMAP (alternate maps)

**PURPOSE:**

Exchange color map onscreen with map stored in buffer.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press ALTMAP.

**EFFECTS:**

The current color map, or palette, is stored in the buffer, and the map in the buffer comes to the screen. The two maps change places each time the command is pressed.

**RELATED COMMANDS:**

A (KEYBOARD COMMANDS)

Pressing the A key has the same effect as pressing the ALTMAP command. It can be used when you want to exchange maps without the menu being visible, as for animation.

---

**COMMAND:** CHANGE

**PURPOSE:**

Change a color in the palette.

**PROMPTS:**

none

**EXIT:**

Release pressure on the pen.

**PROCEDURE:**

1. Press the color in the palette you want to change.
2. Press CHANGE and, retaining pressure, move the pen left or right.

All available colors will appear in sequence.

3. To retain a color, release pressure on the pen.

**EFFECTS:**

The current color changes to the selected color.

(Remember that colors in the palette remain distinct, even though they may be visually the same.)

**COMMAND:** – RMAP + (random map)

**PURPOSE:**

Select random colors for the current palette.

**PROMPTS:**

none

**EXIT:**

Release pressure on the pen.

**PROCEDURE:**

1. Press – RMAP + and retain pressure.

This command brings to the screen a random arrangement of colors that continues to change as long as the pen is depressed. Pressing the + or – side of the command will cause the color selections to reverse direction. Releasing pressure retains the current arrangement.

**EFFECTS:**

A random arrangement of colors replaces the colors in the palette.

---

**COMMAND:** LOAD

**PURPOSE:**

Load a color map from a disk map file.

**PROMPTS:**

LOD

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

If necessary, use the 1-9 command to type in the name under which the file was saved.

**PROCEDURE:**

1. Press LOAD.

The menu changes to display the menu of filenames and LOD appears in the Prompt Box.

2. Press the name of the file to be loaded.

**EFFECTS:**

The selected color map appears onscreen. The map previously onscreen is lost unless it was saved before the new map was loaded.

**RELATED COMMANDS:**

LOAD (DISK MENU)

To load a saved image along with its color map, use LOAD in the DISK MENU.

M (KEYBOARD COMMAND)

To list map files on disk, press M.

**COMMAND:** GETMAP

**PURPOSE:**

Load a color map from the temporary buffer file.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press GETMAP.

**EFFECTS:**

The color map in the temporary buffer file loads onto the screen, replacing the current map.

**RELATED COMMANDS:**

SAVE (PALET MENU)

The color map replaced onscreen will be lost unless it is saved on disk beforehand through SAVE.

PUTMAP (PALET MENU)

Use PUTMAP to store a map in the temporary buffer.

---

**COMMAND:** SHIFT

**PURPOSE:**

Shift all colors one place to the right in the palette.

**PROMPTS:**

none

**EXIT:**

Release pressure on the pen.

**PROCEDURE:**

1. Press SHIFT and retain pressure.

This command shifts all colors to the right in the palette as long as the pen is depressed. Releasing pressure retains the current arrangement.

**EFFECTS:**

Colors are shifted to new palette positions. The changes occur in the image as well as in the palette.

**COMMAND:** XCHCOL (exchange colors)

**PURPOSE:**

Exchange the last two current colors.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press XCHCOL.

**EFFECTS:**

The two colors last selected as the current color exchange places in the palette and in the image. Press again, and they return to their former positions.

If one of the colors is the same as the background color, this command can be used for simple animation, making a drawing appear and disappear.

## Section 9

---

# Fills Menu

>FILLS <	FLOOD	CHANGE	REMOVE	STEPS
XB/LB	FILLTO	FILLIN	MIX/BX	GRAD

The FILLS MENU contains commands for changing a color in a designated part of the image.

Each pixel of color appearing on the screen exists as a number in the screen buffer. The number may be thought of as a palette position—color 0, color 1, color 2. Commands in this menu change the number values in the screen buffer. When you fill an area with a color, you are, for example, changing a pixel that was color 0 in the buffer to color 6. (The appearances of color 0 in the palette and of color 6 in the palette—that is, their Red, Green and Blue values—remain the same.)

By contrast, commands in the COLOR and PALET MENUS change the RGB values of the color in a particular palette position, but they do not alter the numbers in the screen buffer. If you use the COLOR MENU to change the color in palette position 1 from red to blue, for example, all parts of the image drawn with color 1 also change from red to blue; however, they are still identified as having been drawn with color 1.

**COMMAND:** FLOOD

**PURPOSE:**

Fill the screen with a selected color.

**PROMPTS:**

1C (1 color)

**EXIT:**

none needed

**PROCEDURE:**

1. Press FLOOD.
2. Press the color you want to fill the screen.

**EFFECTS:**

The image area of the screen fills with the current color, covering all other colors.

**RELATED COMMANDS:**

FLOOD fills the screen, but the flood color does not become the background color. ERASE and ZAP, for example, will replace the flood color with background color. To actually change the background color, remap the color using commands in the COLOR MENU or PALET MENU.

---

**COMMAND:** CHANGE

**PURPOSE:**

Change one color to another in a selected area of the image.

**PROMPTS:**

2C (2 colors); 2P (2 points); OK?

**EXIT:**

none needed

**PROCEDURE:**

1. Press CHANGE.
2. Press the color to be replaced.
3. Press the color that should take its place.
4. Press two diagonal corners to define the image area where the color change should take place. (To designate the entire screen as the area for change, press in the Prompt Box.)

A temporary box encloses the area of the proposed change.

5. Press OK? in the Prompt Box to complete the command.

**EFFECTS:**

The selected color replaces another color in a designated area of the image.

**RELATED COMMANDS:**

Various commands in COLOR MENU

To change a color throughout the image, remap it using commands in the COLOR MENU and PALET MENUS.

---

**COMMAND:** REMOVE

**PURPOSE:**

Remove a color from the screen in a selected area.

**PROMPTS:**

1C (1 color); 2P (2 points); OK?

**EXIT:**

none needed

**PROCEDURE:**

1. Press REMOVE.
2. Press the color to be removed, selecting the color either from the palette or from the image.
3. Press two diagonal corners to define the image area where the color should be removed.

The area is surrounded with a temporary box, and the prompt asks OK?

4. Press OK? in the Prompt Box.

**EFFECTS:**

This command removes a color in a selected area by replacing it with background color.

**RELATED COMMANDS:**

ERASE (PENS MENU)

BRUSH (PENS MENU)

To remove color pixels selectively from the image, use ERASE in the PENS MENU. To remove all colors, using a brush mode, use BRUSH in the PENS MENU, with background color as the current color.

F-BOX (SHAPE MENU)

To remove all colors from a rectangular area of the screen, use F-BOX with background color as the current color.

TRIM (MOVES MENU)

To remove all colors surrounding a selected area of the image, use TRIM in the MOVE MENU.

---

**COMMAND:** STEPS**PURPOSE:**

Fill a selected color area with a selected range of colors that are spread out in equal steps horizontally or vertically.

**PROMPTS:**

2P (2 points); H?V (horizontal or vertical?); 3C (3 colors)

**EXIT:**

none needed

**PROCEDURE:**

1. Press STEPS.
2. Press two diagonal corners to define the area in which color stepping is to occur.

The prompt H?V asks whether you want the stepping to occur horizontally or vertically.

3. Press down anywhere on the tablet and, retaining pressure, move the pen sideways for horizontal stepping, or move up or down for vertical stepping.

A horizontal or vertical line then crosses the box. The prompt asks for three colors.

4. Press two colors to define the range of palette colors that will be used in stepping. (In vertical stepping, the first color selected will be at the bottom; in horizontal stepping, the first color will be at the left.)
5. Press the color which should be covered, or replaced, by the stepped colors. Choose the colors from the palette or from the image.

To cancel the command at any time before selecting the third color, glide the pen to the right side of the tablet.

**EFFECTS:**

Colors in the selected range appear in equal steps, replacing the chosen color in the defined screen area.

Horizontal stepping occurs from left to right; vertical stepping occurs from bottom to top.

Note that even though the defined area is rectangular, stepping can take an irregular shape since the command covers a selected color. Stepping may appear to be “behind” images onscreen, since it covers only one color.

*continued on next page*

---

STEPS, *cont.*

**RELATED COMMANDS:**

CYCLE MENU

To activate a stepped image, use MAP in the CYCLE MENU to select the same range of colors used in STEPS; then press GO. (To make only the stepped colors cycle, be sure the other colors in the image do not fall within the same palette range as the stepped colors.)

GRAD (FILLS MENU)

GRAD is similar to STEPS, except that graduated colors blend one into the next, while stepped colors remain distinct.

---

**COMMAND:** XB/LB

**PURPOSE:**

Remove from the screen or restore to the screen the last box used for delineating a screen area.

OR

Reactivate for the next command the last box used.

**PROMPT:**

LB (last box)

**EXIT:**

none needed

Note: To *cancel* LB—so the last box is *not* reactivated for the next command—glide the pen to the right side of the tablet.

**PROCEDURE:**

1. Press XB.

OR

1. Press LB.

**EFFECTS:**

XB removes the previous delineating box from the screen. Press again, and the box reappears. A box restored through XB acts only as a visual reminder.

LB reactivates for the next command the screen area last used. This allows you to enact further commands in the exact same screen area previously used.

The LB command is active as long as LB appears in the Prompt Box. That is, if you press LB and then press XB, the box will disappear from the screen but the prompt will remain, indicating that the next command will be carried out in that area of the screen.

To remove a delineating box from the screen, you must use XB before creating another box. If another box is created, the box already onscreen becomes part of the image. That is, XB and LB affect only the box most recently created.

*continued on next page*

*XB/LB, cont.*

**RELATED COMMANDS:**

ERASE (PENS MENU)

REMOVE (FILLS MENU)

A box that has inadvertently become part of the image can be removed with ERASE or REMOVE. (Note, however, that if the box was drawn over other colors, a negative of the box will remain, since ERASE and REMOVE work by applying background color over the color being removed.)

---

**COMMAND:** FILLTO

**PURPOSE:**

Fill an area enclosed by the current color with the current color.

**PROMPT:**

FTO

**EXIT:**

Press FTO in the Prompt Box.

**PROCEDURE:**

1. Press FILLTO.
2. Select from the palette the color to be used for filling.
3. Press inside each area you want to fill.

Change the current color, without leaving the command, by selecting another color from the palette.

4. Press FTO in the Prompt Box to exit.

To stop a FILLTO command in progress, press ESC.

**EFFECTS:**

FILLTO covers all colors until it comes to a border of the filling color.

If the cursor is put in an area enclosed by a color other than the current color, the command will change to FILLIN (FIN will appear in the Prompt Box) and will fill the enclosed area.

**RELATED COMMANDS:**

FILLIN (FILLS MENU)

Although FILLIN and FILLTO are similar, FILLIN fills any enclosure, whereas FILLTO fills only an enclosure of the current color. FILLIN covers only the color under the cursor when the pen was depressed, whereas FILLTO covers all colors within the enclosure.

---

**COMMAND:** FILLIN

**PURPOSE:**

Fill an enclosed area with the current color.

**PROMPT:**

FIN

**EXIT:**

Press FIN in the Prompt Box.

**PROCEDURE:**

1. Press FILLIN.
2. Select from the palette the color to be used for filling.
3. Press inside each area you want to fill.

To change the current filling color without leaving the command, select another color from the palette.

4. Press FIN in the Prompt Box to exit.

To stop a FILLIN command in progress, press the ESC key on the keyboard.

**EFFECTS:**

FILLIN fills an enclosed area with the current color. It covers only the color initially under the cursor and is stopped by other colors. Thus, all other colors within the enclosure will remain.

An "enclosed area" means an area of one color bordered on all sides by another color or several other colors. The border might be a line, patches of colors, or the background against which a patch of color stands. If the enclosure is not complete, however, the FILLIN color will leak out through the hole and proceed to fill the next larger area. (If this begins to happen, you can stop it by pressing the ESC key on the keyboard.)

It is possible to recolor a line with this command, if the line is continuous. (A diagonal line drawn with size 1 Pen, for example, may appear to be continuous but if the pixels do not actually adjoin, the FILLIN color will not be able to follow the line.)

---

**RELATED COMMANDS:**

CHANGE (FILLS MENU)

P/W (BRUSH MENU)

For filling lines that are not continuous, or for filling numerous areas with the same color, CHANGE or P/W might be more efficient commands.

**FILLTO (FILLS MENU)**

Although FILLIN and FILLTO are similar, FILLIN fills any enclosure, whereas FILLTO fills only an enclosure of the current color. FILLIN covers only the color under the cursor when the pen was depressed, whereas FILLTO covers all colors within the enclosure.

---

**COMMAND:** MIX/BX (mix/box)

**PURPOSE:**

Fill a defined area with a mixture of two or three colors.

**PROMPTS:**

2P (2 points); 3C (3 colors); C1% (percentage of color 1); C2% (percentage of color 2); OK?

**EXIT:**

none needed

**PROCEDURE:**

1. Press MIX. (The mix will cover only the color you select.)

OR

1. Press BX. (The mix will cover over all colors within the defined area.)

2. Press two diagonal corners to define the area for the mix.

3. Press the two colors to be in the mix.

4. Press the color you want the mixture to cover. (If you began the command by pressing over BX, do not press a color here since the mix will fill the entire box defining the image area. Go directly to step 5.)

The prompt C1% appears in the Prompt Box, asking what percentage of the mixture should be the first color.

5. Press down anywhere on the tablet and, while keeping the pen depressed, move it to the right.

The message "COL 1 % = x" appears at the top of the screen, with the final digit increasing as you move the pen right and decreasing as you move it left.

6. To select a percentage, release pressure.

- 
7. Press down again and move the pen to the right to select the percentage for color 2.

As you select the percentage of the second color, the screen message also gives the total percentage of the two colors. If the total exceeds 100, the percentage of color 2 returns to zero and begins advancing again. If the total is less than 100, the color(s) under the mixture will show through.

8. Release pressure to select a percentage for color 2.

**EFFECTS:**

A mixture of the two chosen colors fills the selected color; or, if BX was pressed, the mixture fills the entire defined area.

If the percentages selected for the two MIX colors total less than 100, the colors under the mix will show through.

To create a mixture of more than three colors, use MIX/BX repeatedly over the same area. For example, to make a mix of four colors, use MIX/BX to color the area with 50% of color 1 and 25% of color 2, letting the onscreen color show through for the last 25%. Then press MIX/BX again and have a fourth color cover 50% of color 1. (The second color for this second MIX would be left at 0.)

**RELATED COMMANDS:**

AIRBR (PENS MENU)

Use AIRBR to deposit in a drawing mode a mixture of up to four colors.

MIX (COLOR MENU)

Use MIX in the COLOR MENU to remap a palette color by "mixing" it with another palette color.

---

**COMMAND:** GRAD (graduation)

**PURPOSE:**

Fill a selected color area with a given range of colors that gradually blend from one color to the next.

**PROMPTS:**

2P (2 points); H?V (horizontal or vertical?); 3C (3 colors)

**EXIT:**

none needed

**PROCEDURE:**

1. Press GRAD.
2. Press two diagonal corners to define the area in which color graduation is to occur.

The prompt H?V asks whether you want the graduation to occur horizontally or vertically.

3. Press down anywhere on the tablet and, retaining pressure, move the pen sideways for horizontal graduation or move up or down for vertical graduation.

A horizontal or vertical line then crosses the box. The prompt asks for three colors.

4. Press two colors to define the range of palette colors that will be used in the graduation. (In vertical graduation, the first color selected will be at the bottom; in horizontal graduation, the first color will be at the left.)
5. Press the color which should be covered, or replaced, by the graduated colors. Choose the colors from the palette or from the image.

To cancel the command at any time before selecting the third color, glide the pen to the right side of the tablet.

**EFFECTS:**

The selected area fills with the chosen range of colors, each color gradually blending to the next.

Horizontal graduation occurs from left to right; vertical graduation occurs from bottom to top. The color you choose first will be the bottom or leftmost end of the range.

---

Note that even though the defined area is rectangular, graduation can take an irregular shape since the command covers a selected color. Stepping may appear to be “behind” images onscreen, since it covers only one color.

**RELATED COMMANDS:**

TINT (PALET MENU (television))

GRAD is handy for effects such as a sky that lightens toward the horizon. In preparation for such a use, you might want to use TINT to create a range of colors to be used in the GRAD sequence.

**CYCLE MENU**

To activate graduated colors, use MAP in the CYCLE MENU to select the same range of colors used in GRAD; then press GO. (To make only the graduated colors cycle, be sure that other colors in the image do not fall within the same palette range as the colors chosen for GRAD.)

**STEPS (FILLS MENU)**

GRAD is similar to STEPS, except that graduated colors blend one into the next, while stepped colors remain distinct.

## Section 10

---

# Disk Menu

>DISK <	RSAVE	PSAVE		PUTMAP
XB/LB	LOAD	OVLAY	FILTER	GETMAP

The DISK MENU contains commands for saving images on disk and for loading saved images to the screen. Its commands allow images to be loaded in their original form or altered in certain ways.

---

**COMMAND:** RSAVE (rapid save)

**PURPOSE:**

Rapidly save an image from the screen.

**PROMPTS:**

2P (2 points); OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

Use the 1-9 command to type into the filenames menu the name under which the picture will be saved.

**PROCEDURE:**

1. Press RSAVE.

The menu of filenames is displayed.

