



INTRODUCTION

Sketch is a drawing program that enables you to place text and graphics to achieve desired images. The figures can be copy-selected into *TEdit* documents to allow a mixture of text and graphics in the same document. This documentation was produced using *Sketch*.

A sketch consists of *sketch elements*. Sketch elements include text, lines, curves, boxes, circles, and ellipses. Each element has one or more positions (called *control points*) that determine its location and a set of properties such as *brush*. A sketch is viewed in one or more *sketch windows* that provide a region and scale (see Figure 1). Within a window, the sketch can be edited by adding or deleting elements, or by changing the locations of control points or the values of properties.

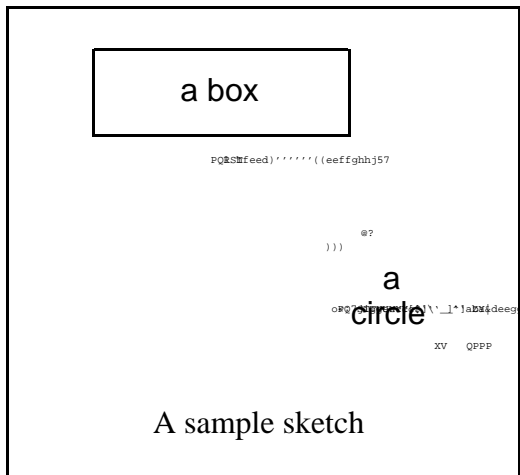


Figure 1. A sketch window

HOW TO LOAD, START, AND STOP SKETCH

To get *Sketch* into your Interlisp-D system, load the file SKETCH.DCOM. This in turn loads several other support files (SKETCHEDIT, SKETCHOBJ, and GRAPHZOOM).

A sketch window can be opened in several ways. The most common method is to select *Sketch* from the background command menu. This prompts you for a region and opens an empty sketch window there.

A sketch in a *TEdit* document can be edited by pressing the left button in it and selecting the Edit Sketch item from the menu that appears. This opens a sketch window the same size as the sketch in the document. You can also call the function `SKETCHW.CREATE` (described below).

When you are finished with a sketch window, you can close it. If you have made changes to the sketch without saving them on a file, *Sketch* asks you to confirm the closing. If the sketch window was created from a sketch in a *TEdit* document, you are given a menu choice of whether or not the changes made to this window should be returned to the document.

SKETCH MOUSE FUNCTIONS EDITING TEXT AND ADDING LINES

The three mouse buttons provide quick access to text editing and line drawing in the sketch window (see Figure 2).

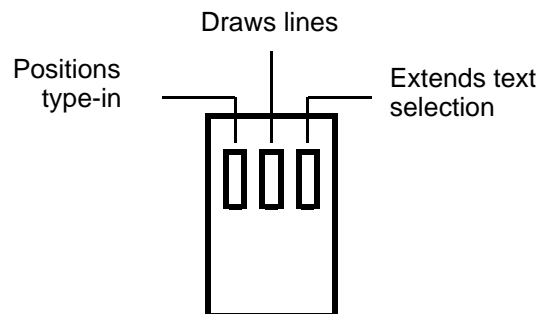


Figure 2. Mouse button functions for a sketch window

The left button is used to position typed-in characters. If this position is not within existing text, a caret shape (⤴) appears. When characters are typed, a new piece of text is centered around that position (see Figure 3). (Note: The alignment of the text relative to this position can be changed. See the sections below on the `Change` command and the `Defaults` command.)

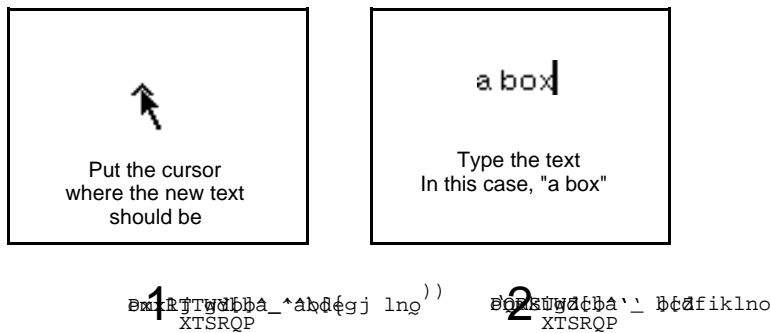


Figure 3. Steps to insert new text

If the cursor is positioned in existing text when the left button is released, a vertical bar (|) appears between the existing characters. The right button can then be used to extend the selection within the text, and any text so selected is deleted when the next character is typed (see Figure 4).

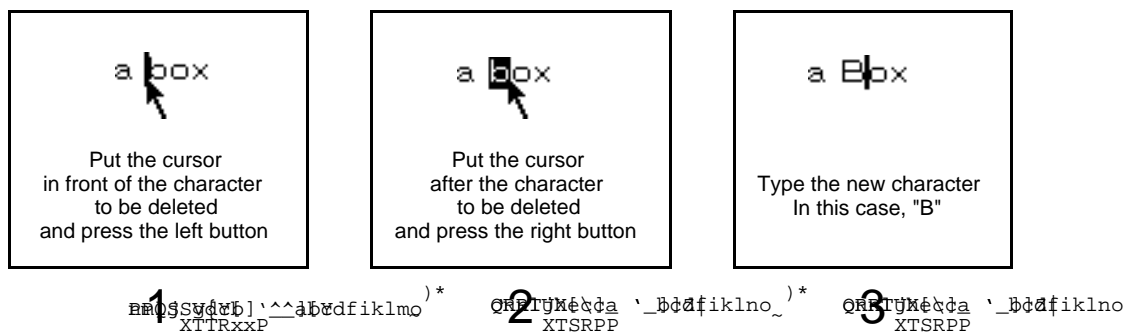


Figure 4. Steps to edit existing text

The middle button is used to construct straight lines. Pressing the middle button causes the cursor to change to ⊕ and an X to track the cursor (though only on grid points, described in the section below on the grid). Releasing the button marks the beginning of the line. Pressing the middle button again stretches the line from the beginning point to the cursor. This line moves until the middle button is released again. More lines can be added by pressing the middle button. Each line starts where the previous one ended. To start a new series of lines, press either the left or the right mouse button. (The series of lines is reset when you select one of the menu commands discussed below.) The drawing of any line segment can be stopped by moving the mouse outside the window. This does not start a new series of lines; moving back into the window and pressing the middle button picks up where the last line ended.