2. Press the name under which the file will be saved.

3. Press two diagonal corners to define the image to be saved. (To save the entire screen image, press once with the cursor in the Prompt Box.)

The defined image is surrounded by a box.

4. Press OK? in the Prompt Box.

**EFFECTS:**

The designated image and the current color map are saved in the selected disk file. Previous contents of the file, if any, are lost.

RSAVE saves an image more quickly than PSAVE because it encodes groups of pixels by color rather than each pixel individually.

**RELATED COMMANDS:**

P (KEYBOARD COMMANDS)

Use the P Keyboard Command to display a list of all picture files on disk.

---

**COMMAND:** PSAVE (pixel save)

**PURPOSE:**

Save an image from the screen, pixel by pixel.

**PROMPTS:**

2P (2 points); OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

Use the 1-9 command to type into the filenames menu the name under which the picture will be saved.

**PROCEDURE:**

1. Press PSAVE.

The menu of filenames is displayed.

2. Press the name under which the file will be saved.

3. Press two diagonal corners to define the image to be saved. (To save the entire screen image, press once with the cursor in the Prompt Box.)

The defined image is surrounded by a box.

4. Press OK? in the Prompt Box.

**EFFECTS:**

The designated image and the current color map are saved in the selected disk file. Previous contents of the file, if any, are lost.

**RELATED COMMANDS:**

P (KEYBOARD COMMANDS)

Use the P Keyboard Command to display a list of all picture files on disk.

LOAD (DISK MENU)

The LOAD command brings a saved image to the screen exactly as it was saved.

FILTER, OVLAY (DISK MENU)

FILTER and OVLAY load to the screen selected pixels of an image saved through PSAVE.

---

**COMMAND:** PUTMAP

**PURPOSE:**

Save the current color map, or palette, in the temporary buffer file.

**PROMPT:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press PUTMAP.

**EFFECTS:**

The current color map is saved in the temporary buffer file. Previous contents, if any, will be lost.

Only one map at a time can be saved in the temporary file. PUTMAP is "temporary" because its contents are lost if you use PUTMAP again or load a picture from disk (because Lumena stores in PUTMAP the map previously onscreen) or exit Lumena or reboot your computer.

**RELATED COMMANDS:**

LOAD, FILTER, OVRLAY (DISK MENU)

As a convenience, Lumena automatically stores the current color map, or palette, in the temporary buffer whenever a picture is loaded to the screen.

GETMAP (DISK MENU)

Use GETMAP to load the color map from the temporary buffer file.

SAVE (PALET MENU)

Use SAVE, in the PALET MENU, to store color maps on disk.

---

**COMMAND:** XB/LB

**PURPOSE:**

Remove from the screen or restore to the screen the last box used for delineating a screen area.

OR

Reactivate for the next command the last box used.

**PROMPT:**

LB (last box)

**EXIT:**

none needed

NOTE: To *cancel* LB—so the last box is *not* reactivated for the next command—glide the pen to the right side of the tablet.

**PROCEDURE:**

1. Press XB.

OR

1. Press LB.

**EFFECTS:**

XB removes the previous delineating box from the screen. Press again, and the box reappears. A box restored through XB acts only as a visual reminder.

LB reactivates for the next command the screen area last used. This allows you to enact further commands in the exact same screen area previously used.

The LB command is active as long as LB appears in the Prompt Box. That is, if you press LB and then press XB, the box will disappear from the screen but the prompt will remain, indicating that the next command will be carried out in that area of the screen.

To remove a delineating box from the screen, you must use XB before creating another box. If another box is created, the box already onscreen becomes part of the image. That is, XB and LB affect only the box most recently created.

*continued on next page*

---

*XB/LB, cont.*

**RELATED COMMANDS:**

ERASE (PENS MENU)

REMOVE (FILLS MENU)

A box that has inadvertently become part of the image can be removed with ERASE or REMOVE. (Note, however, that if the box was drawn over other colors, a negative of the box will remain, since ERASE and REMOVE work by applying background color over the color being removed.)

---

**COMMAND:** LOAD

**PURPOSE:**

Load a saved image onto the screen.

**PROMPTS:**

1P (1 point); OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

If necessary, type into the filenames menu the name under which the picture was saved.

P (KEYBOARD COMMANDS)

Use the P Keyboard Command to display a list of all picture files on disk.

**PROCEDURE:**

1. Press LOAD.

The menu of filenames is displayed and LOD appears in the Prompt Box.

2. Press the name of the file to be loaded.

The prompt asks for one point.

3. Locate the position for the lower left corner of the image being called up and press briefly on the pen. (To load the image in the same place on the screen where it was saved, press with the cursor in the Prompt Box.)

The area to be occupied by the loaded image is surrounded with a box.

4. Press OK? in the Prompt Box.

To reposition the delineating box before pressing OK?, CANCEL the command by moving the pen toward the right side of the tablet and initiate LOAD again.

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---

LOAD, *cont.*

**EFFECTS:**

LOAD brings to the screen an image exactly as it was saved, either through PSAVE or RSAVE.

The loaded image appears with its original color map. The color map that was onscreen when LOAD was initiated is held in the temporary buffer file and can be recalled with the GETMAP command.

(LOAD merely displays a saved image, it does not in any sense move the image from the disk to the screen. Even though you make changes on the screen image, the image on disk remains in its original state. To store the changes on disk, SAVE the changed image under the same name.)

**RELATED COMMANDS:**

FILTER, OVLAY (DISK MENU)

FILTER and OVLAY load selected pixels of an image. These commands can be used only for images saved with PSAVE.

---

**COMMAND:** OVLAY

**PURPOSE:**

Bring to the screen an image which appears to be laid over the image onscreen, rather than to replace it.

**PROMPTS:**

1P (1 point); OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

If necessary, type into the filenames menu the name under which the picture was saved.

P (KEYBOARD COMMANDS)

Use the P Keyboard Command to display a list of all picture files on disk.

**PROCEDURE:**

1. Press OVLAY

The menu of filenames is displayed and LOD appears in the Prompt Box.

2. Press the name of the file to be loaded.

The prompt asks for one point.

3. Locate the position for the lower left corner of the image being called up and press briefly on the pen. (To load the image in the same place on the screen where it was saved, press with the cursor in the Prompt Box.)

The area to be occupied by the loaded image is surrounded with a box.

4. Press OK? in the Prompt Box.

To reposition the delineating box before pressing OK?, CANCEL the command by moving the pen toward the right side of the tablet and initiate OVLAY again.

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---

OVRLAY, *cont.*

**EFFECTS:**

This command loads all colors of a saved image except background color. Therefore, an image brought up by OVRLAY appears to be "on top of" any colors already on the screen.

OVRLAY loads only images saved with PSAVE. (Attempting to load an image saved with RSAVE will have no effect.)

The image loads with its original color map. The color map previously onscreen is held in the temporary buffer.

---

**COMMAND:** FILTER

**PURPOSE:**

Bring to the screen a selected range of colors from an image saved with PSAVE.

**PROMPTS:**

2C (2 colors); 1P (1 point); OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

If necessary, type into the filenames menu the name under which the picture was saved.

P (KEYBOARD COMMANDS)

Use the P Keyboard Command to display a list of all picture files on disk.

**PROCEDURE:**

1. Press FILTER.
2. Press two colors in the palette, the first and last in the range of colors to be loaded from the saved image.

The menu of filenames appears.

3. Press the file to be loaded.
4. Press the position for the lower left corner of the image. (Pressing with the cursor in the Prompt Box will bring the image to the same area of the screen it occupied when saved.)

A box appears, showing the screen area to be covered by the image.

5. Press OK? in the Prompt Box.

To reposition the delineating box before pressing OK?, cancel the command by moving the pen to the right edge of the tablet. Then initiate the command again.

FILTER, *cont.*

**EFFECTS:**

FILTER loads to the screen a selected range of colors from an image saved with PSAVE. (Attempting to use FILTER on an image saved with RSAVE will have no affect.)

In selecting the color range, you have selected palette positions, not visual colors. The colors that appear are the colors mapped in those positions in the saved image.

Since FILTER loads a selected range of colors, it allows you to bring to the screen nonrectangular portions of an image by excluding the surrounding colors.

---

**COMMAND:** GETMAP

**PURPOSE:**

Load a color map, or palette, from the temporary buffer file.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press GETMAP.

**EFFECTS:**

The color map in the temporary buffer file loads onto the screen, replacing the map onscreen.

**RELATED COMMANDS:**

PUTMAP (DISK MENU)

Use PUTMAP to store a color map in the temporary buffer.

LOAD, FILTER, OVRLAY (DISK MENU)

As a convenience, Lumena automatically stores the current color map in the temporary buffer whenever an image is loaded, since the new image will appear with its original color map.

## Section 11

---

# Tools Menu

>TOOLS<	PENS	BRUSH	SHAPE	GRIDS
EDGES				

The TOOLS MENU gives access to menus of commands for drawing.

---

## Pens Menu

>PENS <	AIRBR	BRUSH	CHAR	ERASE
LINE	PEN	R-BAND	Q-LINE	GET/O

The PENS MENU is used to select the action of the digitizing pen to draw on the screen. The drawing mode selected will be active whenever the cursor is in the image area (not in the menu) and the digitizing pen is pressed down, provided no command is pending.

Items from this menu can be selected at any time through the Status Box of any menu, as well as from command boxes in this menu. To select a mode through the Status Box, position the cursor over the initial of the current drawing mode and press down on the pen. Keeping the pen depressed, move it slowly to the left. Initials of all the drawing modes of the PENS MENU will appear. To select a mode, release pressure on the pen.

Whenever a drawing mode is selected, either from this menu or through the Status Box of any menu, it will appear in the size last selected for it. Thus it is easy to alternate between drawing modes of different sizes by changing only the mode.

All PENS modes (except CHAR) range in size from 1 through 8, 1 being the smallest and 8 the largest. However, the measured size for a number is not the same in all modes. 8 Brush, for example, covers a broader area of the screen than 8 Pen. The size range in each drawing mode is appropriate to the work that would be done in that mode.

---

**COMMAND:** AIRBR (airbrush)

**PURPOSE:**

Deposit a random spray of up to four colors.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press AIRBR. Move the cursor into the image area and press down to draw.

**EFFECTS:**

The spray size ranges from only a few pixels in diameter (number 1) to large enough to cover almost the entire screen (number 8).

Airbrush color is determined by the last four color selections. The selections can be made either before or after pressing Airbrush. If four different colors are chosen, an equal mix of those four colors will be deposited. If one color is selected four times, only that color will be deposited. Then if a different color is selected, a one-fourth mix of that color with the previous color will be deposited.

Moving the pen quickly deposits a less dense spray than moving it slowly. If the Airbrush is to cover only one color, it is also possible to create a less dense spray by mixing that background color with the chosen Airbrush color.

**COMMAND:** BRUSH

**PURPOSE:**

Deposit a patch of the current color in a brush mode.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press BRUSH. Move the cursor into the image area and press down to draw.

**EFFECTS:**

The BRUSH command allows drawing a smooth, continuous line whenever the cursor is in the image area, the pen is depressed and no command is pending. Moving the digitizing pen quickly gives a dotted line.

With background color as the current color, BRUSH can be used to erase.

**RELATED COMMANDS:**

PEN (PENS MENU)

The main differences between PEN and BRUSH are these:

PEN deposits a rectangular block of color, while BRUSH deposits a rounded patch.

If you move the digitizing pen quickly, a BRUSH line will be broken or dotted, whereas a PEN line will always be continuous.

**BRUSH MENU**

For various special brushes, including a custom brush, see the BRUSH MENU.

**CELLS MENU**

Images stored in cells can also be used as brushes.

---

**COMMAND:** CHAR (character)

**PURPOSE:**

Deposit characters in a brush mode.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press CHAR. Move the cursor into the image area and press down to draw.

The character to be deposited is shown in the Status Box: "aC" indicates the drawing mode is Character and the character to be deposited is "a".

To change the character to be deposited, put the cursor over the current character in the Status Box and press down on the pen. A caret (^) under the character indicates that it is being changed. Retaining pressure, move the pen to the left until the desired character appears. (Since the characters go by quickly, move the pen very slowly to select a character.) Upper and lower case letters appear, as well as numbers and other characters commonly found on the typewriter keyboard. To select a character, release pressure on the pen.

**EFFECTS:**

CHAR can be used as a brush mode. Moving the pen slowly deposits a line of overlapping characters, while moving the pen quickly leaves a line of characters with spaces between.

It can also be used as a "rubber stamp". To deposit one character, press down and quickly release pressure on the pen.

**RELATED COMMANDS:**

T (KEYBOARD COMMANDS)

To type from the keyboard onto the screen, use the T mode. This method is more suitable for long texts or when legibility is essential. CHAR is handy for special effects and offers greater flexibility of movement than the type mode.

**MOVES, ROTAT and SCALE MENUS**

Characters in CHAR appear in only one size. Their dimensions and orientation can be altered through commands in the MOVES, ROTAT and SCALE MENUS.

---

**COMMAND:** ERASE

**PURPOSE:**

Erase pixels of a selected color.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press ERASE.
2. Position the cursor over any color in the image and press down on the pen. Keeping the pen depressed, move it freely over the image. Only the color initially under the cursor will be replaced with background color.

To change the color to be erased, release pressure on the pen, move the cursor to a new color to be erased, and press down again. (Note that the current color is not relevant for the ERASE command. Whatever color is under the cursor when the pen is depressed will be "erased", that is, replaced with background color.)

To change erase size, put the cursor over the size number in the STATUS BOX, press down on the pen, and move it slowly to left until the desired size number appears.

**EFFECTS:**

ERASE works by applying background color over a selected color. Thus, if a yellow line has been drawn "over" a blue area, erasing the yellow will not reveal the blue again but will yield the background color.

**RELATED COMMANDS:**

BRUSH (PENS MENU)

For erasing all color from an area, use BRUSH in the PENS MENU, with background color as the current color.

REMOVE (FILLS MENU)

To remove a color from a selected rectangular area of the screen, or from the entire screen, use REMOVE in the FILLS MENU.

---

**COMMAND:** LINE**PURPOSE:**

Draw a line in the current color between given endpoints.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press LINE.
2. Position the cursor where the line should begin and press briefly on the pen.
3. Glide the pen to the end point and press briefly again.

A line will draw to connect the two points.

Glide the pen to the next point and press, and a line will connect the end point of the previous line with the new point.

To discard a line without setting it, or to terminate a run of line segments, move the cursor into the menu area. The next time the pen is pressed in the image area, a new run of line segments will begin.

Change line width by putting the cursor over the size number in the Status Box, pressing down on the pen, and moving the pen left until the desired size is reached.

**EFFECTS:**

A line of the current color connects the last two points selected.

**RELATED COMMANDS:**

R-BAND, Q-LINE (PENS MENU)

R-BAND is similar to LINE, except that it displays each line in a temporary mode before drawing. Q-LINE draws lines that are exactly horizontal or vertical.

LINE (EDGES MENU)

LINE in the EDGES MENU draws lines that do not appear jagged.

---

**COMMAND:** PEN

**PURPOSE:**

Deposit a patch of the current color in a pen mode.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press PEN. Move into the image area and press while drawing.

**EFFECTS:**

The PEN mode allows drawing a continuous line as long as the cursor is in the image area, the pen is depressed and no command is pending. It is ideal for freehand drawing since it offers the greatest freedom of movement along with the finest line size. Although a PEN line is always continuous, very rapid movement of the digitizing pen will result in a squared off rather than a smooth line, as the computer tries to catch up with the stylus movement.

Change pen size by positioning the cursor over the size number in the Status Box, pressing down on the digitizing pen and moving it left until the desired size appears.

**RELATED COMMANDS:**

BRUSH (PENS MENU)

The main differences between PEN and BRUSH are these:

PEN deposits a rectangular block of color, while BRUSH deposits an rounded patch.

If you move the digitizing pen quickly, a BRUSH line will be broken or dotted, whereas a PEN line will always be continuous.

---

**COMMAND:** R-BAND (rubber-band line)

**PURPOSE:**

Draw a line of the current color, displaying each new line segment in a temporary mode before drawing.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press R-BAND.
2. Position the cursor where the line should begin and press down briefly on the pen. Keeping the pen in contact with the tablet, move it around. A temporary line connects the initial point with the cursor.
3. To set the line, press down briefly on the pen. As you glide the pen to the next point, a temporary line connects the cursor with the previous point.

To discard a line without setting it, or to terminate a run of line segments, move the cursor into the menu area. (Lifting the pen off the tablet also breaks a run of line segments.) The next time the pen is pressed in the image area, a new run of rubber-band line segments will begin.

Change line WIDTH by putting the cursor over the size number in the STATUS AREA, pressing down on the pen, and moving the pen left until the desired size number appears.

**EFFECTS:**

This command gets its name from the action of the temporary line, which appears to be a rubber band with one end tacked down at the last-selected point and the other end at the cursor. As with LINE, the end point of the last line becomes the beginning point of the next line, until the run of line segments is broken.

Note that the size, or width, of the temporary line is always the same; the size of the actual rubber-band line will not be apparent until the line is set.

---

**COMMAND:** Q-LINE (quantized line)

**PURPOSE:**

Draw a horizontal or vertical line of the current color. This command quantizes endpoints to 90 degrees.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press Q-LINE.
2. Position the cursor where the line should begin and press down briefly on the pen.
3. Glide the pen to the approximate end point for the line and press down.

Q-LINE will quantize the position of the endpoint to 90 degrees and draw a horizontal or vertical line.

To discard a line without setting it, or to terminate a run of line segments, move the cursor into the menu area. The next time the pen is pressed in the image area, a new run of line segments will begin.

Change line width by positioning the cursor over the size number in the Status Box, pressing down on the pen, and moving the pen slowly left until the desired size appears.

**EFFECTS:**

This command always draws lines that are exactly horizontal or vertical.

As with LINE, the end point of the last line becomes the beginning point of the next line segment unless the run is broken.

**RELATED COMMANDS:**

GRID, GRAV (GRIDS MENU)

For help in making vertical or horizontal alignments of elements in an image, use GRID or GRAV in the GRIDS MENU. Lines displayed by those commands act as guides and can be removed without affecting the image. Use Q- LINE only to draw lines that are meant to be part of the image.

---

**COMMAND:** GET/O (getbrush/options)

**PURPOSE:**

Get, in a drawing mode, the image in the Put buffer.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PRELIMINARY COMMANDS:**

P (GENERAL MENU COMMANDS)

Store an image in the buffer through P (put) in the PSG command.

**PROCEDURE:**

To reveal the image exactly as it appears in the buffer:

1. Press GET. Move the cursor into the image area and press down to draw.

To change the buffer image as you reveal it:

2. Press O.

The menu is replaced by a menu of options:

RESET	BRUSH	XOR	OR	AND
FLIP	BLOCK	NXOR	NOR	NAND

BRUSH gives a brush that does not carry background.

BLOCK gives a brush that carries background.

FLIP turns the image upside down.

XOR, NXOR, OR, NOR, AND and NAND give a variety of color changes and texture.

RESET returns the command to its default mode. (For GET brush, this is a brush that carries background color.)

3. Press one of the choices.

The PENS MENU returns to the screen. You can now draw with a pen that reveals the buffer image according to the selected option.

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---

GET/O (getbrush/options), *cont.*

**EFFECTS:**

Wherever you draw, the image in the buffer will be revealed according to the option selected.

This command can be used to restore an image to an earlier state. For this use press, P (in the PSG command box) from time to time while you are working on an image. This stores in the buffer the current version of the image, and you can continue making changes onscreen. Then, if any of your changes are unsatisfactory, use GET (in its default mode) to "erase" the changes. That is, draw over your changes with GET, and the picture in the buffer (the earlier version of your picture) will come back to the screen.

If the working screen is blank, the picture in the buffer will dramatically appear as you draw with GET.

XOR, NXOR, OR, NOR, AND and NAND in the menu of options give a variety of color changes. How the color changes are determined is explained in Appendix C, but the effects of these commands are best discovered through experimentation.

Any option selected remains active until you make another choice or until you leave this menu.

**RELATED COMMANDS:**

G in PSG (GENERAL MENU COMMANDS)

G (get) in the PSG command is similar to the GET brush in this menu: G brings to the working screen the entire image in the buffer, while GET brings to the screen only those portions of the buffer image over which you draw.

---

## Brush Menu

>BRUSH<	SYM	EDGE/X	CSTM/O	RING/X
XB/LB	P/W			

The BRUSH MENU contains various special brushes.

Commands with an X, such as RING/X, can be used either as regular brushes or as texture brushes. Pressing over the left part of the command activates a brush that colors in the usual way, the current color replacing any color it crosses. Pressing over the X activates a special brush: when used over background color, it gives a speckled texture in the current color; when used over another color, it produces texture in a third color.

The color produced when an X brush crosses another color is determined by the palette positions of the two colors involved.

(The X brushes, as well as several choices available through the CSTM/O command, use Boolean logic functions. For a further explanation of the color changes involved, see BOOLEAN LOGIC in Appendix C.)

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**COMMAND:** SYM (symmetry brush)

**PURPOSE:**

Enable drawing in four-way symmetry.

**PROMPTS:**

2P (2 points)

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press SYM.
2. Press two diagonal points to define the area for drawing.

Move the cursor into the defined area and press while drawing.

**EFFECTS:**

All drawing done inside the selected area appears in four-way symmetry. The pen is not active when the cursor is outside that area.

**RELATED COMMANDS:**

XB (BRUSH MENU)

To remove the delineating box from the screen, press XB in the XB/LB command box. (The area selected for SYM is still active, even though the box is not visible.)

CHANGE COLOR (Status Box)

CHANGE SIZE (Status Box)

Change the current color and brush size at any time, without leaving SYM.

---

**COMMAND:** EDGE/X

**PURPOSE:**

Deposit in a brush mode the color under the cursor when the pen is depressed.

OR

Deposit in a textural brush mode the color under the cursor, which changes as it crosses other colors.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press EDGE. Then put the cursor over any color in the image, press down and draw.

OR

1. Press X. Then put the cursor over any color in the image, press down and draw.

**EFFECTS:**

The color deposited by EDGE or EDGE/X is initialized each time the pen is pressed over a color, and the color lasts only until pressure on the pen is released. (This means: 1. the current color is not relevant; 2. if you press the pen with the cursor over background color, there will be no apparent effect.)

Pressing EDGE in the left side of the command box gives an Edge brush that colors in the usual manner.

Pressing with the cursor over the X activates a textured brush that allows background color to show through. Crossing a color other than background produces a third color.

Used with a stroking motion, this brush is good for edging one color into another or softening hard edges. Size 1 picks up one pixel of color. Larger sizes may be used to draw out several adjacent colors.

**COMMAND:** CSTM/O (custom brush/options)

**PURPOSE:**

Create a custom brush or a custom rubberstamp from an onscreen image.

**PROMPT:**

2P (2 points)

**EXIT:**

Initiate another command.

**PROCEDURE:**

To make a brush using the image as it appears:

1. Press CSTM in the left side of the command box.
2. Select diagonal corners to define the image to be repeated.

A box will briefly surround the image.

3. To "stamp" the image, press anywhere in the image area of the screen.

To use in a brush mode, keep the digitizing pen depressed and draw.

To make a brush that varies from the original:

4. Press O.

The menu is replaced by a menu of options for the brush.

RESET	BRUSH	XOR	OR	AND
FLIP	BLOCK	NXOR	NOR	NAND

BRUSH gives an image that carries all colors except background color.

BLOCK gives an image that carries all colors.

FLIP turns the original image upside down.

XOR, NXOR, OR, NOR, AND and NAND give a variety of color changes and texture.

RESET returns the command to its default mode. (The custom-brush image appears like the original.)

---

5. Press one of the options.

The BRUSH MENU returns to the screen. You can now draw or stamp with a brush that uses the selected option.

**EFFECTS:**

The selected image may be any shape and have any number of colors. The image will be repeated each time the pen is pressed.

Used as a brush, this command will yield a continuous line of overlapping images. A CSTM brush works best when the image is small. Speed and direction of pen movement affect the appearance of a CSTM brush line.

Using CSTM in its default mode produces a brush or stamp that appears in its original colors. It does not carry background color, so an image drawn on background will appear to be stamped or drawn "over" any other colors.

XOR, NXOR, OR, NOR, AND and NAND in the menu of options give a variety of color changes when the custom brush crosses other colors onscreen. How the color changes are determined is explained in Appendix C, but the effects of these commands are best discovered through experimentation.

Any option selected remains active until you make another choice or until you leave this menu.

**RELATED COMMANDS:**

CELLS MENU

Images stored in cells can be brought to the screen as brushes at any time. See the opening pages of the CELLS MENU.

**COMMAND:** RING/X

**PURPOSE:**

Deposit a ring of the current color in a brush mode.

OR

Activate a textured ring-shaped brush that changes color when it crosses other colors.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press RING.

OR

1. Press X.

**EFFECTS:**

Pressing the left side of the RING command activates a brush that deposits color in the usual way, the current color covering any color it crosses.

Pressing with the cursor over X activates a textured brush that allows background color to show through. Crossing a color other than background produces a third color. (See note on first page of this menu.)

---

**COMMAND:** XB/LB

**PURPOSE:**

Remove from the screen or restore to the screen the last box used for delineating a screen area.

OR

Reactivate for the next command the last box used.

**PROMPT:**

LB (last box)

**EXIT:**

none needed

NOTE: To *cancel* LB—so the last box is *not* reactivated for the next command—glide the pen to the right side of the tablet.

**PROCEDURE:**

1. Press XB.

OR

1. Press LB.

**EFFECTS:**

XB removes the previous delineating box from the screen. Press again, and the box reappears. A box restored through XB acts only as a visual reminder.

LB reactivates for the next command the screen area last used. This allows you to enact further commands in the exact same screen area previously used.

The LB command is active as long as LB appears in the Prompt Box. That is, if you press LB and then press XB, the box will disappear from the screen but the prompt will remain, indicating that the next command will be carried out in that area of the screen.

To remove a delineating box from the screen, you must use XB before creating another box. If another box is created, the box already onscreen becomes part of the image. That is, XB and LB affect only the box most recently created.

*continued on next page*

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*XB/LB, cont.*

**RELATED COMMANDS:**

ERASE (PENS MENU)

REMOVE (FILLS MENU)

A box that has inadvertently become part of the image can be removed with ERASE or REMOVE. (Note, however, that if the box was drawn over other colors, a negative of the box will remain, since ERASE and REMOVE work by applying background color over the color being removed.)

---

**COMMAND:** P/W (protect/write)

**PURPOSE:**

Activate a mask brush that Protects one color.

OR

Activate a mask brush that Writes over only one color.

**PROMPT:**

1C (1 color)

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press P.

2. Press the color to be protected, selecting it either from the palette or from the image.

OR

1. Press W.

2. Press the color to be written over, selecting it either from the palette or from the image.

**EFFECTS:**

If you pressed P, the selected color is protected, or masked out, while all other colors can be drawn on.

If you pressed W, only the selected color can be written on, and the pen is inactive over all other colors.

Pressing W creates a mask brush that is efficient for coloring small areas surrounded by another color or several colors, since it covers only one color. It can also be used to erase such areas, if background is selected as the current color.

**RELATED COMMANDS:**

CHANGE COLOR

You can change the current color any number of times without affecting the mask color. The mask color selected through P/W remains in effect until you initiate another command or reinitiate P/W and select another color.

---

## Shape Menu

>SHAPE<	CIRCLE	ELLIPS	BOX	
L-CNTR	F-CIRC	F-ELIP	F-BOX	

The SHAPE MENU contains commands for easily constructing geometric figures, either in outline or as filled shapes.

### Related Menu

#### EDGES MENU

Commands in the EDGES MENU draw geometric figures that have smooth rather than jagged edges.

---

**COMMAND:** CIRCLE

**PURPOSE:**

Outline a circle in the current color.

**PROMPTS:**

CTR (center); RAD (radius)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

PEN (PENS MENU)

To select the width of line used to draw the circle, select the size of PEN in the Status Box.

L-CNTR (SHAPE MENU)

To draw a circle concentric with the last circle or ellipse, press L-CNTR before pressing CIRCLE.

**PROCEDURE:**

1. Press CIRCLE.
2. Press the center for the circle (unless you have previously selected L-CNTR, in which case go immediately to step 3).
3. Glide the pen away from the center and press down for the radius.

To relocate the center of a circle before the radius has been selected, move the cursor into the menu. Then move back into the image area and begin again.

**EFFECTS:**

The command outlines a circle in the current color and last selected pen size.

---

**COMMAND:** ELLIPS

**PURPOSE:**

Outline an ellipse in the current color.

**PROMPTS:**

CTR (center); END; OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

PEN (PENS MENU)

To select the width of line used to draw the ellipse, select the size of PEN in the Status Box.

L-CNTR (SHAPE MENU)

To draw an ellipse concentric with the last circle or ellipse, press L-CNTR before pressing ELLIPS.

**PROCEDURE:**

1. Press ELLIPS.
2. Press the center for the ellipse (unless you have previously selected L-CNTR, in which case go immediately to step 3).
3. Glide the pen from the centerpoint and press the point of the ellipse that will be furthest from the center.

An ellipse will be drawn in a temporary mode, with points nearest to and furthest from the center highlighted.

4. To change the dimensions or the orientation of the ellipse, press with the cursor over one of the highlighted points, glide the pen to the new location for that point, and press again on the pen.

The ellipse will redraw according to the new dimensions. To move the ellipse to another location on the screen, press with the cursor on the center point, move the cursor to where you want the center to be, and press again.

The same ellipse will redraw in the new location. You may change the location and dimensions any number of times before pressing OK?.

---

5. To actually draw the ellipse, press OK? in the Prompt Box.

To discard an ellipse without drawing it, cancel the command by gliding the pen to the right side of the tablet. This may be done any time before you press OK?.

**EFFECTS:**

The command draws an ellipse in the current color and the last-selected Pen size.

**COMMAND:** BOX

**PURPOSE:**

Outline a rectangle of the current color.

**PROMPTS:**

2P (2 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press BOX.
2. Press two points to define the diagonal corners of the box, keeping the pen in contact with the tablet while moving from the first to the second point.

To reposition a box after locating the first corner but before locating the second corner, move the cursor into the menu. Then move back into the image area and set the first corner again.

**EFFECTS:**

A rectangle is outlined in the current color.

---

**COMMAND:** L-CNTR (last center)

**PURPOSE:**

Reselect for the next command the center point last used for a circle or ellipse.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press L-CNTR before pressing the CIRCLE or ELLIPS command that it is to affect.

**EFFECTS:**

The center of the last-drawn circle or ellipse is activated for the next command, and the point is marked with a temporary dot. A subsequent CIRCLE, ELLIPS, F-CIRC or F-ELIP command will use this point as its center, and the prompt will ask for only the radius or end.

To cancel L-CNTR, glide the pen to the right edge of the tablet before initiating a CIRCLE or ELLIPS command.

**COMMAND:** F-CIRC (filled circle)

**PURPOSE:**

Draw a circle filled with the current color.

**PROMPTS:**

CTR (center); RAD (radius)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

L-CNTR (SHAPE MENU)

To draw a circle concentric with the last circle or ellipse, press L-CNTR before pressing CIRCLE.

**PROCEDURE:**

1. Press F-CIRC.
2. Press the center for the circle (unless you have previously selected L-CNTR, in which case go immediately to step 3).
3. Glide the pen away from the center and press down for the radius.

To relocate the center of a circle before the radius has been selected, move the cursor into the menu. Then move back into the image area and begin again.

**EFFECTS:**

The command draws a circle and fills it with the current color.

---

**COMMAND:** F-ELIP (filled ellipse)

**PURPOSE:**

Draw an ellipse filled with the current color.

**PROMPTS:**

CTR (center); END; OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

L-CNTR (SHAPE MENU)

To draw an ellipse concentric with the last circle or ellipse, press L-CNTR before pressing F-ELIP.

**PROCEDURE:**

1. Press F-ELIP.
2. Press the center for the ellipse (unless you have previously selected L-CNTR, in which case go immediately to step 3).
3. Glide the pen from the centerpoint and press the point of the ellipse that will be furthest from the center.

An ellipse will be drawn in a temporary mode, with the points nearest to and furthest from the center highlighted.

4. To change the dimensions or the orientation of the ellipse, press with the cursor over one of the highlighted points, glide the pen to the new location for that point, and press again on the pen.

The ellipse will redraw according to the new dimensions. To move the ellipse to another location on the screen, press with the cursor on the center point, relocate the center and press again on the pen.

The same ellipse will redraw in the new location. You can change the dimensions or location any number of times before pressing OK?.

5. To actually draw the ellipse, press OK? in the Prompt Box.

To discard an ellipse without drawing it, cancel the command by gliding the pen to the right side of the tablet. This may be done any time before you press OK?.

**EFFECTS:**

The command draws an ellipse filled with the current color.

---

**COMMAND:** F-BOX (filled box)

**PURPOSE:**

Make a rectangle filled with the current color.

**PROMPT:**

2P (2 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press F-BOX.
2. Press two points to define the diagonal corners of the box, keeping the pen in contact with the tablet while moving from the first to the second point.

To reposition a box after locating the first corner but before locating the second corner, move the cursor into the menu. Then move back into the image area and set the first corner again.

**EFFECTS:**

A rectangle filled with the current color appears.

---

## Grids Menu

>GRIDS<	GRID	XY-GRD	GRDCOL	
NEW	GRAV	X/Y	GRVCOL	

The GRIDS MENU has commands that help in arranging images on the screen.

Grids and gravity lines appear as underlays, covering only background color. As long as the grid or gravity line color is not used as a paint color, images already on the screen, as well as color added afterwards, will not be affected when the grid or gravity lines are removed.

**COMMAND:** GRID

**PURPOSE:**

Display or remove the grid.

**PROMPTS:**

none

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

GRDCOL (GRIDS MENU)

Use GRDCOL to change the color of the grid.

NEW (GRIDS MENU)

Press NEW before pressing GRID if you want to set a new grid size.

**PROCEDURE:**

1. Press GRID.

If you pressed NEW before pressing GRID:

2. Press two diagonal corners to define the grid size.

The prompt asks OK?

3. Press OK? in the Prompt Box.

**EFFECTS:**

The grid is alternately displayed or removed each time the command is pressed.

Once you set a grid size, using NEW and then GRID, that is the size displayed by the grid command until you change grid size or until you exit Lumena.