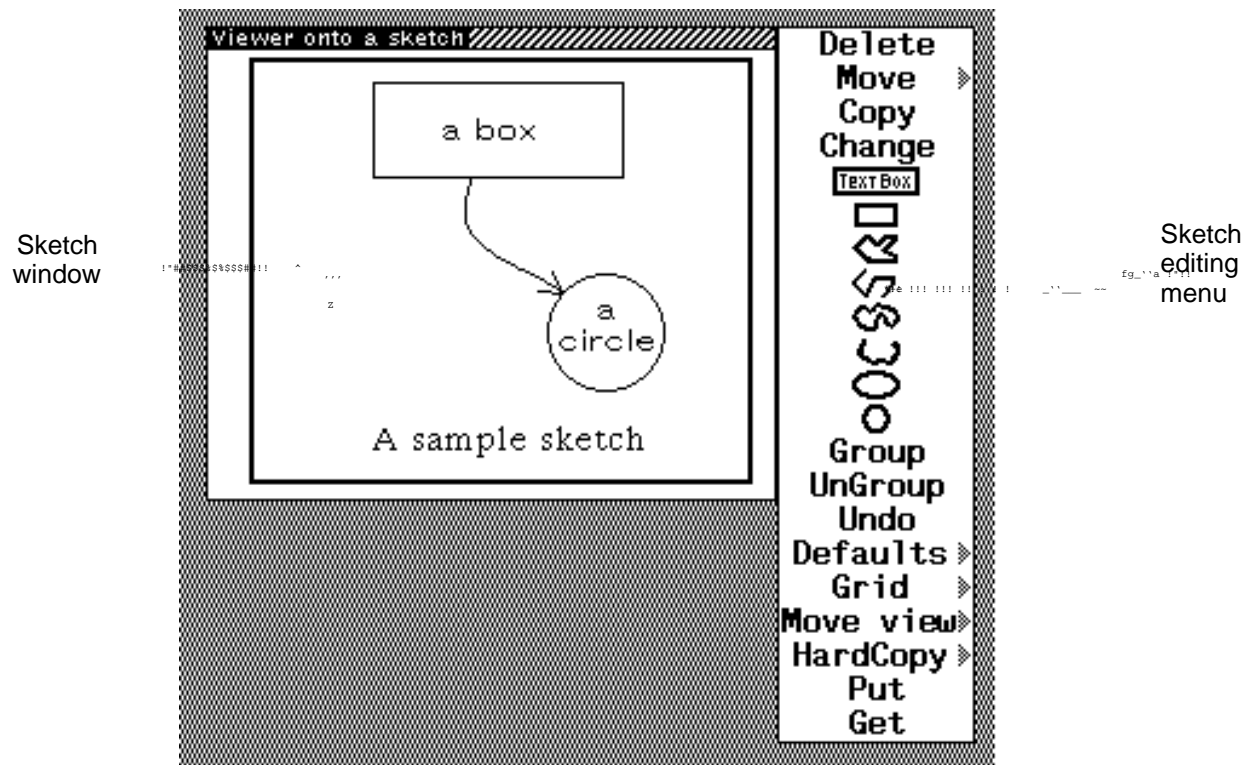


Figure 5. A sketch window with its editing menu

SKETCH EDITING MENU


The *Sketch* menu (shown in Figure 5) provides commands to add elements other than text and lines, plus commands to modify existing elements. In most cases, the menu is visible at the right of the sketch window. The menu can be closed by right-buttoning in it and selecting Close from the presented menu. After you close the menu, or if it wasn't visible in the first place, you can retrieve it by depressing the middle mouse button in the title bar. If more than one command will be executed, it is convenient to keep the menu visible. This is achieved by selecting Fix Menu from the *Sketch* menu (see Fix Menu below). Select commands with the left or middle mouse button.

The standard Interlisp-D window command menu can be retrieved by pressing the right button while the cursor is in the title bar of the window. The Redisplay command is sometimes useful for cleaning up the display in the sketch window, which may get "dirtied" when elements are deleted


or moved. The Shape command is used to change the size and shape of the sketch window. The size of the sketch window determines the size of a sketch when it is inserted into a text document.



COMMANDS TO ADD ELEMENTS TO THE SKETCH



The following commands add different elements to the sketch. After selecting one of these commands, you are prompted to specify where in the sketch window you want the new element to be.



 is used to add a "text box," a box within which text flows. It prompts for a region, which becomes the box. Whenever the caret is inside a text box, the characters typed become part of the text within the box. The text in a box is broken into lines that fit within the width of the box. The justification properties of the text specify the position of the text within the box. If a word in the text is wider than the box, it spills over. If there are more lines than fit in the height of the box, they spill over also. The characters outside the box cannot be selected for editing. The dimensions of the box are changed by using the Move or Move Point command on either corner point of the box.


 is used to sketch boxes. It prompts for a region, which becomes the box.

 is used to connect a series of points with a closed (first and last points are connected) collection of straight lines. The points that the lines go through (its control points) are placed by moving the cursor to the desired position and depressing any mouse button. The lines are drawn through the knots when you click a mouse button when the cursor is outside the window. To cancel this command, click the button with the cursor outside the window before entering any knots.

 is used to connect a series of points with an open (first and last points are not connected) collection of straight lines. See the  procedure.

 is used to draw a closed (first and last points are connected) curve through a collection of points. See the  procedure.

 is used to draw an open (first and last points are not connected) curve through a collection of points. See the  procedure.

 is used to sketch an ellipse. Figure 6 shows the relationships between the three control points of an ellipse. First, indicate the center of the ellipse by depressing the left mouse button in the window. Second, indicate the semimajor axis by depressing the left mouse button. This second

point is an axis point on the ellipse. Finally, indicate the semiminor axis by depressing the left mouse button. The second radius is determined by the distance the third point is from the center point. This command can be canceled by clicking outside the window.

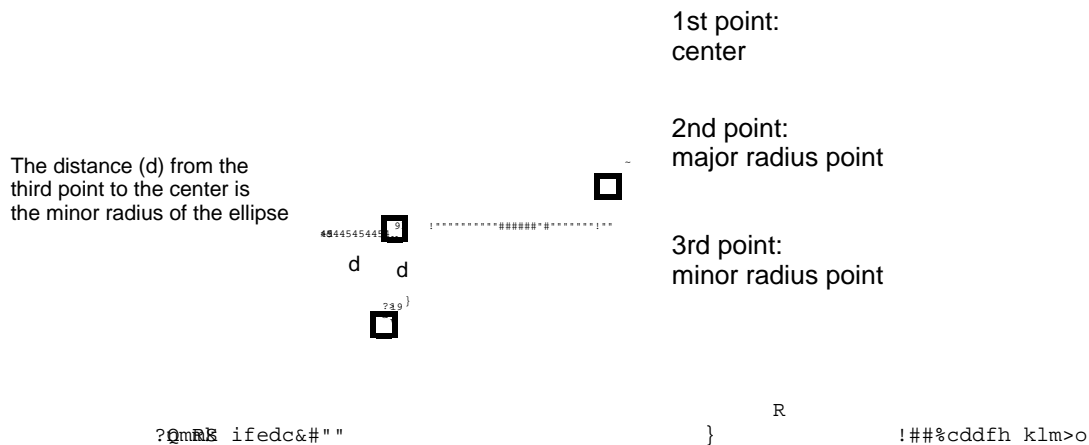


Figure 6. The control points for an ellipse

○ is used to sketch a circle. First, indicate the center of the circle by depressing the left mouse button in the window. Then indicate a point of the circumference of the circle by depressing the left mouse button. This command can be canceled by clicking outside the window.

SKETCH ELEMENT SELECTION

The commands Delete, Move, Copy, and Change apply to existing elements in the sketch. You use these commands by first selecting the command from the editing menu, then specifying the element or elements to apply the command to. When *Sketch* expects you to select elements, the control points are highlighted with a box as shown in Figure 7.

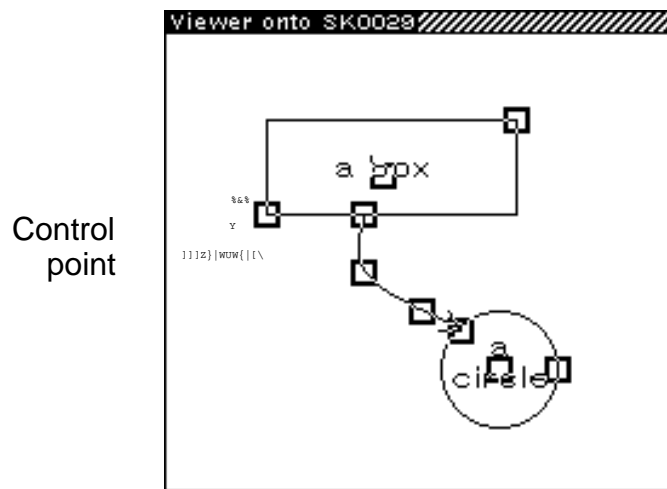


Figure 7. A sketch window in selection mode (control points visible)

While the control points are visible, elements are selected by the following protocol. One element can be selected by placing the cursor within the square surrounding any of its points and clicking the left button (see Figure 8). A group of elements can be selected by moving the cursor to one corner of the group, pressing the left button, then while holding the left button down, sweeping to the opposite corner. This selects all elements in the swept-out area. A selected element can be deselected when the left button is held down by also holding down the right button. All visible parts of the sketch can be selected by clicking the left button twice in the same square. The elements selected are marked by blackened control points. The Move command works on points as well as complete elements. To select a point, place the cursor within the square surrounding that point and click the left button. A second immediate click (double-clicking) of the left button selects the element of which the point is a part. A third click selects all visible parts of the sketch.

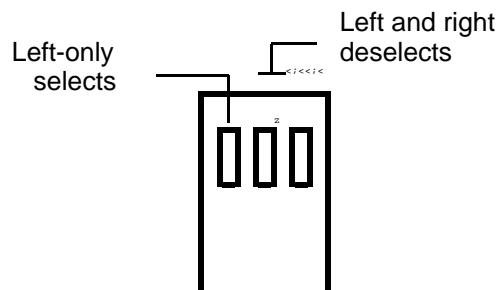



Figure 8. Mouse button functions during selection

COMMANDS THAT MODIFY SKETCH ELEMENTS

Delete deletes an element or a group of elements. Note that Delete cancels the element, not just one point. All graphic objects are identified when Delete is chosen, and you must select the object(s) to be deleted using the protocol described above. To cancel this selection before deleting, place the cursor outside the sketch window and click a mouse button.