**RELATED COMMANDS:**

Various commands

Be sure to remove the grid before saving an image and before using commands in the XFORM MENUS, as these commands incorporate grid lines as a permanent part of the image.

---

**COMMAND:** XY-GRD

**PURPOSE:**

Display a grid according to the dimensions last set through the X/Y command; or remove the grid.

**PROMPTS:**

none

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

X/Y

Use X/Y to set the dimensions for this grid.

**PROCEDURE:**

1. Press XY-GRD.

**EFFECTS:**

A grid is displayed according to the dimensions set by X/Y. If the grid is already displayed, pressing XY-GRD will remove it.

---

**COMMAND:** GRDCOL (grid color)

**PURPOSE:**

Choose a color for the grid.

**PROMPT:**

1C (1 color)

**EXIT:**

none needed

**PROCEDURE:**

1. Press GRDCOL.

The prompt asks for one color.

2. Press a color.

**EFFECTS:**

The selected color will be used for displaying the grid. (This command does not display the grid.)

---

**COMMAND:** NEW

**PURPOSE:**

Signal the next GRID or GRAV command to set new grid size or gravity lines.

**PROMPTS:**

NEW

**EXIT:**

none needed

**PROCEDURE:**

1. Press NEW.

**EFFECTS:**

NEW is considered a prefix. It has no independent effect, but it affects a subsequent GRID or GRAV command.

If NEW is followed by GRID, you will be able to set a new grid size. If NEW is followed by GRAV, you will be able to set new gravity lines.

---

**COMMAND:** GRAV (gravity)

**PURPOSE:**

Display and activate gravity fields or remove and deactivate gravity fields.

**PROMPTS:**

none

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

GRDCOL (GRIDS MENU)

Use GRDCOL to change the color of the grid.

NEW (GRIDS MENU)

To set new gravity fields, press NEW before pressing GRAV.

**PROCEDURE:**

1. Press GRAV.

If you pressed NEW before pressing GRAV, a horizontal line and a vertical line appear on the screen in a temporary mode, crossing at the position of the cursor. The crossing point follows the cursor, allowing you to position the gravity lines. Position the lines and press down to set them.

**EFFECTS:**

The gravity fields are alternately activated and deactivated each time the command is pressed.

A line marks the center of the gravity field. If the cursor is put down close to the line but not quite on it, the cursor will jump onto the line—that is, to the center of the field. Gravity lines make it easy to align elements in the image, such as characters deposited by CHAR.

Once you set gravity fields, using NEW and then GRAV, these same fields will be used by the GRAV command until you change them or until you exit Lumena.

---

**COMMAND:** X/Y (resolution brush—X and Y dimensions)

**PURPOSE:**

Select the width or height of a brush.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PROCEDURE:**

To set the width of the brush:

1. Press the X.

X appears as the mode indication in the Status Box.

2. Position the cursor on the size number in the Status Box and press down. Retaining pressure, move the pen left until the desired size number appears, then release pressure.
3. Press again on the X in the X/Y command box to set the selected size as the width of the brush.

To set the height of the brush, follow the same procedure as above, pressing the Y in the X/Y command box.

**EFFECTS:**

Color will be deposited according to the selected width and height until the size or drawing mode is changed.

Using this brush is like drawing in a selected screen resolution. Color patches are rectangular and do not overlap; they can appear only adjacent to each other.

**COMMAND:** GRVCOL (gravity lines color)

**PURPOSE:**

Choose a color for the gravity lines.

**PROMPT:**

1C (1 color)

**EXIT:**

none needed

**PROCEDURE:**

1. Press GRVCOL.

The prompt asks for one color.

2. Press a color.

**EFFECTS:**

The selected color will be used for displaying gravity lines. (This command does not display the gravity lines.)

---

## Edges Menu

>EDGES<	CIRCLE	ELLIPS	LINE	FADE
L-CNTR	F-CIRC	F-ELIP		

The EDGES MENU contains commands for drawing lines and geometric figures that have smooth rather than jagged edges.

Diagonal and curved lines normally appear jagged or stepped on the graphics screen because positions of the pixels are quantized according to the resolution of the screen. Commands in this menu make a line appear smoother by composing it of several colors, arranged so that the edges of the line fade toward the background color.

For a line to appear smooth, the colors composing it must be faded toward background color. This is done through FADE, a command that automatically affects the number of colors needed by commands in this menu.

To get a clear idea of what happens in this menu, select color 1 as the current color. Then press FADE and press color 1 twice. Now draw a diagonal line with the LINE command in this menu and a parallel line with the LINE command in the PENS MENU. Then go to the MOVES MENU and use ZOOM two or three times to enlarge a portion of the pair of lines. You will be able to see how the line made from the EDGES MENU is composed of pixels of several colors which, at higher resolution, work together to fool the eye.

### Related Menu

#### SHAPE MENU

The SHAPE MENU draws geometric figures using only the current color. Since it is not necessary to fade colors for this menu, a greater variety of colors can be used in the image.

---

**COMMAND:** CIRCLE

**PURPOSE:**

Draw a smooth circle.

**PROMPTS:**

CTR (center); RAD (radius)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

FADE (EDGES MENU)

This command is necessary for the proper appearance of the circle.

L-CNTR (EDGES MENU)

To draw a circle concentric with the last circle or ellipse, press L-CNTR before pressing CIRCLE.

**PROCEDURE:**

1. Press CIRCLE.
2. Press the center for the circle.

As you glide the pen away from the center, temporary dots follow the cursor, showing the radius.

3. Press down for the radius.

To relocate the center of a circle before the radius has been selected, move the cursor into the menu. Then move back into the image area and begin again.

**EFFECTS:**

The command outlines a smooth circle.

None of the colors composing this circle can later be changed without disturbing the appearance of the circle.

---

**COMMAND:** ELLIPS

**PURPOSE:**

Draw a smooth ellipse.

**PROMPTS:**

CTR (center); END; OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

FADE (EDGES MENU)

This command is necessary for the proper appearance of the ellipse.

L-CNTR (EDGES MENU)

To draw an ellipse concentric with the last circle or ellipse, press L-CNTR before pressing ELLIPSE.

**PROCEDURE:**

1. Press ELLIPS.
2. Press the center for the ellipse (unless you have previously selected L-CNTR, in which case go immediately to step 3).
3. Glide the pen from the centerpoint and press the point of the ellipse that will be furthest from the center.

An ellipse will be drawn in a temporary mode, with points nearest to and furthest from the center highlighted.

4. To change the dimensions or the orientation of the ellipse, press with the cursor over one of the highlighted points, glide the pen to the new location for that point, and press again on the pen.

The ellipse will redraw according to the new dimensions. To move the ellipse to another location on the screen, press with the cursor on the center point, move the cursor to where you want the center to be, and press again.

The same ellipse will redraw in the new location. You may change the location and dimensions any number of times before pressing OK?.

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ELLIPS, *cont.*

5. To actually draw the ellipse, press OK? in the Prompt Box.

To discard an ellipse without drawing it, cancel the command by gliding the pen to the right side of the tablet. This may be done any time before you press OK?.

**EFFECTS:**

The command draws a smooth ellipse.

None of the colors composing this ellipse can later be changed without disturbing the appearance of the ellipse.

---

**COMMAND:** LINE

**PURPOSE:**

Draw a smooth line between given endpoints.

**PROMPTS:**

none

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

FADE (EDGES MENU)

This command is necessary for the proper appearance of the line.

**PROCEDURE:**

1. Press LINE.
2. Press down where the line should begin.
3. Glide the pen to where the line should end and press down for the endpoint.

A line will connect the two points.

4. Press another point, and a line will join the previous point with the new endpoint.

To discard a line without setting it, or to terminate a run of line segments, move the cursor into the menu area. The next time the pen is pressed in the image area, a new run of line segments will begin.

**EFFECTS:**

The command draws smooth lines between selected endpoints.

None of the colors composing the line can later be changed without disturbing the appearance of the line.

---

**COMMAND:** FADE

**PURPOSE:**

Fade a sequence of colors after the first color pressed toward the second color pressed. This command prepares the palette for other commands in the EDGES MENU.

**PROMPT:**

2C (2 colors)

**EXIT:**

none needed

**PROCEDURE:**

1. Press FADE.
2. Press the color to be used for drawing.
3. Press the color over which the drawn figure will appear.

**NOTE:** As a default, pressing any color twice will automatically fade the sequence toward background color.

**EFFECTS:**

A sequence of colors following the first color selected fades toward the second color selected. The number of colors in the sequence is the number required by commands in the EDGES MENU. Note that the number of colors affected is always the same, no matter how far apart the two chosen colors are in the palette.

The remapping appears both in the palette and in the image.

---

**COMMAND:** L-CNTR (last center)

**PURPOSE:**

Reselect for the next command the center point last used for a circle or ellipse.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press L-CNTR before pressing the CIRCLE or ELLIP command that it is to affect.

**EFFECTS:**

The center of the last-drawn circle or ellipse is activated for the next command, and the point is marked with a temporary dot. A subsequent CIRCLE, ELLIP, F-CIRC or F-ELIP command will use this point as its center, and the prompt will ask for only the radius or end.

To cancel L-CNTR, glide the pen to the right edge of the tablet before initiating a CIRCLE or ELLIP command.

---

**COMMAND:** F-CIRC (filled circle)

**PURPOSE:**

Draw a smooth circle filled with the current color.

**PROMPTS:**

CTR (center); RAD (radius)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

FADE (EDGES MENU)

This command is necessary for the proper appearance of the circle.

L-CNTR (EDGES MENU)

To draw a circle concentric with the last circle or ellipse, press L-CNTR before pressing F-CIRC.

**PROCEDURE:**

1. Press F-CIRC.
2. Press the center for the circle (unless you have previously selected L-CNTR, in which case go immediately to step 3).

As you glide the pen away from the centerpoint, temporary dots follow the cursor, showing the radius.

3. Press down for the radius.

To relocate the center of a circle before the radius has been selected, move the cursor into the menu. Then move back into the image area and begin again.

**EFFECTS:**

The command draws a smooth circle and fills it with the current color.

None of the colors composing this circle can later be changed without disturbing the appearance of the circle.

---

**COMMAND:** F-ELIP (filled ellipse)

**PURPOSE:**

Draw a smooth ellipse filled with the current color.

**PROMPTS:**

CTR (center); END; OK?

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

Same as for ELLIPS.

**PROCEDURE:**

Same as for ELLIPS.

**EFFECTS:**

The command draws an ellipse filled with the current color.

None of the colors composing this ellipse can later be changed without disturbing the appearance of the ellipse.

# Xform Menu

>XFORM<	MOVES	ROTAT	SCALE	

The XFORM MENU gives access to menus of commands for transforming 2D images.

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## Moves Menu

>MOVES<	COPY/O	DUP	ROT	REFL-X
XB/LB	MOVE	ZOOM	TRIM	REFL-Y

The MOVES MENU contains commands for rearranging and replicating portions of the image.

### Related Menus

ROTAT MENU  
SCALE MENU

The SCALE MENU allows free rescaling of images (whereas ZOOM in this menu will double or halve a dimension). The ROTAT MENU allows rotation and shearing of images according to a selected angle (whereas ROT in this menu rotates 90 degrees). The advantage of the MOVES MENU is that images rotated or enlarged through these commands can be returned to their original dimensions with no distortion.

### ANIM MENUS

ANIM MENUS allow moving images in real time—that is, producing animation effects.

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**COMMAND:** COPY/O

**PURPOSE:**

Copy an image to another area of the screen, leaving the original image in position.

**PROMPTS:**

3P (3 points)

**EXIT:**

none needed

**PROCEDURE:**

To use COPY in its default mode (with the copied image appearing exactly like the original):

1. Press COPY in the left hand side of the command box.
2. Press two points to define the image to be copied.

A box will surround the image, and an outline of the box will follow the cursor as you move the pen.

3. Position the outline box where the image should be copied and press down.

OR

To make a copy that varies from the original:

1. Press O.

The menu is replaced by a menu of options for the copied image.

RESET	BRUSH	XOR	OR	AND
FLIP	BLOCK	NXOR	NOR	NAND

BRUSH gives an image that does not carry background.

BLOCK gives an image that carries background.

FLIP turns the copied image upside down.

XOR, NXOR, OR, NOR, AND and NAND give a variety of color changes and texture.

RESET returns the command to its default mode. (The copied image appears like the original.)

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COPY/O, *cont.*

2. Press one of the options.

The MOVES MENU returns to the screen.

3. Press COPY in the left hand side of the box.

4. Press two points to define the image to be copied.

A box will surround the image, and an outline of the box will follow the cursor as you move the pen.

5. Position the outline box where the image should be copied and press down.

### **EFFECTS:**

COPY, in its default mode, carries all colors except background, so an image drawn on background color can be copied "on top of" other colors.

XOR, NXOR, OR, NOR, AND and NAND in the menu of options give a variety of color changes when the copied image crosses other colors. How the color changes are determined is explained in Appendix C, but the effects of these commands are best discovered through experimentation.

Any option selected is active until you make another choice or until you leave this menu.

### **RELATED COMMANDS:**

CSTM/O (BRUSH MENU)

CSTM (custom brush) is similar to COPY, but it makes a copy of the selected image each time you depress the pen, without your having to reinitiate the command. COPY allows for more precise placement, while CSTM can be used in a brush mode.

MOVE (MOVES MENU)

MOVE moves an image to another area of the screen, leaving only background color at the original location.

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**COMMAND:** DUP (duplicate)

**PURPOSE:**

Duplicate an image repeatedly to fill a defined area of the screen.

**PROMPTS:**

3P (3 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press DUP.

The prompt asks for three points.

2. Press two diagonal points to define the image to be duplicated.

A box surrounds the image.

3. For the third point, press the upper right corner of the screen area to be filled with the duplicated image.

To relocate the first corner of the box before the second corner has been selected, move the cursor into the menu. Then move back into the image and set the first point again. (Lifting the pen off the tablet also interrupts the command by breaking contact. The command is still active, but the first point must be reset.)

To reposition the delineating box before duplicating the image, cancel the command by gliding the pen to the right side of the tablet. Then initiate the command again.

**EFFECTS:**

Duplication begins at the current position of the defined image and works toward the right and toward the top of the screen, repeating the image as often as necessary to fill the screen area you designated.

DUP makes only complete images. An image begun inside the designated area will not be cut off, even if it must go beyond the boundary set by the third point.

DUP carries all colors except background, so an image drawn on background appears to be "on top of" other colors it crosses when duplicating.

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DUP (duplicate), *cont.*

**RELATED COMMANDS:**

MOVE (MOVES MENU)

To duplicate an image in an area of the screen below or to the left of where it already exists, first MOVE the image to the lower left corner of the area where duplication should begin. Then use DUP.

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**COMMAND:** ROT (rotate)

**PURPOSE:**

Rotate a selected image 90 degrees clockwise.

**PROMPTS:**

2P (2 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press ROT.

The prompt asks for two points.

2. Press two corners to define the image to be rotated.

As you glide the pen to set the second point, the box attaching the cursor to the first corner will remain square, so the image will have the same number of pixels horizontally as vertically. Move the pen diagonally to enlarge or reduce the size of the box.

**EFFECTS:**

The defined image rotates 90 degrees clockwise.

To rotate an image 180 degrees, press ROT and select the two diagonal points. When the first rotation is complete, press LB (last box), then press ROT again. For a 270-degree rotation, press LB and ROT once more.

**RELATED COMMANDS:**

ROT/NW, TURN (ROTAT MENU)

Use ROT/NW and TURN in the ROTAT MENU for rotating an image a specified number of degrees in either direction.

**COMMAND:** REFL-X (reflect on X axis)

**PURPOSE:**

Invert an image on its X axis.

**PROMPTS:**

2P (2 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press REFL-X.

The prompt asks for two points.

2. Press two diagonal corners, to define the image to be reflected.

**EFFECTS:**

The defined image is turned upside down in the same location.

**RELATED COMMANDS:**

REFL-Y (MOVES MENU)

To mirror an image left to right, use REFL-Y.

LB (MOVES MENU)

To mirror an image upside down and left to right, use REFL-X, then press LB (in the XB/LB command box) and press REFL-Y.

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**COMMAND:** XB/LB

**PURPOSE:**

Remove from the screen or restore to the screen the last box used for delineating a screen area.

OR

Reactivate for the next command the last box used.

**PROMPT:**

LB (last box)

**EXIT:**

none needed

NOTE: To *cancel* LB—so the last box is *not* reactivated for the next command—press LB in the Prompt Box or glide the pen to the right side of the tablet.

**PROCEDURE:**

1. Press XB.

OR

1. Press LB.

**EFFECTS:**

XB removes the previous delineating box from the screen. Press again, and the box reappears. A box restored through XB acts only as a visual reminder.

LB reactivates for the next command the screen area last used. This allows you to enact further commands in the exact same screen area previously used.

The LB command is active as long as LB appears in the Prompt Box. That is, if you press LB and then press XB, the box will disappear from the screen but the prompt will remain, indicating that the next command will be carried out in that area of the screen.

To remove a delineating box from the screen, you must use XB before creating another box. If another box is created, the box already onscreen becomes part of the image. That is, XB and LB affect only the box most recently created.

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*XB/LB, cont.*

**RELATED COMMANDS:**

ERASE (PENS MENU)

REMOVE (FILLS MENU)

A box that has inadvertently become part of the image can be removed with ERASE or REMOVE. (Note, however, that if the box was drawn over other colors, a negative of the box will remain, since ERASE and REMOVE work by applying background color over the color being removed.)