Move moves a selected control point, an element, or a group of elements. If a single point is selected (see "Sketch Element Selection"), the cursor changes to  and a new location for that point should be selected by pressing the left button. To stop the move, select a point outside the sketch window.


If an element or a group of elements is selected, an image of the selected elements is shown on the screen and follows the cursor until the left button is pressed and released. When the button is released, the selected elements are moved to the shown locations. To stop the move, press the left button when the entire image is out of the window. (Note: An image containing curves or ellipses may be clipped at the edges. All the displayed elements will be moved and redrawn when you let up the button.)



Figure 9. Move menu item showing submenu

The menu item for this command is followed by a gray triangle pointing to the right indicating a submenu (see Figure 9). To retrieve the submenu, press down the left button, slide the cursor to the right through the triangle, and select the desired subcommand. When the desired item is found, release the button while over it. If you wish to choose a different menu command, slide to the left and the submenu will be withdrawn. The submenu commands for Move are Move Point, Move Elements, and Move Onto Grid.

Move Point moves a single control point. Select the point to be moved by pressing the left button and releasing it while the cursor is over the point. The control point underneath the cursor is


blackened while the left button is down. When the button is released, the cursor changes to . Specify a new location for the selected control point by pressing the left button. To stop the move, select a point outside the sketch window. Points can also be moved with the main menu Move command. This subcommand provides an easier method of selecting a point because you cannot mistakenly select the whole element.


Move Elements moves an element or a collection of elements. This command is the same as the main menu Move command, except that single points cannot be specified. It provides an easier method of selecting an element because you cannot mistakenly select a single point.

Move Onto Grid moves all the control points of a selected element or elements onto the current grid. This is useful for aligning a piece that is copied from another sketch, which may have had a different grid.

Copy is similar to Move except that it copies the selected elements in the new position.

Copying, deleting, and moving can also be accomplished by using copy-selection, deletion-selection, and move-selection. Copy-selection is done using the following steps. First, click any mouse button in the sketch window. This makes sure you are "talking" to the sketch window. (If you are "talking" to some other window, the selected sketch elements are copied into that window.) Next, hold down the "copy key." On Dandelion keyboards, this can be either SHIFT key or the COPY key; on Alto-style keyboards, it is either shift key. With the copy key held down, press the left mouse button. At this point, the selection control points appear and you can use the method described in "Sketch Element Selection" to select the elements you wish to copy. The selected elements have their control points shaded with gray. When you have selected the right elements, release the mouse buttons, then release the copy key. At this point, you are prompted with an image of the selected elements, which you should move into place. If you wish to stop copy-selection, move the cursor outside the window with either button held down, or place the image completely outside the sketch window.

Deletion-selection is similar. The difference is that the "delete key" is held instead of the copy key. On Dandelion-style keyboards, the "delete key" is the props key or the DELETE key; on Alto-style keyboards, it is the CTRL key. During deletion-selection, the control points of selected elements are marked with .

Move-selection is also similar. For "move-selection," both the delete key and the copy key are held down. During move selection, the control points of selected elements are marked with .

Change enables you to change the properties of an element or collection of elements. All graphic elements are identified when Change is chosen, and you must select the elements to change. After selecting these elements, you are presented with a menu of ways to change them. The particular menu varies for different elements because each has different properties. If in doubt, select the object you want to change and see what choices are offered. Selecting outside the offered menu does not change anything. If the selection contains elements of different types, the change offered is for the type that is first selected, and the change is made to any other selected elements to which it is applicable. For example, if the first selected element is a line and you select Larger, all the selected lines, curves, and boxes are made larger.



Figure 10. Menu offered for changing text elements

Text enables you to change the font, size, and face of the text, as well as the alignment of the text relative to its position. The menu commands (see Figure 10) are as follows:

Look Same enables you to make all of a collection of text look alike. It makes all the selected text items be the same font size, face, and alignment as the first selected item. This changes the

selected text items only. It is convenient for making text that was entered at different scales look the same.

Different Font enables you to change the type of the font. You are offered a menu of the previously entered font families and the item Other. If Other is selected, you are prompted for the name of a font family. If the selected or named font is not available in the size of the first selected text element, an error message is printed and nothing is changed. If an appropriately sized font is found, any of the selected text elements that have the same size as the first selected text element are changed to the new font. The search for fonts encompasses any directories on DISPLAYFONTDIRECTORIES and may take a few minutes. For Press fonts, there is no way to determine what sizes of a given font exist. *Sketch* tries to create sizes 8, 10, and 12 in new fonts. If it doesn't find a font that you believe exists, you can make that font the default font (both family and size) and retry the change.

The following commands provide font size control:

Smaller Font, Larger Font, Set Font Size

The following commands provide font face control:

Bold, Unbold, Italic, UnItalic

The relationship between the text and its control point is determined by the horizontal and vertical alignment properties.

The horizontal alignment properties are:

Center Justify, Right Justify, and Left Justify

The vertical alignment properties are:

Top Justify, Middle Justify, Baseline Justify, Bottom Justify

The Table 1 shows the effects of the different values for horizontal and vertical alignment.