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**COMMAND:** MOVE**PURPOSE:**

Move an image to another area of the screen, leaving only background color at the original site.

**PROMPTS:**

3P (3 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press MOVE.

The prompt asks for three points.

2. Press two diagonal points to define the image to be moved.

A box encloses the image and an outline of the box follows the cursor as you glide the pen.

3. Position the box, and press down to move the image.

To relocate the first corner of the box before the second corner has been selected, move the cursor into the menu. Then move back into the image area and set the first point again. (Lifting the pen off the tablet also interrupts the command by breaking contact. The command is still active, but the first point must be reset.)

To reposition the delineating box before moving the image, cancel the command by gliding the pen to the right side of the tablet. Then initiate the command again.

**EFFECTS:**

MOVE carries all colors except background, so an image drawn on background color can be put "on top of" other colors.

**RELATED COMMANDS:**

COPY (MOVES MENU)

COPY is similar to MOVE except that it leaves the original image in position.

**COMMAND:** ZOOM

**PURPOSE:**

Double or halve an image vertically, horizontally, or in both directions.

**PROMPTS:**

3P (3 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press ZOOM.

The prompt asks for three points.

2. Press two diagonal corners to define the image to be zoomed.

The image is surrounded with a box. As you glide the pen for the third point, a temporary mode indicates in advance the dimensions of the zoomed image.

3. Press down to zoom the image.

**EFFECTS:**

The size of the image will be doubled or halved, horizontally, vertically or in both directions, according to the dimensions shown when you pressed for the third point.

All changes occur in relation to the right and top of the screen; the lower left corner of the image always retains the same position.

**RELATED COMMANDS:**

XY-SCL (SCALE MENU)

To freely adjust the scale of an image, use XY-SCL in the SCALE MENU.

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**COMMAND:** TRIM

**PURPOSE:**

Return to background color the screen area outside a selected image area.

**PROMPT:**

2P (2 points); OK?

**EXIT:**

none needed

**PROCEDURE:**

1. Press TRIM.

The prompt asks for two points.

2. Press two diagonal corners to define the image to be kept.

The image is surrounded with a box.

3. Press OK? in the Prompt Box.

To reposition the first corner before setting the second, move the cursor into the menu. Then move back into the image area and set the first point again.

To cancel the command any time before pressing OK?, glide the pen to the right side of the tablet.

**EFFECTS:**

All colors outside the designated area are "trimmed away", leaving the selected image against a field of background color.

**COMMAND:** REFL-Y (reflect on Y axis)

**PURPOSE:**

Invert an image on its Y axis.

**PROMPT:**

2P (2 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press REFL-Y.

The prompt asks for two points.

2. Press two diagonal corners, to define the image to be reflected.

**EFFECTS:**

The defined image is mirrored left to right in the same location.

**RELATED COMMANDS:**

REFL-X (MOVES MENU)

To turn an image upside down, use REFL-X.

To mirror an image upside down and left to right, use REFL-X, then press LB (in the XB/LB command box) and press REFL-Y.

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## Rotat Menu

>ROTAT<	SHR/NW	OBLIQ	ROT/NW	TURN
XB/LB	L-CNTR	=/LANG	SQRBOX	

The ROTAT MENU contains commands for shearing and rotating images.

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**COMMAND:** SHR/NW (shear/shear no wrap)

**PURPOSE:**

Shear an image horizontally or vertically.

**PROMPTS:**

2P (2 points); H?V (horizontally or vertically?); CTR (center)

**EXIT:**

none needed

**PROCEDURE:**

1. Press over SHR.

OR

1. Press over NW.

2. Press two diagonal corners to define the image to be sheared, keeping the pen in contact with the tablet between the first and second corner.

The prompt (H?V) asks whether you want to shear the image horizontally or vertically.

3. To shear horizontally, press anywhere on the tablet, move the pen sideways, and release pressure; to shear vertically, press and move the pen up or down, then release pressure.

A horizontal or vertical line appears and follows the cursor. The prompt (CTR) asks for the center of the shear.

4. Move the cursor to the proposed center for shearing and press down. (To locate the exact center of the defined area, press anywhere in the menu.)

The centerline remains in place and a flashing line appears which pivots on the center point while following the cursor. Use this line to set the angle for shearing.

5. Press down to shear the image.

A sheared image uses only the area occupied by the original image. If you initiated the command by pressing SHR, portions of the image clipped off in the move will be "wrapped around" the image to fill the space. If you began by pressing NW, no wrap-around will occur.

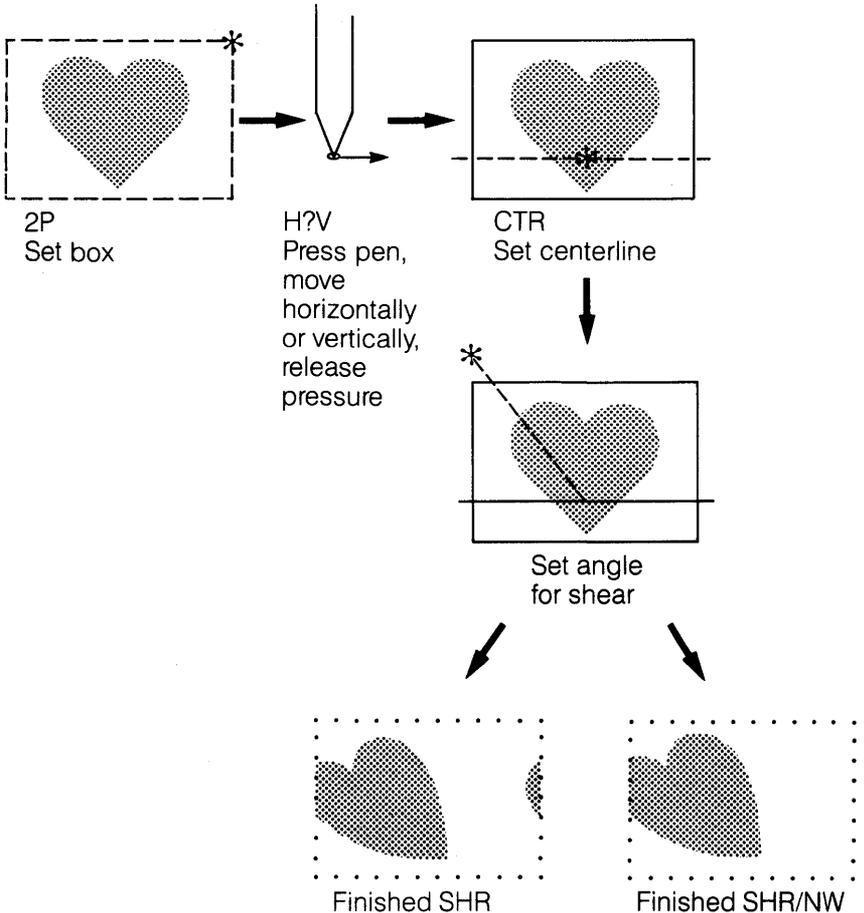
To relocate the first corner of the box before selecting the second corner, move the cursor into the menu. Then return to the image and reselect the first corner.

To reselect horizontal or vertical, or to choose a different center, cancel the command by gliding the pen to the right side of the tablet. Then initiate SHR/NW again.

**EFFECTS:**

The image will shift according to the selected angle of shear. Pixels on the centerline remain in place; pixels above and below a horizontal line, or left and right a vertical line, move in opposite directions.

If you pressed SHR to initiate the command, portions of the image clipped off in shearing will be wrapped around to fill the original space. If you pressed NW, no wrap-around will occur.

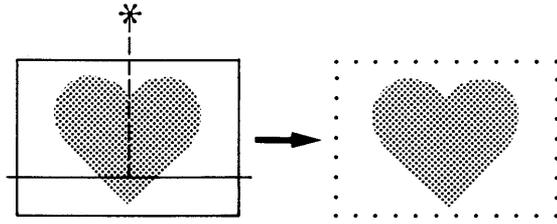


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SHR/NW (shear/shear no wrap), *cont.*

If the shear line is set perpendicular to the centerline, the finished shear will look exactly like the original.  
(The more the shear line approaches the centerline, the more the image will slant.)



**RELATED COMMANDS:**

OBLIQ (ROTAT MENU)

OBLIQ (oblique) is similar to SHR/NW, except that it allows a sheared image to extend beyond its original screen area.

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**COMMAND:** OBLIQ (oblique)

**PURPOSE:**

Tilt (or shear) an image horizontally or vertically.

**PROMPTS:**

2P (2 points); H?V (horizontal or vertical?); CTR (center)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

LB (ROTAT MENU)

L-CNTR (ROTAT MENU)

SQRBOX (ROTAT MENU)

LB reactivates the last box used. L-CNTR reactivates the last center. SQRBOX limits the defined area to a square. These commands are prefixes and must be pressed before you initiate the SHR/NW command.

**PROCEDURE:**

1. Press OBLIQ.

2. Press two diagonal corners to define the image to be tilted.

The prompt H?V asks whether you want to tilt the image by shearing it vertically or horizontally.

3. To shear horizontally, press anywhere on the tablet, move the pen sideways, and release pressure; to shear vertically, press and move the pen up or down, then release pressure.

A horizontal or vertical line appears and follows the cursor. The prompt (CTR) asks for the center of the shear.

4. Move the cursor to the proposed center for shearing and press down. (To choose the exact center of the defined area, press anywhere in the menu.)

A tilting box then pivots on the centerline, following the cursor as you glide the pen, showing in advance the shape of the tilted image.

OBLIQ (oblique), *cont.*

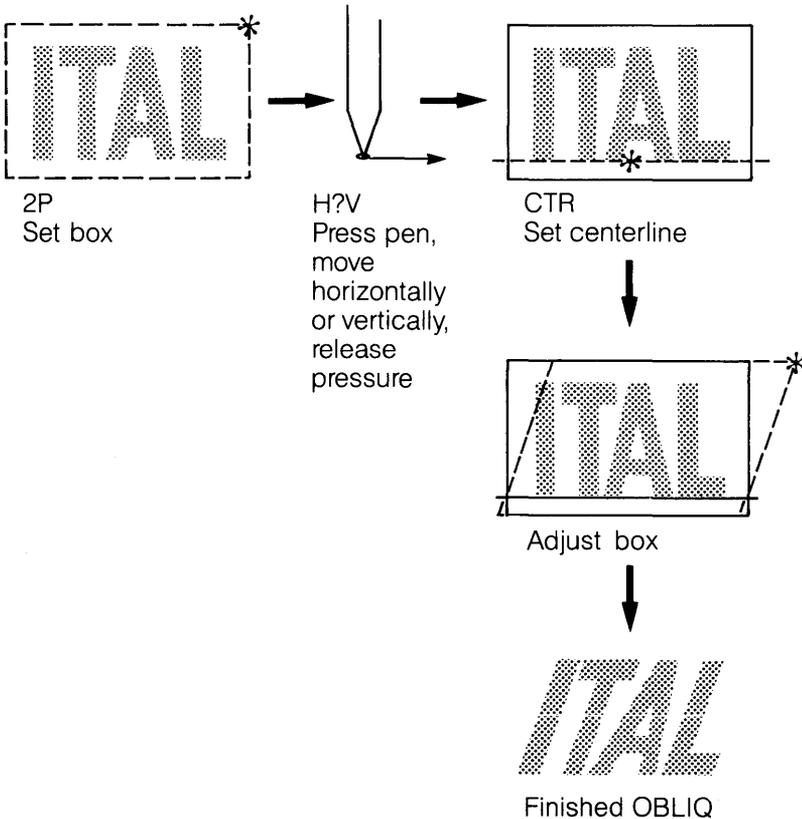
5. Press down to tilt the image.

To reselect horizontal or vertical, or to choose a different center, cancel the command by gliding the pen to the right side of the tablet. Then initiate OBLIQ again.

To relocate the first corner of the box before selecting the second corner, move the cursor into the menu. Then return to the image and reselect the first corner.

### EFFECTS:

The image will tilt according to the selected shear factor. Lines of pixels above and below a horizontal line, or left and right a vertical line, move in opposite directions.

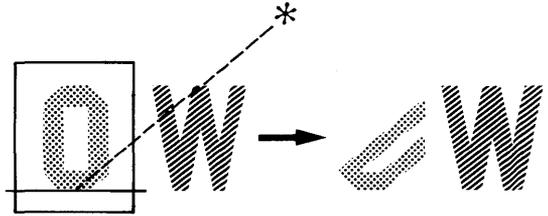


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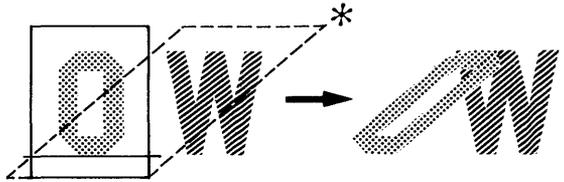
**RELATED COMMANDS:**

SHR/NW (ROTAT MENU)

The difference between SHR and OBLIQ is that SHR stays within the defined screen area.



OBLIQ uses whatever space is necessary and overwrites images previously onscreen.



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**COMMAND:** ROT/NW (rotate/rotate no wrap)

**PURPOSE:**

Rotate an image clockwise or counterclockwise within its original screen area.

**PROMPTS:**

2P (2 points); CTR (center); 2P (2 points)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

LB, L-CNTR, SQRBOX, =/LANG (ROTAT MENU)

LB reactivates the last box used. L-CNTR reactivates the last center. SQRBOX limits the defined area to a square. =/LANG reactivates the last angle used. These commands are prefixes and must be pressed before you initiate the ROT/NW command.

**PROCEDURE:**

1. Press ROT.

OR

1. Press NW.
2. Press two diagonal corners to define the image area to be rotated, keeping the pen in contact with the tablet between the first and second corner.

The prompt asks for the center (CTR) and a cross appears which follows the cursor.

3. Move the cross to the center of the proposed rotation and press down. (To locate the exact center of the defined area, press down anywhere in the menu. You may, however, use a centerpoint completely outside the defined image area.)

A vertical line appears crossing the center point.

4. Press down once more and a flashing line appears with one end attached to the center point, the other following the cursor. Use this line to set the angle of rotation, which can vary from 90 degrees to -90 degrees. Moving the cursor some distance from the centerpoint will give you better control of this line.

The angle of rotation, which varies from 90 degrees to -90 degrees, appears on the terminal screen and changes as you move the pen.

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5. Position the line and press down to rotate the image.

A rotated image uses only the area occupied by the original image. If you initiated the command by pressing ROT, the portions of the image clipped off in the move will be "wrapped around" the image to fill the space. If you began by pressing NW, no wrap-around will occur.

To relocate the first corner of the box before selecting the second corner, move the cursor into the menu. Then return to the image and reselect the first corner.

To choose a different center, cancel the command by gliding the pen to the right side of the tablet. Then initiate ROT/NW again.

**EFFECTS:**

The image will rotate according to the selected angle.

If you pressed ROT to initiate the command, portions of the image clipped off in rotating will be wrapped around to fill the original space. If you pressed NW, no wrap-around will occur.

**RELATED COMMANDS:**

TURN (ROTAT MENU)

ROT/NW is similar to TURN. However, a TURNed image may extend beyond its original screen area, while a ROTated image may not. Also, an image can TURN only around its own center, but it can ROTate around any centerpoint you select.

ROT (MOVES MENU)

ROT in the MOVES MENU rotates a square image area 90 degrees clockwise.

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**COMMAND:** TURN

**PURPOSE:**

Rotate an image clockwise or counterclockwise.

**PROMPTS:**

2P (2 points); 2P (2 points)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

LB, SQRBOX, =/LANG (ROTAT MENU)

LB reactivates the last box used. SQRBOX limits the defined area to a square. =/LANG reactivates the last angle used. These commands are prefixes and must be pressed before you initiate the TURN command.

**PROCEDURE:**

1. Press TURN.
2. Press two diagonal corners to define the image to be turned.  
  
A box encloses the area and a vertical line crosses its center. The prompt asks for two points.
3. Press down briefly and a flashing line appears with one end attached to the center point, the other following the cursor. Use this line to set the angle of rotation. Moving the cursor some distance from the centerpoint will give you better control of this line.  
  
A box, which varies in size as you move the cursor, shows the screen area that will be needed to turn the image. The angle of rotation, ranges from 90 degrees to  $-90$  degrees.
4. Position the line to set the angle for rotation and press down to rotate the image.  
  
To relocate the first corner of the box before selecting the second corner, move the cursor into the menu. Then return to the image and reselect the first corner.

---

**EFFECTS:**

The image will rotate according to the selected angle.

A image rotated with TURN extends beyond its original screen area. The command uses the rectangular area behind the TURNed image to make the change, and any work previously on that area of the screen will be lost. This larger rectangle is retained as the "Last Box".

**RELATED COMMANDS:**

ROT/NW (ROTAT MENU)

ROT/NW is similar to TURN. However, a TURNed image may extend beyond its original screen area, while a ROTated image may not. Also, an image can TURN only around its own center, but it can ROTate around any centerpoint you select.

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**COMMAND:** XB/LB

**PURPOSE:**

Remove from the screen or restore to the screen the last box used for delineating a screen area.

OR

Reactivate for the next command the last box used.

**PROMPT:**

LB (last box)

**EXIT:**

none needed

NOTE: To *cancel* LB—so the last box is *not* reactivated for the next command—glide the pen to the right side of the tablet.