Vertical Horizontal	Baseline Justify	Middle Justify	Top Justify	Bottom Justify
Center Justify	Play	Play	Play	Play
Left Justify	Play	Play	Play	Play
Right Justify	Play	Play	Play	Play

+ - control point of the text

Table 1. How the alignment properties affect the position of text relative to its control point

Closed Curves, Circles, and Ellipses changes the brush size and shape with the following submenus:

Shape enables you to choose from the following submenu:

Round, Square, Vertical, Horizontal, Diagonal

Size enables you to choose from the following submenu:

Smaller Line makes the curve one thinner.

Larger Line makes the curve one thicker.

Set Line Size prompts for a number and sets the line to that thickness.



Figure 11. First menu for changing open curves

Open Curves changes the brush size and shape or adds and changes arrowheads at either end of the curve (see Figure 11).

You are first asked to specify which aspect of the curve you wish to change. The aspects are Shape, Size, and Arrowheads. Depending upon your choice, you are prompted with different submenus.

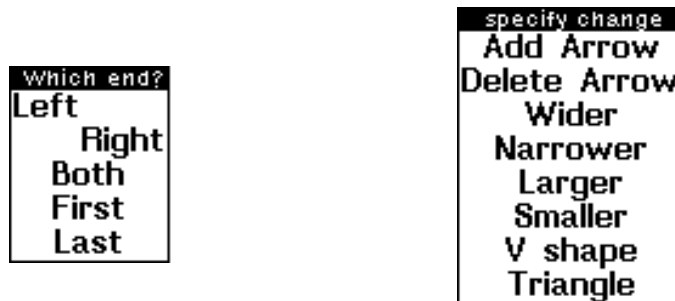


Figure 12. Menus for changing arrowheads

Arrowheads gives you two menus (see Figure 12). The first one specifies which end of the curve this change is to affect. The second one specifies the change to make. If a selected line or curve does not already have an arrowhead on it, any choice but Add Arrow from the second menu does nothing. The choices in the first menu are:

Left changes an arrowhead at the leftmost end of the curve (topmost if ends have the same X position).

Right changes the arrowhead at the rightmost end of the curve (bottommost if ends have the same X position).

Both changes the arrowheads at both ends of the curve.

First changes the arrowheads at the first control point entered.

Last changes the arrowheads at the last control point entered.

The choices in the second menu are:

Add Arrow adds an arrowhead of the default specifications at the previously specified end or ends. If that end already has an arrowhead, nothing happens.

Delete Arrow deletes an arrowhead at the previously specified end or ends. If that end doesn't have an arrowhead, nothing happens.

Wider increases the angle of the arrowhead with respect to the line.

Narrower decreases the angle of the arrowhead with respect to the line.

Larger increases the length of the side of the arrowhead.

Smaller decreases the length of the side of the arrowhead.

V shape changes the shape of the arrowhead to be two sides.

Triangle changes the shape of the arrowhead to be two sides and a base.

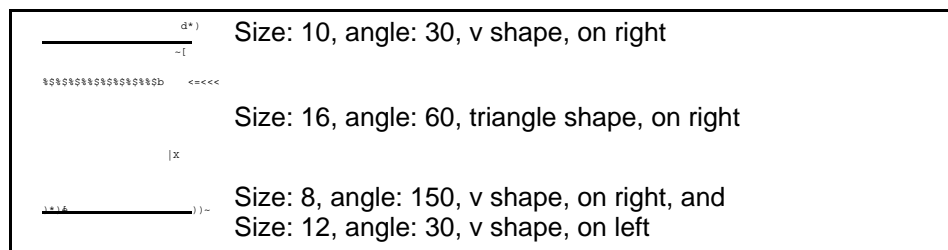


Figure 13. Sample arrowheads

Shape gives the same menus as for Curves.

Size gives the same menus as for Curves.

(Note: If you are entering many arrowheads, it is convenient to set the properties of the default arrowhead using the Defaults command before adding the arrows.)

Lines enables you to change the arrowhead characteristics and the size in the same manner as Open Curves.

Boxes enables you to change the line thickness in the same manner as changing the brush size of Curves.

Text Boxes enables you to change the line thickness of the box in the same manner as changing the brush size of Curves or the properties of the text as in Text.

OTHER SKETCH COMMANDS

Group collects a group of elements together. After the elements are grouped, they have a single control point, at their center. This is sometimes convenient to reduce the number of control points in a diagram or to more easily duplicate common parts of a figure. The elements in a group are moved, copied, deleted, and changed together. If you want to change just one piece of a group, you must UnGroup it first. Groups can be included in other groups.

UnGroup restores the first selected group to its individual elements.

Undo undoes a previous command. Selecting this command brings up a menu of past commands. Select the command you wish to have undone. The most recent event is placed at the top of the menu. To cancel this command, click the button with the cursor outside the menu. In the menu, Wire refers to lines. If the same graphical element has been changed more than once, the changes to it must be undone in reverse order.

The number of changes that are remembered is determined by the variable `SKETCH#.UNDO.ITEMS` and is initially set to 30. If you wish to save more or fewer changes, you can set `SKETCH#.UNDO.ITEMS` to a larger or smaller number. To change it to 50, for example, type `(SETQ SKETCH#.UNDO.ITEMS 50)` into the top-level typescript window.

Defaults enables you to change the default brush, text, text box, and arrowhead characteristics. The default characteristics are the properties given to newly added lines, text, or arrowheads. (The properties of an existing object can be changed by using the Change command above.)