**PROCEDURE:**

1. Press XB.

OR

1. Press LB.

**EFFECTS:**

XB removes the previous delineating box from the screen. Press again, and the box reappears. A box restored through XB acts only as a visual reminder.

LB reactivates for the next command the screen area last used. This allows you to enact further commands in the exact same screen area previously used.

The LB command is active as long as LB appears in the Prompt Box. That is, if you press LB and then press XB, the box will disappear from the screen but the prompt will remain, indicating that the next command will be carried out in that area of the screen.

To remove a delineating box from the screen, you must use XB before creating another box. If another box is created, the box already onscreen becomes part of the image. That is, XB and LB affect only the box most recently created.

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**RELATED COMMANDS:**

ERASE (PENS MENU)

REMOVE (FILLS MENU)

A box that has inadvertently become part of the image can be removed with ERASE or REMOVE. (Note, however, that if the box was drawn over other colors, a negative of the box will remain, since ERASE and REMOVE work by applying background color over the color being removed.)

**COMMAND:** L-CNTR (last center)

**PURPOSE:**

Reactivate the centerpoint last used.

**PROMPTS:**

none

**EXIT:**

Initiate the next command, or cancel L-CNTR by gliding the pen to the right side of the tablet.

**PROCEDURE:**

1. Press L-CNTR.

L-CNTR is a prefix and must be pressed before you initiate the command that will use it.

**EFFECTS:**

L-CNTR puts a temporary mark at the last centerpoint used and activates it for the next command. (A command that follows L-CNTR will not ask for the CTR since the point is already selected; it will proceed to the next prompt or to execution.)

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**COMMAND:** =/LANG (last angle)

**PURPOSE:**

Select for the next command the rotation angle last used.

**PROMPTS:**

none

**EXIT:**

Initiate the next command, or cancel =/LANG by gliding the pen to the right side of the tablet.

**PROCEDURE:**

1. Press over LANG.

OR

1. Press over =

LANG reactivates the last angle used.

= activates the opposite of the last angle. (That is, if the last angle was 50 degrees, pressing = will make the next angle - 50 degrees; if the previous angle was - 50 degrees, the next angle after = will be positive.)

=/LANG is a prefix for ROT/NW or TURN, and it must be pressed before you initiate the command that will use it.

**EFFECTS:**

If you pressed LANG, the next command will use the same angle previously used. If you pressed =, the next command will use an angle with the opposite sign of the previous angle. (A command that follows =/LANG will not give the line that allows you to set the angle, since the angle was preselected; it will proceed to execution.)

---

**COMMAND:** SQRBOX (square box)

**PURPOSE:**

Limit the defined area of the next command to a square.

**PROMPTS:**

none

**EXIT:**

Initiate the next command or cancel SQRBOX by gliding the pen to the right side of the tablet.

**PROCEDURE:**

1. Press SQRBOX.

SQRBOX is a prefix and must be pressed before you initiate the command that will use it.

**EFFECTS:**

In the next command for altering an image, the defined area will be limited to a square. As you select corners to define the image, the box following the cursor will always have the same number of pixels horizontally as vertically.

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## Scale Menu

>SCALE<	XY-SCL	TAPER	PERSP	
XB/LB	L-CNTR			

The SCALE MENU has commands for rescaling and tapering images. It permits 3D manipulations by allowing you to put an image into perspective according to a centerline and vanishing point selected by you.

**COMMAND:** XY-SCL (scale)

**PURPOSE:**

Enlarge or reduce the scale of an image horizontally, vertically or in both directions.

**PROMPTS:**

2P (2 points); VTX (vertex)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

LB (SCALE MENU)

LB reactivates the last box used.

**PROCEDURE:**

1. Press XY-SCL.
2. Press two diagonal corners to define the image to be rescaled.

The prompt VTX asks for a vertex, or corner.

3. Put the cursor near a corner of the box and press briefly.

As you glide the pen, the corner you pressed will follow the cursor, while the opposite corner remains stationary.

4. Set the box to the desired size and press down.

**EFFECTS:**

The image will be enlarged or reduced according to the selected size. The rectangular screen area occupied by the rescaled image will be retained as the "Last Box."

**RELATED COMMAND:**

ZOOM (MOVES MENU)

ZOOM in the MOVES MENU allows you to double or to halve the image size in either direction, whereas XY-SCL lets you adjust scale freely. An image enlarged with ZOOM can always be returned to its original size with no distortion; for an image enlarged with XY-SCALE, this is not possible.

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**COMMAND:** TAPER**PURPOSE:**

Taper an image horizontally or vertically.

**PROMPTS:**

2P (2 points); H?V (horizontal or vertical?); CTR (center); VTX (vertex)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

LB, L-CNTR (SCALE MENU)

LB reactivates the last box used. L-CNTR reactivates the last center.

**PROCEDURE:**

1. Press TAPER.
2. Press two diagonal corners to define the image to be tapered.

The prompt H?V asks whether you want to use a horizontal centerline of convergence or a vertical one.

3. For a horizontal centerline, press down anywhere on the tablet and move the pen sideways, then release pressure; for a vertical centerline, press and move up or down, then release pressure.

A horizontal or vertical line appears and follows the cursor.

4. Position this centerline and press down. (To put the line in the exact center of the defined area, press down anywhere in the menu. You may, however, locate the centerline outside the defined image.)

The prompt asks for a vertex (VTX), or corner.

5. Put the cursor near a corner of the box and press down.

A rubberbanding box appears with two adjacent corners following the cursor, while the opposite corners remain attached.

6. Adjust the box to the desired dimensions and press down to taper the image.

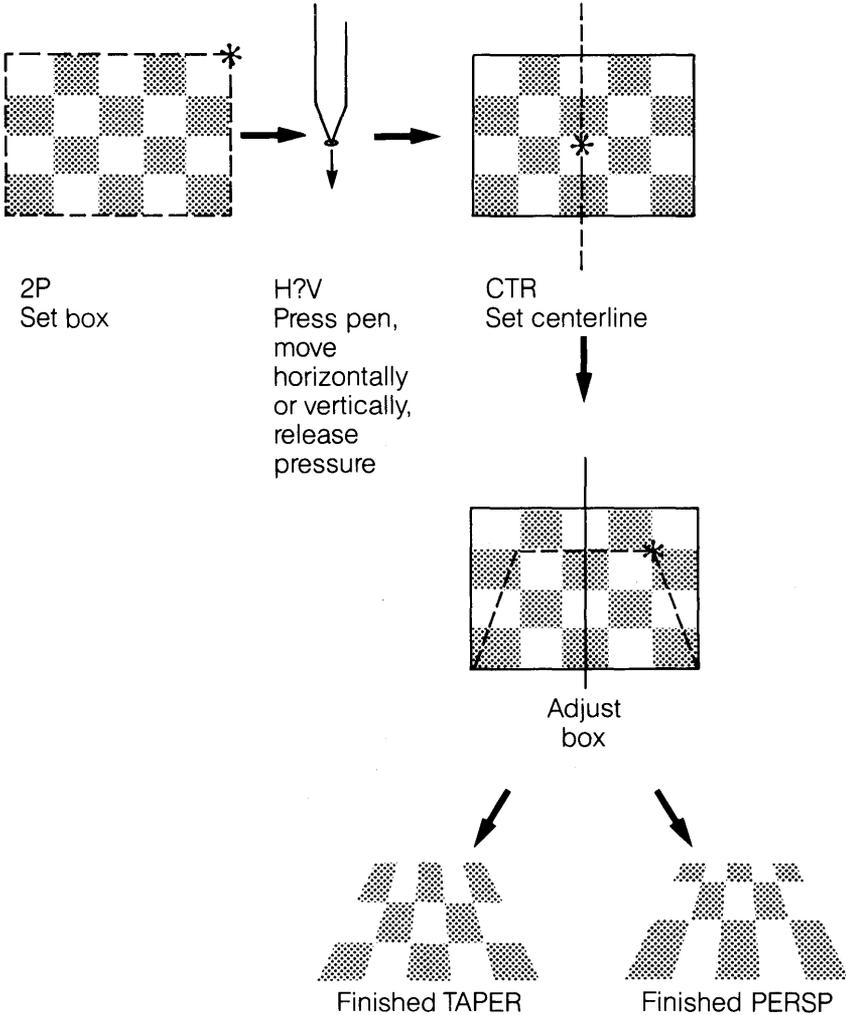
To make any changes before step 6—reselect horizontal or vertical, reposition the centerline of convergence, or rechoose a vertex—cancel the command by gliding the pen to the right side of the tablet. Then initiate TAPER again.

*continued on next page*

TAPER, *cont.*

**EFFECTS:**

The image will taper according to the selected size.



TAPER makes an image narrower in the chosen direction by increasing or reducing the number of pixels in each line perpendicular to the centerline.

PERSPective uses a formula that changes the relative number of pixels throughout the image, so that the wider side of the image appears closer to the viewer.

---

If the tapered image is larger than the original, the command will use the larger rectangular screen area to make the change and will destroy any imaging already there.

The rectangular screen area occupied by the tapered image will be retained as the "Last Box."

---

**COMMAND:** PERSP (perspective)

**PURPOSE:**

Put an image into horizontal or vertical perspective.

**PROMPTS:**

2P (2 points); H?V (horizontal or vertical?); CTR (center); VTX (vertex)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

LB, L-CNTR (SCALE MENU)

LB reactivates the last box used. L-CNTR reactivates the last center.

**PROCEDURE:**

1. Press PERSP.
2. Press two diagonal corners defining the image to be put into perspective.

The prompt H?V asks whether you want to use a horizontal centerline of convergence or a vertical one.

3. For a horizontal centerline, press down anywhere on the tablet and move the pen sideways, then release pressure; for a vertical centerline, press and move the pen up or down, then release pressure.

A horizontal or vertical line appears and follows the cursor.

4. Position this centerline and press down. (To put the line in the exact center of the defined area, press down anywhere in the menu. You may, however, put the centerline of convergence outside the defined image area.)

The prompt asks for a vertex, or corner.

5. Put the cursor near a corner of the box and press down.

A rubberbanding box appears with two adjacent corners following the cursor as you move the pen, while the opposite corners remain attached. The flashing dot along the centerline represents the vanishing point.

---

6. Adjust the box to the desired dimensions and press down to put the image in perspective.

To make any changes before step 6—reselect horizontal or vertical, reposition the centerline of convergence, or rechoose a vertex—cancel the command by gliding the pen to the right side of the tablet. Then initiate PERSP again.

**EFFECTS:**

The image will be put into perspective according to the selected size.

The rectangular screen area occupied by the changed image will be retained as the “Last Box.”

**RELATED COMMAND:**

TAPER (SCALE MENU)

PERSPective is somewhat similar to TAPER, but they are not the same.

TAPER primarily increases or reduces the relative number of pixels in each line perpendicular to the centerline; PERSPective uses a formula that changes the relative number of pixels throughout the image, so that the wider side of the image appears closer to the viewer. (See page 12-34 for an illustration of these two commands.)

---

**COMMAND:** XB/LB

**PURPOSE:**

Remove from the screen or restore to the screen the last box used for delineating a screen area.

OR

Reactivate for the next command the last box used.

**PROMPT:**

LB (last box)

**EXIT:**

none needed

NOTE: To *cancel* LB—so the last box is *not* reactivated for the next command—glide the pen to the right side of the tablet.

**PROCEDURE:**

1. Press XB.

OR

1. Press LB.

**EFFECTS:**

XB removes the previous delineating box from the screen. Press again, and the box reappears. A box restored through XB acts only as a visual reminder.

LB reactivates for the next command the screen area last used. This allows you to enact further commands in the exact same screen area previously used.

The LB command is active as long as LB appears in the Prompt Box. That is, if you press LB and then press XB, the box will disappear from the screen but the prompt will remain, indicating that the next command will be carried out in that area of the screen.

To remove a delineating box from the screen, you must use XB before creating another box. If another box is created, the box already onscreen becomes part of the image. That is, XB and LB affect only the box most recently created.

---

**RELATED COMMANDS:**

ERASE (PENS MENU)

REMOVE (FILLS MENU)

A box that has inadvertently become part of the image can be removed with ERASE or REMOVE. (Note, however, that if the box was drawn over other colors, a negative of the box will remain, since ERASE and REMOVE work by applying background color over the color being removed.)

**COMMAND:** L-CNTR (last center)

**PURPOSE:**

Reactivate for the next command the centerpoint last used.

**PROMPTS:**

none

**EXIT:**

Initiate the next command, or cancel L-CNTR by gliding the pen to the right side of the tablet.

**PROCEDURE:**

1. Press L-CNTR.

L-CNTR is a prefix and must be pressed before you initiate the command that will use it.

**EFFECTS:**

L-CNTR marks the last centerpoint used and activates it for the next command. (A command that follows L-CNTR will not ask for the CTR since the point is already selected; it will proceed to the next prompt or to execution.)

## Anim Menu

>ANIM <	CYCLE			

The ANIM MENU gives access to menus used for animation.

## Cycle Menu

>CYCLE<	MAP	BRUSH		GO

The CYCLE MENU has commands for producing animation effects through color changes. When a sequence of colors is activated through the GO command, the red, green and blue values of each color are passed to the color in the next position in the palette. Thus, a line drawn with the colors in their palette sequence will appear to move.

In using this menu, the usual order of commands would be:

1. MAP—to choose the range of colors
2. BRUSH—to draw an image with a brush that automatically uses the range of colors selected in MAP.
3. GO—to animate the picture

When a BRUSH line is activated by the GO command, it seems to move in the direction in which drawing took place. A spiral drawn from the outside in will appear to move inward. Two lines drawn in opposite directions from a common point will appear to flow out of that point.

Colors composing the line affect the apparent movement. A BRUSH line composed of many colors moves more slowly when cycled than a line composed of few colors. A line drawn with only two colors will appear to shimmer rather than “move along”.

### Related Menus

COLOR MENU (television)

PALET MENU (monitor)

Changing colors in the palette expands the possibilities of the CYCLE MENU.

Cycling can create the effect of movement through space. For example, draw six circles in a line from top to bottom of the screen, using six colors in sequence, one color for each circle. Then change colors 2 through 6 to background color, using C/L in the COLOR MENU (television) or CHANGE in the PALET MENU (monitor). Now return to the CYCLE MENU. Press MAP and select colors 1 and 6. Then press GO. It should appear that a circle is falling from the top of the screen.

---

COLOR MENU (television)

PALET MENU (television)

For an apparition, draw something in the middle of the blank screen, using color 9. Then use L, in C/L of the COLOR MENU, to change colors 1 and 15 to background. Then TINT between colors 2 and 9 and between colors 9 and 15. Then press GO. Your drawing will gradually appear and disappear.

**COMMAND:** MAP

**PURPOSE:**

Select a range of colors to be used by BRUSH or GO.

**PROMPTS:**

2C (2 colors)

**EXIT:**

Initiate another command.

**PROCEDURE:**

1. Press MAP.
2. Press two colors, the first and last in the range of colors to be cycled.

The colors may be chosen from the palette or from the image, but selecting from the palette lets you see exactly which colors fall within the range.

If you want future color cycling to take place against a constant background, do not include background color (palette position 0) in your MAP sequence.

**EFFECTS:**

MAP determines the set of colors for a subsequent BRUSH or GO command. There is no visible effect until one of those commands is used.

---

**COMMAND:** BRUSH

**PURPOSE:**

Enable drawing with a paint color which is composed of a range of colors chosen through the MAP command.

**PROMPTS:**

none

**EXIT:**

Initiate another command.

**PRELIMINARY COMMAND:**

MAP (CYCLE MENU)

Use MAP to select the range of colors used by BRUSH. (Otherwise, BRUSH will use the colors last chosen.)

**PROCEDURE:**

1. Press BRUSH. Then move into the image area and press while drawing.

**EFFECTS:**

In a BRUSH line, all colors in the palette between the two colors chosen through the MAP command appear in succession. A slow movement of the pen gives overlapping patches of the colors. A rapid movement gives the sequential color patches with space between.

**RELATED COMMANDS:**

CHANGE SIZE (Status Box)

Change the size of BRUSH through the Status Box at any time.

---

**COMMAND:** GO

**PURPOSE:**

Actively cycle the range of colors determined under the MAP command.

**PROMPTS:**

none

**EXIT:**

Press down with the pen anywhere on the tablet.

**PRELIMINARY COMMAND:**

MAP (CYCLE MENU)

Use MAP to select the range of colors cycled. (Otherwise, GO will use the colors last chosen.)

**PROCEDURE:**

1. Press GO.

**EFFECTS:**

All colors on the screen which fall within the range chosen through MAP shift to the position on their right in the palette. The movement repeats until the command is exited.

**RELATED COMMANDS:**

COPY (PALET MENU)

Portions of the screen image not drawn by BRUSH will also be affected by GO if their colors fall within the MAP range. If this effect is undesirable, use COPY in the PALET MENU to copy a range of colors from one area of the palette to another. You may want to use the colors in palette positions 1 through 4 for cycle brush drawing as well as in parts of the image not meant to be cycled. Copying colors 1 through 4 into positions 5 through 8 will give you separate sets of colors that are visually the same. One sequence can be designated for cycling, the other can remain for normal use.

# Cells Menu

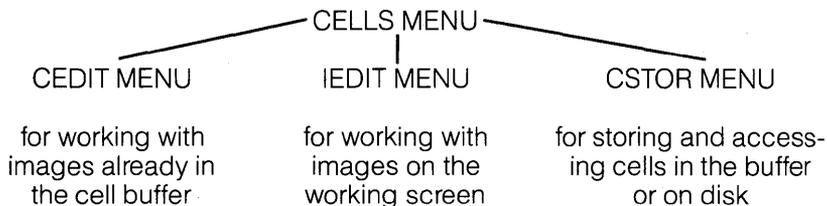
>CELLS<	IEDIT	SWAP		
CSTOR	CEDIT	VIEW		

A cell is a defined area of the cell buffer.

The cell buffer can be thought of as a separate screen used only for storing images. That is, you can put images into it (as cells), retrieve images from it, and manipulate images in it (by moving or copying, for example). But you create the original image on the working screen, since you cannot draw directly on the cell buffer.

The advantage of the cell buffer is that images stored there are more readily accessible than those stored on disk, and images in the buffer can be used in various ways. However, the cell buffer is a “temporary” storage area. Cells that you expect to want in the future should be saved on disk before you exit Lumena.

The general arrangement of the cells menus is this:



The CEDIT and the IEDIT MENUS have the same commands. If you want to manipulate images on the working screen, use the IEDIT (Image Edit) MENU. If you want to manipulate images already in the cell buffer, use the CEDIT (Cell Edit) MENU. When you exit either menu, the changes that you have just made are copied into the cell buffer.

---

VIEW, in the CELLS MENU, allows you to look at the cell buffer and then return to the working screen.

SWAP, in the CELLS MENU, lets you exchange the image content of the cell buffer for that of the working screen, keeping the screens independent but allowing you to draw on either screen alternatively.

## Some Uses of the Cell Buffer



### Custom Brushes

Design brushes of any shape and number of colors, and hold them for ready access in the Cell Buffer. The entire contents of the buffer can be stored on disk as a single file, so all brushes may be stored together.



### Pattern Design

After making one unit of a design, create adjoining copies of it by using DUP in the CEDIT MENU. Then reorient individual cells horizontally or vertically, using REFLCT, to try out different arrangements. Several cells can be merged together, through MRG/\*, and accessed as a single cell.



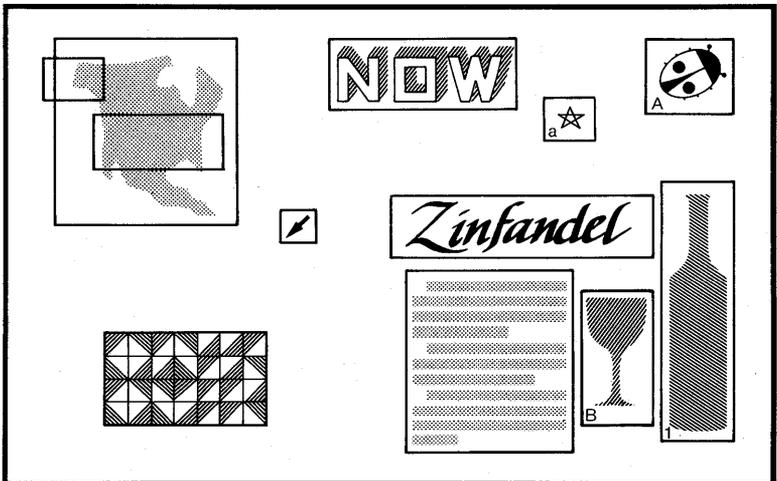
### Shadows

Images in cells can be given shadows, through COPY/\$ in the CEDIT/IEDIT MENU.



### Parts of a Whole

Cells can be used to bring to the screen parts of a larger image. The cells may overlap. Each cell contains whatever image falls within its boundaries, but the outlines of its own cell or of other cells do not appear on the working-screen image.



## Value of Naming Cells

It is not necessary to name a cell. Any image can be stored in a cell and retrieved from the buffer, whether or not the cell has a name.

However, naming a cell lets you bring it to the screen from any menu at a press of the pen. What the cell is named determines the properties of the image brought to the screen. (See NAME in the CEDIT/IEDIT MENU for the procedure for naming cells and accessing named cells.)



a-z = brush

Cells named with lower-case letters do not carry background and can be used as brushes.



A-Z = movable

Cells named with upper-case letters can move over any background. To bring the cell to the screen once the cell name is in the Status Box, press once anywhere on the tablet. The cell image will then take the place of the cursor, following the movement of the digitizing pen as you glide it on the tablet. To set the image, press down. Lifting the pen off the tablet breaks the connection and returns you to the cursor.

Cells named with upper-case letters can be used for animation. When such a cell is accessed through the Status Box, its image will appear to move onscreen as you move the digitizing pen.



Upper-case cells can also be used for rearranging elements onscreen—in planning the placement of furniture in a room or preparing a display ad, for example—since the components can be easily repositioned.



Such a cell can also be used as a pointer, appearing only when the pen is touching the tablet.



1-9 = carries background

Cells named with numbers can be used as brushes that carry background (color 0).

---

## Temporary Storage

The Cell Buffer is also handy for temporary storage of a full-screen image. You can put the current image into the buffer and continue working on the picture. Should your further work be unsatisfactory, you can call back the earlier version.

Storing in the Cell Buffer is faster than saving on disk, but the Cell Buffer is only a temporary holding place. For permanent storage, save pictures and cells on disk before exiting Lumena. (Save cell information through SAVE in the CSTOR MENU and images through RSAVE or PSAVE in the DISK MENU.)

**COMMAND:** SWAP

**PURPOSE:**

Exchange images between the working screen and the cell buffer.

**PROMPTS:**

none

**EXIT:**

none needed

**PROCEDURE:**

1. Press SWAP.

**EFFECTS:**

The image in the cell buffer comes to the working screen and the onscreen image goes to the cell buffer. The two images can be worked on independently, since SWAP does not affect the contents of either.

**RELATED COMMANDS:**

VIEW (CELLS MENU)

Use VIEW to display the cells (as well as the image) in the cell buffer. Unlike SWAP, VIEW does not allow you to work on the images in the cell buffer but merely displays them.

CSTOR MENU

Use commands in the CSTOR MENU to move images between the cell buffer and the working screen.

---

**COMMAND:** VIEW

**PURPOSE:**

View the contents of the cell buffer.

**PROMPTS:**

1P (1 point)

**EXIT:**

Press anywhere on the tablet to return to the working screen.

**PROCEDURE:**

1. Press VIEW.

**EFFECTS:**

The cell and image contents of the cell buffer appear onscreen.

This command does not allow you to change the contents of the cell buffer.

---

## Cedit Menu and Iedit Menu

>CEDIT<	MAKE	REFLECT	MOVE/\$	MRG/ *
	NAME	DUP	COPY/\$	DEL/ *

>IEDIT<	MAKE	REFLECT	MOVE/\$	MRG/ *
	NAME	DUP	COPY/\$	DEL/ *

The CEDIT MENU (Cell Edit) and IEDIT MENU (Image Edit) have commands for creating and manipulating cells in the cell buffer. The difference between the two menus is that CEDIT works with images already in the buffer while IEDIT works with images currently on the working screen.

When you enter the CEDIT MENU by pressing any command, the image on the working screen is put in a temporary storage buffer and the cell buffer becomes visible. An abbreviation of the active command appears in the Prompt Box. You can go from one command to another in the menu by just pressing the appropriate command name.

When you exit the CEDIT MENU by pressing in the Prompt Box, the changes you have just made are sent to the cell buffer, and the picture onscreen when you entered CEDIT returns to the screen. (The contents of the cell buffer before you entered CEDIT are lost.)

When you enter the IEDIT MENU by pressing any of its commands, the image currently onscreen is copied into the cell buffer and the cell buffer—cells and images—becomes visible. An abbreviation of the active command appears in the Prompt Box. You can go from one command to another in the menu by just pressing the command.

When you exit the IEDIT MENU by pressing in the Prompt Box, the images on the visible screen are sent to the cell buffer, and the picture that was onscreen when you entered IEDIT returns to the screen. (The contents of the cell buffer before you entered IEDIT are lost.)

---

**COMMAND:** MAKE

**PURPOSE:**

Make a cell.

**PROMPT:**

MAK

**EXIT:**

Select another command or press in the Prompt Box.

**PROCEDURE:**

1. Press MAKE.
2. Select diagonal corners to define the image to be enclosed in a cell.

**EFFECTS:**

The selected image is enclosed in a cell.

---

**COMMAND:** REFLCT (reflect)

**PURPOSE:**

Reflect a cell top to bottom or left to right.

**PROMPT:**

H?V (horizontally or vertically?)

**EXIT:**

Select another command or press in the Prompt Box.

**PROCEDURE:**

1. Press REFLCT.

The cell outlines are briefly displayed, then disappear, leaving only the images onscreen. The prompt H?V asks whether you want to reflect a cell horizontally or vertically.

2. Press down in the cell you want to reflect and, keeping the pen depressed, stroke sideways to reflect horizontally, or stroke up or down to reflect vertically.

When you release pressure, the cell will reflect.

You may reflect any number of cells; the command is active until you exit.

**EFFECTS:**

Each selected cell is reflected sideways or upside down in its same space.

Since the cell outlines are not displayed, this command can be used for simple animation.

---

**COMMAND:** MOVE/\$ (move/shift)

**PURPOSE:**

Move a cell and its contents to a selected location.

OR

Shift a cell a specific number of pixels in a selected direction.

**PROMPTS:**

MOV (move); MSH (move shift)

**EXIT:**

Select another command or press in the Prompt Box.

**PROCEDURE:**

1. Press MOVE.
2. Press inside the cell to be moved.

A temporary cell will follow the cursor as you glide the pen.

3. Select the new location for the cell and press down.

OR

1. Press over the \$.

MSH (move shift) appears in the Prompt Box and \$, preceded by a number, appears in the Status Box. That number, multiplied by 2, is the number of pixels the cell will be shifted.

2. To change the number of pixels for the shift, press and move the pen left as you would do to change brush size.
3. Press inside the cell to be shifted and glide the pen in any of eight directions—horizontally, vertically or diagonally.

A temporary box shows the cell's new location, moved in the direction of the cursor's movement and offset from the original according to the number in the Status Box.

4. Press down to shift the cell.

**EFFECTS:**

The cell moves the selected number of pixels in the chosen direction.

---

**COMMAND:** MRG/\* (merge)

**PURPOSE:**

Merge two cells.

OR

Merge several cells and clear away outlines of cells falling within the new cell.

**PROMPTS:**

MRG (merge); OK?; CLR (clear)

**EXIT:**

Select another command or press in the Prompt Box.

**PROCEDURE:**

1. Press MRG.
2. Press inside the two cells to be merged.

OR

1. Press over the\*.
2. Press inside the two outermost cells of those to be merged.

The two cells are joined, and OK? appears in the Prompt Box.

3. Press OK? in the Prompt Box to retain the new cell and clear away outlines of all cells that are wholly within the cell just created.

(After you press OK, the prompt CLR will appear, indicating that the "clear" or "\*" mode of the merge command is still active. You may continue to merge groups of cells, select another command, or exit by pressing in the Prompt Box.)

**EFFECTS:**

Two selected cells are merged, with the new cell taking the name of the second cell pressed.

OR

Two selected cells are merged and all cells falling wholly within the new cell are deleted. The new cell takes the name of the second cell pressed.

The \* option of MRG is useful for joining together a set of duplicated cells.

---

**COMMAND:** NAME

**PURPOSE:**

Name a cell.

**PROMPT:**

NAM

**EXIT:**

Select another command or press in the Prompt Box.

**PROCEDURE:**

1. Press NAME.

C appears in the Status Box, preceded by a character. This character is the name for the next cell pressed, unless you choose a different name, as described in step 2.

2. To select a name for a cell, press the character in the Status Box and move the pen left. All the characters and symbols from the keyboard will appear in succession. To select a character, release pressure on the pen.
3. Press inside each cell to be named.

**EFFECTS:**

As each cell is pressed, it is labeled in the lower left corner with the character in the Status Box; that character then advances by one in preparation for naming the next cell.

If the cell you press already has a name, the new name will replace it. If another cell is already named with the character in the Status Box, the cell you press will get that name and the name will be removed from the other cell (so that two cells in the buffer do not have the same name).

Cells can be called to the working screen by name.

From the Status Box of any menu, press over the mode letter and move the pen left to call up the mode C; then press the character to the left of the C and move the pen to call up the name of the particular cell.

Cells named with lower-case letters do not carry background color and can be used as custom brushes.

Cells named with upper-case letters follow the movement of the digitizing pen and can be used for animation. Pressing the pen deposits the image. Lifting the pen off the tablet returns you to the cursor.

*continued on next page*

---

NAME, *cont.*

Cells named with numbers carry background color.

See opening pages of the CELLS MENU for further discussion.

**RELATED COMMANDS:**

C (Status Box/PENS MENU)

C in the Status Box stands for either Character (a drawing mode in the PENS MENU) or Cell. If there is no cell currently in the buffer with a given name, the character itself will be deposited; if there is a cell in the buffer with that name, the image in that cell will be deposited each time the pen is pressed.

---

**COMMAND:** DUP (duplicate)

**PURPOSE:**

Duplicate a cell repeatedly to fill a defined area.

**PROMPT:**

DUP

**EXIT:**

Select another command or press in the Prompt Box.

**PROCEDURE:**

1. Press DUP.
2. Press once inside the cell to be duplicated, then glide the pen toward the top and right of the screen.

As you glide the pen, a box attached to the lower left corner of the cell follows the cursor, showing the screen area that will be covered by the duplicate cells.

3. Adjust the box, then press down to duplicate the cell.

**EFFECTS:**

Duplicates of the selected cell fill the designated screen area.

DUP does not carry background color, so duplicated cells will appear to be "on top of" images they cross. (And whatever images are within a cell's boundaries are part of that cell. If this overlapping effect is not desirable, clear the space of images before using DUP.)

Duplicated cells do not carry the name of the original.

---

**COMMAND:** COPY/\$ (copy/shadow)

**PURPOSE:**

Copy a cell and its contents.

OR

Create a shadow for a cell.

**PROMPTS:**

COPY (copy); 1C (1 color); CSH (copy shadow)

**EXIT:**

Select another command or press in the Prompt Box.

**PROCEDURE:**

1. Press COPY.
2. Press inside the cell to be copied.

A temporary cell will follow the cursor as you glide the pen. (For small cells, the temporary mode will include the image in the cell.)

3. Position the cell and press down to copy it.

OR

1. Press over the \$.
2. Press the color that the shadow should be.

\$, preceded by a number, appears in the Status Box. The number in the Status Box, multiplied by 2, is the number of pixels the shadow will be offset from the original.

3. To change the number in the Status Box, press briefly over the number, then press down again and move the pen left, releasing pressure when the appropriate number appears. The range is from 1 to 8.
4. Press inside the cell to be shadowed and glide the pen in any of eight directions—horizontally, vertically or diagonally.

A shadow cell will follow the direction of the cursor movement, being offset from the original according to the number in the Status Box.

---

5. Press down to make the shadow cell.

CPY or CSH will remain in the Prompt Box until you press another command or exit the menu. Thus you can copy or shadow any number of cells in succession. You can change the number in the Status Box whenever you wish.

If you want to change the shadow color for the next cell, press \$ again and choose another color.

**EFFECTS:**

The selected cell is copied in the chosen location.

OR

A shadow of a cell is made a specified number of pixels in the designated direction. The image in the shadow cell appears in the selected color.

Copied cells do not carry the name of the original.

**RELATED COMMANDS:**

MRG (CEDIT/IEDIT MENU)

Use MRG to join the shadow cell to the original, so you can access both as a single cell.

DUP (CEDIT/IEDIT MENU)

Use DUP to make multiple, contiguous copies of a cell.

---

**COMMAND:** DEL/\* (delete)

**PURPOSE:**

Delete a cell.

OR

Delete all cells in the buffer.

**PROMPT:**

DEL

**EXIT:**

Press another command or press in the Prompt Box.

**PROCEDURE:**

1. Press DEL.
2. Press inside each cell to be deleted.

OR

1. Press over the \*.
2. Press OK? in the Prompt Box.

**EFFECTS:**

Each cell is deleted as it is pressed.

OR

All cells are cleared from the buffer.

These commands delete only cell outlines in the buffer. They do not affect images within the cells.

**RELATED COMMANDS:**

SWAP (CELLS MENU)

To clear *images* from the cell buffer, use SWAP in the CELLS MENU to bring the image contents of the cell buffer to the working screen; then ZAP the image and press SWAP again to send a blank screen to the buffer.

---

## Cstor Menu

>CSTOR<	PUTBUF	PUTCEL	TRIM	SAVE
	GETBUF	GETCEL	MARK	LOAD

The CSTOR MENU (Cell Store) governs storing and retrieving cell information in the cell buffer and on disk.

---

**COMMAND:** PUTBUF

**PURPOSE:**

Copy into the cell buffer the contents of the working screen.

**PROMPTS:**

OK?

**EXIT:**

none needed

**PROCEDURE:**

1. Press PUTBUF.

The prompt asks OK? because the images in the buffer will be replaced by the contents of the working screen.

2. Press OK? in the Prompt Box.

**EFFECTS:**

The working screen is copied into the cell buffer. Images previously in the cell buffer are lost, though the cell outlines remain.