Submenu indicators

Submenu is accessed
by holding down a button
and rolling out the right side

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```

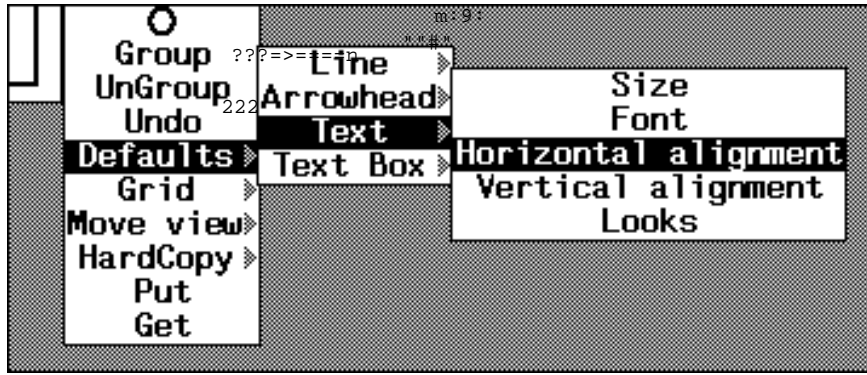


Figure 14. Defaults Menu item showing submenus

The menu item for this command is followed by a gray triangle pointing to the right indicating a submenu (see Figure 14). To retrieve the submenu, press down the left button, slide the cursor to the right through the triangle, and select the desired subcommand before releasing the button. Continue holding the button and slide through the desired submenu item to obtain the subsubmenus. When the desired item is found, release the button while the cursor is over it. If you wish to choose a different item from a higher-level menu, slide to the left and the submenus will be withdrawn.

Line enables you to change the default line size. A pad of numbers is displayed from which you choose the size and click OK to exit. If you don't want to change the brush size, select OK when the size is zero to cancel the command.

A submenu allows you to change the default brush shape or size.

Shape enables you to change the brush shape. The most recent change becomes the default for all new elements created. Choose from the following submenu:

Round, Square, Vertical, Horizontal, Diagonal

Size is the same as Line above.

Add Arrowhead enables you to set whether or not newly added open lines and curves get arrowheads on either or both ends. After selecting this item, you are given a menu of the following choices from which you can pick one, or click outside if you don't want to make any change.

First, Last, Both, Neither, Left, Right

Arrowhead enables you to change the default arrowhead size. A pad of numbers is displayed from which you choose the arrowhead size and click OK to exit. If the arrowhead size is not to change, select OK when the size is zero to cancel the command. The arrowhead size is given in screen points. When the arrowhead is added, the screen point size is scaled to get its real sketch size. This size is then scaled as the line or curve scales.

A submenu allows you to change the default arrowhead size, angle, and type.

Size is the same as Arrowhead above.

Angle enables you to change the angle of the default arrowhead. A pad of numbers is displayed from which you choose the angle in degrees. If the arrowhead angle is not to change, select OK when the size is zero to cancel the command.

Type enables you to change the type of the default arrowhead. A menu of types is displayed from which you choose the new default. Currently there are two types: V-shape and triangle. In V-shape, the arrowhead consists of two lines from the head. In Triangle the arrowhead consists of a triangle (two lines from the head and a line connecting their endpoints).

Text enables you to change the size of new text. A menu of the known font sizes is displayed from which you choose the size. Note: not all fonts are available in all sizes. The submenu allows you to change the size, face, and alignment properties of new text.

Size is the same as Text above.

Font enables you to change the font family property of new text. You specify a font family using the same method as when the font property of text is changed (described under the Change command). If the specified font cannot be found in the current default size, an error message is printed and the default is not changed.

Horizontal Alignment enables you to change the horizontal alignment property of new text. The choices are:

Center, Left, Right

Vertical Alignment enables you to change the vertical alignment property of new text. A menu of alignments is displayed from which you choose the new default. The choices are:

Top, Center, Baseline, Bottom

Looks enables you to change the face property of new text. A menu of faces is displayed from which you choose the new default. The choices are:

Regular, Bold, Italic, Bold/Italic

Text Box enables you to change the horizontal alignment of text within new text boxes. The default for text boxes is different from the default for text. Its initial setting is Center. The submenu allows you to change the horizontal and vertical alignment properties of new text boxes.

Horizontal Alignment enables you to change the horizontal alignment property of text within new text boxes. The choices are:

Center, Left, Right

Vertical Alignment enables you to change the vertical alignment property of text within new text boxes. A menu of alignments is displayed from which you choose the new default. The choices are:

Top, Center, Baseline, Bottom

Grid displays and changes the grid that determines where points can be positioned on the display. When the grid is on, only points on the corners of the grid can be specified for any sketch operations. This makes it much easier to align parts of the sketch. The default is to have a grid turned on with a default grid size of about half a centimeter (see Figure 15). If the grid is off, any point can be selected. The main menu Grid item flips back and forth between using and not using the grid. Submenu items are available to display the grid and to change its size. The grid is always on a power of two in the sketch coordinate space. This means that the same points are accessible on the grid as the sketch scale changes.

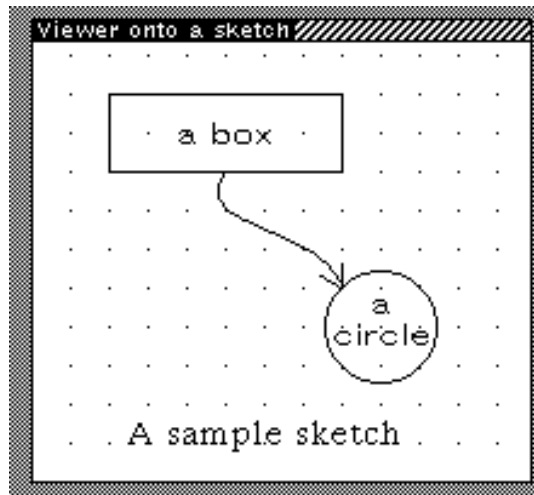


Figure 15. Sketch window with default grid displayed

A submenu of commands can be obtained by rolling out the right side of this menu item. The submenu commands are:

Turn Grid On turns the grid on; any points selected are on the grid.