---

**COMMAND:** PUTCEL

**PURPOSE:**

Copy an image from the working screen into the cell buffer.

**PROMPTS:**

3P (3 points)

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

C (Status Box)

To specify the name for the cell being put into the buffer, call up C in the Status Box and choose a character. (See NAME in the CEDIT/ IEDIT MENU for the significance of different names.)

**PROCEDURE:**

1. Press PUTCEL.

2. Press two diagonal points to define the image to be copied into the cell buffer.

The cell buffer is displayed, and a ghost of the new cell follows the cursor, allowing you to position the cell.

3. Position the cell and press down. (To put the cell in the same position on the cell buffer screen that it occupies on the working screen, glide the pen into the menu, then press down.)

**EFFECTS:**

The selected image is copied to the cell buffer as a named cell, and you are returned to the working screen.

---

**COMMAND:** TRIM

**PURPOSE:**

Copy the working screen into the cell buffer, trimming away what is outside the cells.

**PROMPTS:**

OK?

**EXIT:**

none needed

**PROCEDURE:**

1. Press TRIM.

The prompt asks OK? because the images in the cell buffer will be lost.

2. Press OK? in the Prompt Box.

**EFFECTS:**

The working screen is copied into the cell buffer, with imaging outside the cells trimmed away. Previous image contents of the cell buffer are lost.

---

**COMMAND:** SAVE

**PURPOSE:**

Save cell information in the buffer to a disk file.

**PROMPTS:**

SAV

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

Use the 1-9 command to type into the filenames menu the name under which the cell information will be saved.

**PROCEDURE:**

1. Press SAVE.

The menu of filenames appears at the bottom of the screen.

2. Press the name under which the cell information will be saved.

**EFFECTS:**

Cell information in the buffer is saved in a disk file. (This command does not save images in the buffer.)

**RELATED COMMANDS:**

GETBUF (CSTOR MENU)

PSAVE, RSAVE (DISK MENU)

To save images in the cell buffer, bring the images to the working screen with GETBUF, then use RSAVE or PSAVE in the DISK MENU. (Image and cell information can be saved under the same name, since images are stored in a .PIX file and cells are stored in a .CEL file.)

---

**COMMAND:** GETBUF

**PURPOSE:**

Copy onto the working screen the images in the cell buffer.

**PROMPT:**

OK?

**EXIT:**

none needed

**PROCEDURE:**

1. Press GETBUF.

The prompt asks OK? as a warning, because the onscreen image will be lost when replaced by the image from the buffer.

2. Press OK? in the Prompt Box.

**EFFECTS:**

Image contents of the cell buffer are copied onto the working screen. Previous contents of the working screen are lost.

---

**COMMAND:** GETCEL

**PURPOSE:**

Copy a cell in the buffer onto the working screen.

**PROMPTS:**

2P (2 points)

**EXIT:**

none needed

**PROCEDURE:**

1. Press GETCEL.

The cell buffer is displayed.

2. Press inside the cell to be brought to the working screen.

The working screen is then displayed, with the selected cell following the cursor.

3. Position the cell and press down to set it.

NOTE: To put the cell in the same position on the working screen that it occupies in the buffer, glide the pen into the menu, then press down.

**EFFECTS:**

The selected cell is copied to the working screen.

**RELATED COMMANDS:**

NAME (CEDIT/IEDIT MENU)

Cells can also be brought to the screen as brushes. For details, see the NAME command in the CEDIT/IEDIT MENU.

**COMMAND:** MARK

**PURPOSE:**

Copy onto the working screen the contents of the cell buffer with the cells visible, or marked.

**PROMPTS:**

OK?

**EXIT:**

none needed

**PROCEDURE:**

1. Press MARK.

The prompt asks OK? because the image on the working screen will be lost when it is replaced by the image from the cell buffer.

2. Press OK? in the Prompt Box.

**EFFECTS:**

The image and cell contents of the cell buffer are copied onto the working screen. Previous contents of the working screen are lost.

Pressing MARK a second time removes the cell outlines, leaving only the images onscreen.

---

**COMMAND:** LOAD

**PURPOSE:**

Load cell outlines from a disk file to the cell buffer.

**PROMPTS:**

LOD

**EXIT:**

none needed

**PRELIMINARY COMMANDS:**

1-9 (KEYBOARD COMMANDS)

If necessary, type into the filenames menu the name under which the cell information was saved.

**PROCEDURE:**

1. Press LOAD.

The menu of file names appears at the bottom of the screen.

2. Press the file to be loaded.

**EFFECTS:**

The selected cell file is loaded into the cell buffer, replacing any cell information previously in the buffer. The cell buffer is not displayed.

This command loads only cell information, not images.

**RELATED COMMANDS:**

LOAD (DISK MENU)

Use LOAD in the DISK MENU to load saved images from a disk file.

---

## Print Menu

>PRINT<	QJ-BIG	QJ-SML		

The PRINT MENU allows printing an image from the screen. The menu displays names of printers that can be used with your system and a size indication. "BIG" is about 9½ by 7½ inches for a full screen image. "SML" is about 7½ by 5½ inches.

To print an image:

1. Press in the box indicating your printer and the size print you want.
2. Press diagonal corners to define the image to be printed.
3. Press OK? in the Prompt Box.

To stop printing before the image is completed, press ESC.

## Fonts Menu

>FONTS<				
PRINT				

The FONTS MENU gives access to menus of fonts and allows printing image or text from the screen.

# Appendix A

---

## Lumena Hardware Configuration

Lumena works with a number of digitizing tablets.

For the Summagraphics Bit Pad One or the GTCO Digi-Pad 5, the following equipment is necessary:

1. Serial input port
2. Three-wire RS-232-C cable
3. Summagraphics Bit Pad One  
or  
GTCO Digi-Pad 5

Both the digitizing tablet and the serial interface should be set for 9600 baud, binary (not ASCII) data.

---

### Summagraphics Bit Pad One

Remove the bottom of the digitizing tablet to expose the printed circuit board. Set switches SW-2 and SW-3 as shown below. (Switch SW-1, used for calibration, is factory set and its settings should not be changed.)

SW-2		1	2	3	4	5	6				
on		x		x	x	x					
off			x				x				
SW-3		1	2	3	4	5	6	7	8	9	10
on			x								
off		x		x	x	x	x	x	x	x	x

---

## GTCO Digi-Pad 5

Switches are on the underside of the digitizing tablet. The appropriate settings are these:

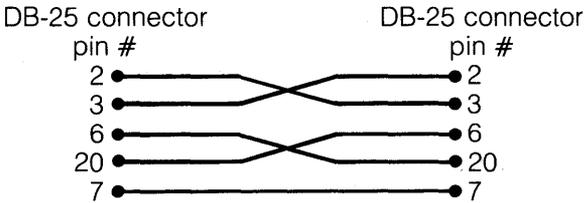
S1		1	2	3	4	5	6	7	8
	on			x	x			x	x
	off	x	x			x	x		
S2		1	2	3	4	5	6	7	8
	on						x		
	off	x	x	x	x	x		x	x
S3		1	2	3	4	5	6	7	8
	on	x		x	x	x		x	
	off		x				x		x

---

## Cable Connecting Tablet to Computer

As a minimum, the following connections must be present in your cable:

COMPUTER	DIGITIZING TABLET
async serial port	Summagraphics Bit Pad 1 output
	or
	GTCO Digi-Pad 5 # 71D4J5




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## Kurta Tablet

For the Kurta tablet, the following equipment is necessary:

1. Serial input port
2. Kurta tablet

Both the digitizing tablet and the serial interface should be set for 9600 baud, binary (not ASCII) data.

---

Switches are at the back of the tablet. The appropriate settings are these:

Upper Set:		1	2	3	4	5	6	7	8
	on						x	x	x
	off	x	x	x	x	x			

Lower Set:		1	2	3	4
	on				x
	off	x	x	x	

If your computer has more than one serial port, plug the tablet into the rightmost serial port (as you face the back of the computer).

# Appendix B

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# Problem Solving

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>WHAT TO DO</b>
no cursor, no menu	file is being saved	wait
	type mode is active	press ESC
	you have exited Lumena	check screen, load Lumena
	digitizing tablet not connected	check connections of tablet, pen, power supply; reset tablet
	a command is executing, though you can't see it (such as shearing a blank area of screen)	press ESC
erratic lines onscreen, more than one cursor	malfunctioning digitizing pen or tablet	reset or replug tablet, check connections, be sure cords are not knotted
file won't load	file is not on current disk, or you spelled it wrong	press L to check filename
	file did not save properly	exit Lumena. Type <i>DIR</i> . If a full-screen picture takes, for example, 2K space, it did not properly save.

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>WHAT TO DO</b>
Lumena won't load	system disk not in drive you are accessing	check directory of current drive
cursor moves onscreen but will not draw	the current color is background color	check Status Box, change color
	a command is pending	check Prompt Box, cancel command or press ESC
	active mode is Erase	check Status Box, change mode
	active mode is Line, Q-line, etc.	check Status Box, change mode
SYM is active and cursor is outside defined area	SYM is active and cursor is outside defined area	check Status Box, change mode
	a command is pending	check Prompt Box, cancel command
cannot select a new color, change menus, etc.	a command is pending	check Prompt Box, cancel command
screen goes blank, no menu and no image	you've loaded a black color map	press X to make menu visible, load or create another map
lines in image appear speckled	you've used commands in the EDGES MENU without first using FADE	use FADE command to restore image
	you've changed color map after using commands in EDGES MENU	use FADE command to restore image
menu has become difficult to read	menu color has been altered	press X key twice to restore menu color
command exits before completion	while in a command, you have moved cursor offscreen on right, canceling command	begin the command again, keeping cursor onscreen

---

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>WHAT TO DO</b>
box is lost before second corner is set	pen was lifted off table between setting of first and second corners	keep pen in contact with tablet
box is lost after second corner is set	pen not depressed long enough in setting second corner (for large box)	depress pen slightly longer for second corner
colors onscreen are distorted, or image vibrates	system set for wrong display mode	press D to set proper display mode
picture will not print	printer has no power	check power cord turn on printer
	printer not connected to computer	check cable between computer & printer
printed picture is distorted	wrong printer selected from menu	select correct printer

---

# Glossary

**AND**—See *BOOLEAN LOGIC*.

**ANIMATION**—apparent movement

**ANTI-ALIASING**—programming that makes jagged lines appear smooth. In Lumena, anti-aliasing functions are performed by commands in the *EDGES MENU* (television).

**BINARY NOTATION** or **BINARY NUMBER SYSTEM**—representation of numbers using only two digits, 0 and 1. In this system, each place has twice the value of the place to its right. Thus:

place value	etc.	← 8	4	2	1	
					1	(= 1)
					1	0 (= 2)
					1	1 (= 3)
				1	0	0 (= 4)
				1	0	1 (= 5)
				1	1	0 (= 6)
						etc.

**BOOLEAN LOGIC** (named after mathematician George Boole)—operations for dealing with information expressed in binary form. Since palette positions in Lumena are expressed as binary numbers, the interaction of any two colors can be based on these logic operations. Six such operations are found in the menu of options offered by several commands (the commands which have “/O” in their names). It is not necessary—and probably not even helpful—to understand these operations in order to use the Lumena commands successfully. This explanation is just for the curious.

*continued on next page*

**BOOLEAN LOGIC, cont.**

In these operations, 1 and 0 represent opposite states—1 may be said to mean “on”, 0 may be said to mean “off”.

In AND, if the first *and* second members in the combination are 1, the result will be 1; all other combinations give 0.

Thus, when the color in position 10	1010
crosses the color in position 9	1001
the resulting color is in position 8	1000

In NAND (not AND), the source color is changed to its binary opposite—1001 becomes 0110—and the digits are combined as in AND.

Thus, when the color in position 10	1010
crosses the color in position 9 (inverted)	0110
the resulting color is in position 2	0010

In OR, if the first *or* second digit is 1, the result will be 1; only 0 + 0 gives 0.

Thus, when the color in position 10	1010
crosses the color in position 9	1001
the resulting color is in position 11	1011

In NOR (not OR), the source color is changed to its binary opposite—1001 becomes 0110—and the numbers are combined as in OR.

Thus, when the color in position 10	1010
crosses the color in position 9 (inverted)	0110
the resulting color is in position 14	1110

In XOR (Exclusive OR), similar digits give 0, and only combinations of different digits result in 1.

Thus, when the color in position 10	1010
crosses the color in position 9	1001
the resulting color is in position 3	0011

In NXOR (not Exclusive OR), the source color is changed to its binary opposite—1001 becomes 0110—and the two numbers are combined as in XOR.

Thus, when the color in position 10	1010
crosses the color in position 9 (inverted)	0110
the resulting color is in position 12	1100

**BOOT** (from “bootstrap”)—load the disk operating system

---

**BUFFER**—temporary storage device. The CELL BUFFER and the buffers accessed through PUT and GET commands are created in software. The FRAME BUFFER is hardware that acts as a buffer between the computer and the monitor, determining the quality of the video image, or frame. It acts as memory to the computer and as a video signal to the monitor.

**COLOR MAPPING**—See *MAPPING*.

**CURSOR**—spot of light on the graphics screen corresponding to the position of the pen on the digitizing tablet

**DEFAULT**—state which the system assumes until a specific instruction is given. For example, the default map is the one which comes to the screen whenever Lumena is loaded.

**DIGITIZE**—convert an analog measurement of quantity to a numeric value. The DIGITIZING PEN AND TABLET convert the position of the stylus to a set of X and Y coordinates, which are then sent to the computer. The VIDEO DIGITIZER converts brightness of the scene before the camera into shades of grey (or colors). The number of shades depends on the colors available in your system.

**DISK**—a magnetic storage medium

**DISK DRIVE**—hardware for accessing disks

**DOCUMENTATION**—explanation of use of materials. This manual and the on-screen doc constitute the documentation for Lumena.

**EXTENSION** (of a filename)—optional addition to the end of a filename, consisting of a period and up to three characters. Files saved through Lumena automatically receive an appropriate extension to the name. A picture named GOOD will appear in the directory listing as GOOD.PIX.

**FRAME**—one full screen of display information

**FRAME BUFFER**—See *BUFFER*.

**GRAPHICS SCREEN**—screen on which graphics are displayed

**HARDCOPY**—computer-generated information in tangible, humanly accessible form (as distinct from the non-tangible form appearing on a screen or the not humanly intelligible form on disk consisting of arrangements of magnetic particles). Hardcopy of a program is usually a printout on paper. Hardcopy of an image might be film, slide, photograph, or image made by a printer attached to the computer.

---

**LOAD**—bring a file stored on disk into the computer's memory

**MAPPING**—a correspondence established between two sets that associate each member of the first set with a single member of the second. In **COLOR MAPPING**, each position in the palette is associated with a location in a color look-up table existing in software; locations in that table have numbers designating different combinations of red, green, and blue. **REMAPPING** a color means modifying the RGB values in that location in the look-up table. The word **MAP** may refer to either the RGB composition of a single color or the RGB values of all colors in the palette.

**NAND**—See *BOOLEAN LOGIC*.

**NOR**—See *BOOLEAN LOGIC*.

**NXOR**—See *BOOLEAN LOGIC*.

**OR**—See *BOOLEAN LOGIC*.

**PALETTE**—the display of colors available for imaging. (The colors actually displayed are referred to as the **MAP**.) See also *MAPPING*.

**PENDING**—awaiting conclusion. A Lumena command is pending when it has been initiated but needs further information before it can begin executing.

**PERSPECTIVE**—technique for representing 3D objects and relationships on a 2D surface

**PIXEL**—picture element, the smallest unit of information on the graphics screen

**PROMPT**—a message in the Prompt Box, indicating an active or pending command

**QUANTIZE**—restrict a variable to a discrete set of values. One's age, for example, is usually quantized to whole numbers. In Lumena, **Q-line** restricts the orientation of a line to either horizontal or vertical.

**RANDOM**—in unpredictable order

**REAL TIME**—time as experienced by humans to be without delay. A computer solves complex mathematical problems "in real time." Real-time animation actually takes place at a speed comfortable for viewing (compared with animation in which still frames are filmed in order to be projected at a comfortable rate).

---

**RGB**—red, green, blue—the colors composing all colors of a video image

**RGB MONITOR**—hardware accepting separate red, green, and blue signals for the display of computer images

**SAVE**—store in a disk file. Saving on disk is considered permanent storage, while storing in a buffer is temporary.

**SHEARING**—a deformation in which parallel planes slide with respect to one another. In Lumena this occurs by relocating adjacent rows of pixels.

**SOFTWARE**—computer programs

**SYSTEM**—group of interacting components that form a collective entity. Your imaging system comprises computer, frame buffer, RGB monitor, digitizing pen and tablet, and possibly additional hardware, as well as Lumena software.

**SYSTEM DISK**—disk on which Lumena command, menu and documentation files are located

**SYSTEM DISK DRIVE**—disk drive in which the system disk is located

**TAPER**—become gradually narrower toward one end

**TEMPORARY**—lasting only for a limited time. A temporary buffer, such as that accessed by PUT and GET commands, stores information only until Lumena is exited. A temporary mode serves as an aid in carrying out a further step in a command and disappears when that step is accomplished.

**VERTEX**—point at which sides of an angle intersect; corner

**X-AXIS**—horizontal reference line in a 2D coordinate system

**XOR**—See *BOOLEAN LOGIC*.

**Y-AXIS**—vertical reference line in a 2D coordinate system