Turn Grid Off turns the grid off; any point can be selected.

Larger Grid doubles the space between the grid points.

Smaller Grid halves the space between the grid points.

Display Grid displays a point at each point on the grid. If the grid points are closer than three points together they are not shown. Instead, a message giving the number of screen points per grid point is displayed in the status window above the sketch window. If the grid points are a large distance apart, a message indicating how far apart the grid points are is displayed also.

Remove Grid Display removes the grid display.

Move View changes the portion of the sketch that is visible in the window. You specify the new portion of the sketch to appear in the window by depressing any mouse button at one corner and sweeping the cursor to the other corner (see Figures 16 and 17). The specified region is outlined in gray. When the button is released, the portion of the sketch within the gray box is scaled to fill the sketch window. The box maintains the same aspect ratio as the window. The section may be smaller or larger than the current window size. This command can be canceled by typing control-E. (Note: the sketch can be scrolled either horizontally or vertically using the standard Interlisp-D

scroll bars at the left and bottom of the window.) Use the subitem Home to return the sketch to its original form.

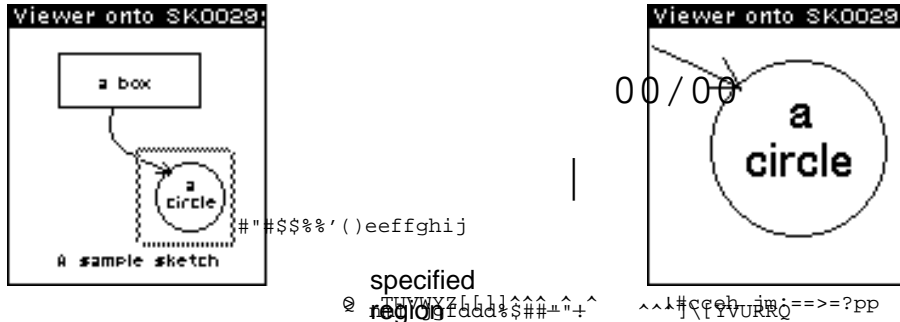


Figure 16. Zooming In With Move View

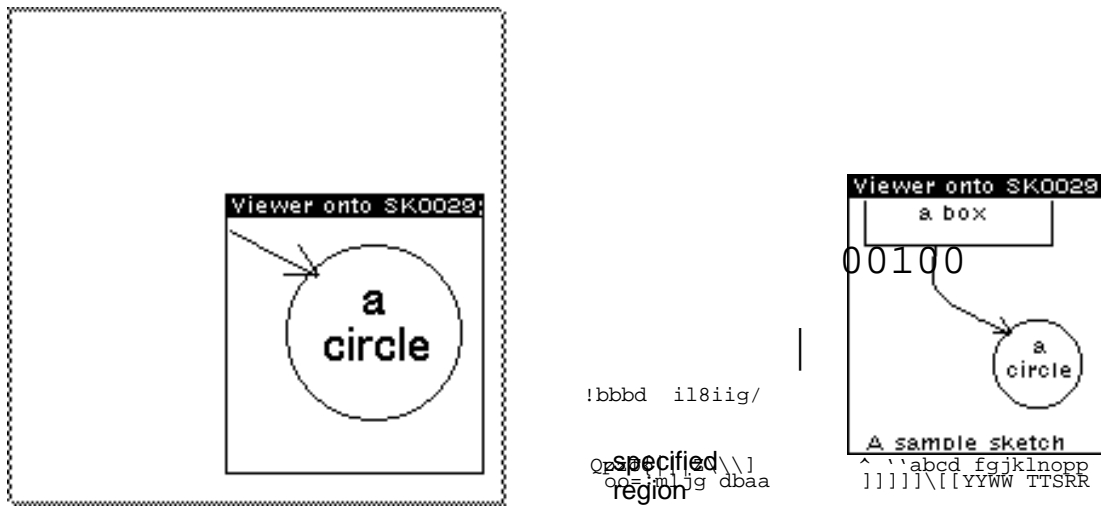


Figure 17. Zooming Out With Move View

The Move View command is followed by a gray triangle pointing to the right indicating a submenu. To retrieve the submenu, slide the cursor to the right through the triangle and select the desired subcommand before releasing the button. The submenu gives you other ways to change the view on the sketch.

Zoom does the same action as Move View.

AutoZoom changes the scale around a selected point. Holding the left button down zooms in toward the cursor. Pressing the middle button zooms out from the cursor. The amount of each scale jump is determined by the global variable `AUTOZOOM.FACTOR` and is initially `.8`. Holding either button down zooms continuously in the appropriate direction. Use `Home` to return the sketch to its original form. Press any button outside the window to stop autozoom mode.

`Home` returns you to a view at scale of `1.0`, which has the origin in the lower-left corner. This is useful if you lose the sketch after scrolling or using `Zoom` or `AutoZoom`.

`Locator` puts up a small window that displays the cursor's location in sketch coordinates whenever the cursor is inside the sketch window.

`New Window` opens another window onto the same sketch. The second window can be scrolled or zoomed without affecting the view in the original window. This allows one window to act as an overview while the other can be used to blow up an intricate part of the sketch and make detailed changes. Any changes made to either of the windows are reflected in both windows.

`Hardcopy` sends the image in the window to the `DEFAULTPRINTINGHOST`. The image is centered in the page. `Hardcopy` has a submenu that can change the display to hardcopy mode or makes a printer file of the current view of the sketch in either `Press` or `Interpress` format, and, optionally, sends it to the printer. Each of the subcommands has subitems that allow the choice of `Press` or `Interpress`. If the submenu is not used to specify the print format type, the type appropriate for the first entry on `DEFAULTPRINTINGHOST` is used. The subcommands are:

`File Only` prompts for a file name and makes an image on it.

`Print Only` prints the image but doesn't save the file.

`File & Print` prompts for a file name, makes an image on it, and prints the image on `DEFAULTPRINTINGHOST`.

`Hardcopy Display` displays the text in the window as close as possible to the way it will look when printed. Text fonts have significantly different widths on the display and on the `Press` printer.

`Normal Display` displays the text in a way more easily read and edited on the screen.

`Put` saves the sketch on a file. The sketch can be retrieved by the `Get` command. Sketches can also be saved by including them in *TEdit* documents (see below).

`Get` retrieves a sketch from a file. Any elements in the window before the `Get` will still be there.

Fix Menu (which appears in the pop-up menu only) fixes the menu to the right edge of the sketch window.

INCLUDING IMAGE OBJECTS IN A SKETCH

Other Interlisp-D image objects (such as bit maps) can be placed in sketches by using the standard copy-select mechanism. For example, to include a bit map image, hold down the copy-select key, move the cursor into the background, press the right button, and select Snap from the offered menu. Select the region of the screen to be included, move the cursor back into the sketch window, and place the bit map image (which should now be following the cursor) in place. (Note: image objects do not scale.)

Image objects in sketches can be moved, copied and deleted like any other elements. Calling Change on an image object or pressing a button down while over its image in the sketch window calls that object's BUTTONEVENTINFN, which is often an editor for the object.

PUTTING SKETCHES INTO *TEDIT* DOCUMENTS

Sketches can be included in documents by copy-selection. Select the location in the document where the sketch is to go. Hold down the copy-select key. Move the cursor into the sketch window and select the pieces of the sketch to be inserted. The whole sketch can be selected by double-clicking on a sketch element. While selecting pieces, the right button removes elements from the selection. When the desired elements have been selected, release the copy-select key. The sketch is inserted into the document; it will be the size of the window from which it is copied. To change its shape, reshape the sketch window. The copy-selection process can be aborted by moving the cursor outside the sketch window while a button is down.

The sketch is adjusted so that the lower-left corner of the inserted sketch is on a grid point. This is done so that when the sketch is edited, the grid remains aligned with existing points. The grid can be made smaller before the copy-insertion to reduce the amount of adjustment.

Note: You must have *Sketch* loaded to edit or look at a *TEdit* document that has a sketch object in it. If *Sketch* isn't loaded, *Tedit* will break with an undefined function SKIO.GETFN. From the break window, load *Sketch* and type OK into the break window. Also, *TEdit* will display a sketch only if the *TEdit* window is at least as tall as the sketch.

A sketch that is in a document can be edited by pressing the left button inside it and selecting the offered menu item Edit Sketch. This prompts for a position of a sketch window the same size as the sketch. In this window, the sketch can be edited, scrolled, zoomed, etc. A sketch so edited may

contain elements that are not visible in the printed document. These elements can be exposed by zooming or scrolling. When the window is closed, you are offered a chance to place the sketch back into the document. If you accept, the current view of the sketch is placed into the document. The sketch window has the menu already fixed beside it.

COPYING FROM ONE SKETCH TO ANOTHER

Parts of a sketch can be copied from one sketch to another using a protocol similar to the above. Select the target sketch. Hold-down the copy-select key. Move into the source window and select the desired elements using the left- and right-button protocol described earlier. When the copy-select key is released, position the cursor back in the target window. You will be dragging an image of the selected elements that can be placed in the target by pressing and releasing the left button. For now, the scale of the transferred elements is not changed, so the image in the new window may be a different size after the transfer.

COPYING THE TEXT OUT OF A SKETCH AS CHARACTERS

You can copy the text characters in a sketch (i.e., text and text box elements) by using the selection procedure described above, but selecting elements with the middle button instead of the left one. When the copy-select key is released, the characters in selected text and text box elements are copied.

SKETCH IMPLEMENTATION NOTES

`SKETCHW.CREATE` *Sketch SketchRegion ScreenRegion Title InitialScale BringUpMenuFlg InitialGrid* [Function]

opens a sketch window onto the sketch *Sketch*. *Sketch* can be NIL, where an empty sketch is generated and given a name, a sketch, or the name of a sketch. *SketchRegion*, if given, is a region in sketch coordinates of the part of the sketch to be initially displayed. *ScreenRegion* can be a region, the screen region to be used for the sketch window, or a window to be used as the sketch window. *Title* is used as the title of the sketch window. If *Title* is NIL, the title "Viewer Onto *SketchName*" is used. *InitialScale*, if a number is the initial scale of the sketch; 1.0 is the default. If *BringUpMenuFlg* is non-NIL, the sketch operations menu is brought up beside the right edge of the window. *InitialGrid* indicates whether to use a grid. If it is a number, the grid is set to the least power of two greater than *InitialGrid*. If *InitialGrid* is T, the grid is set to allow approximately half a centimeter between grid points. If it is NIL, no grid is used.

BringUpMenuFlg can be a menu, in which case it is brought up beside the right edge of the window. The standard *Sketch* command menu is the SKETCHPOPUPMENU property of the window.

(EDITSLIDE *Sketch*) [Function]

opens a window the size of a sheet of 8 1/2 by 11 paper. This is useful for laying out slides or other full-page images.

Programming Note

If a sketch window has a non-NIL value for the property DONTQUERYCHANGES, you are not asked to confirm the close even though changes have occurred.