3. How to Create Sketch Elements

The elements a sketch consists of are text, boxed text, lines, boxes, polygons, curves, closed curves, circles, ellipses, arcs, arrowheads, and bit maps. This chapter explains how to create and change each kind of element, and how to change the way new elements will look.

To Use Text in a Sketch

In Sketch, text is provided by text elements. Each text element has some characters, a control point that positions it, and properties that determine the way it looks (e.g., boldness, font family) and how it is justified relative to its position (e.g., left, right, or center justification). A new text element is added by typing it in (see the section ‘‘To Type In Text,‘‘ below). You edit existing text elements by selecting within them and typing (see the sections ‘‘To Insert Characters Into a Piece of Existing Text‘‘ and ‘‘To Replace Characters in a Piece of ExistingText‘‘). The size, font family, boldness, and italic properties, and the location of the text relative to its position, are changed using the Change command (see the section ‘‘To Change the Way Text Looks’’).

In a sketch window, the three mouse buttons provide quick access to text editing and line drawing. Figure 8 summarizes these mouse button functions.

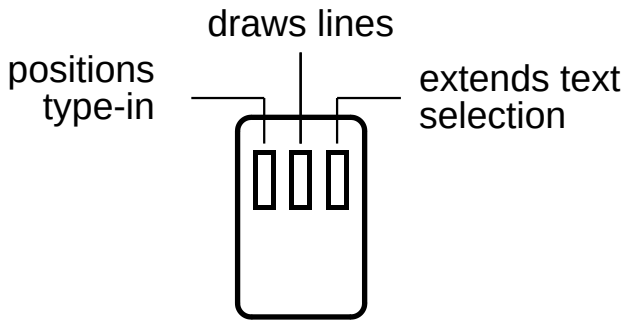
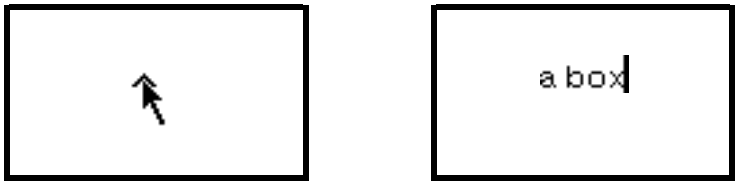


Figure 8. Mouse button text-editing and line-drawing functions

To Type In Text

Move the cursor to where you would like the text to be and press the left mouse button. The caret shape ( ) will appear. Type the text. Typing a carriage return will start another line.

If a vertical bar ( ) appears instead of a caret, the position you selected is in existing text (see the following sections). You cannot create a new text element in the middle of an existing text element. Any characters you type will be added to the existing text. To create a new text element, hold down the left button and move the cursor until the vertical bar ( ) changes into the caret shape ( ). At this point you can create a new text element by typing new text.



1. Put the cursor where the new text should be.
2. Type the text. In this case, "a box."

Figure 9. Steps to insert new text

When characters are typed, a new piece of text is centered around the position of the caret. The alignment of the text relative to this position can be changed. For example, the text can be changed so that this position is its left edge. See the sections ''To Change the Justification of Text'' and ''To Change the Properties of New Text.''

To Insert Characters Into a Piece of Existing Text

Move the cursor to the place in the text where you want to insert the characters and click the left button. When you press the left button, the vertical bar ( ) will appear between the characters. Type the characters. The typed characters will appear where the vertical bar is. If you hold the left button down while moving the cursor, the vertical bar will follow.

If you place the cursor over a piece of text and the vertical bar does not appear, the text may be contained in a group or it may be overflow from a text box. If it is in a group, you can edit this text only by ungrouping it first. See the section ''To Use Groups.'' If it is overflow from a text box, you can reshape the text box to make it large enough to hold the text. See the section ''To Change the Size of a Text Box.''

You can insert characters at the beginning of a text element by selecting the left half of the first character. The vertical bar will appear in front of the first character when the cursor is positioned correctly. If you move out of the text, the vertical bar will change to a caret shape ( ). If you type when the caret shape is visible, you will create a new text element rather than inserting characters into the existing one. You can insert characters at the end of a text element by selecting the right half of the last character.

To Replace Characters in a Piece of Existing Text

Move the cursor to in front of the first character to be replaced; press and release the left button. A vertical bar ( ) will appear in front of that character. Move the cursor to the last character to be replaced; press and release the right button. After you press the right button, the text that will be replaced when you type is shown white-on-black. Type the new characters (see figure 10).

1. Put the cursor in front of the characters to be deleted and click the left button.
2. Move the cursor to after the characters to be deleted and click the right button.
3. Type the new text. In this case, "B."

Figure 10. Steps to edit existing text

To Delete Characters in a Piece of Existing Text

Select the characters using the left and right buttons as described above in the section ''To Replace Characters in a Piece of Existing Text'' and press the delete key.

To Delete Text During Type-in

When you are typing text, you can use the backspace (BS) key to delete the previous character, and control-W to delete the previous word.

To Change the Way Text Looks

You can change the properties of text by using the Change command. After selecting the Change command, select a piece of text or a collection of pieces of text (see the section ''To Select Sketch Elements'') that you wish the change to apply to. You will then be presented with a menu (see figure 11) of possible ways of changing the text.

To Change the Bold and Italic Properties of Text

Select the Change command, move the cursor to the control point of the text (which will be marked with a), and press and release the left button. The menu shown in figure 11 will appear. Select one of the items Bold, Unbold, Italic, or Unitalic.

Bold will make the selected text element appear in bold letters. Unbold will remove the bold property from the text if it was previously bold. Italic will make the selected text element appear in italics. Unitalic will change italic text to roman text.

Figure 11. Menu offered for changing text elements

To Change the Size of Text

Select the Change command, move the cursor to the control point of the text (which will be marked with a), and press and release the left button. The menu shown in figure 11 will appear. Select one of the items Smaller Font, Larger Font, or Set Font Size.

Smaller Font will make the characters appear in the next smaller font. Larger Font will make the characters appear in the next larger font. Set Font Size will prompt you for a size to make the text.

Note: The font size is changed at the scale in which the text was originally entered. If you are viewing the text from a *zoomed view* (a window that has had its scale changed) the text size may not change. Or it may change more than a single size. If you have difficulty getting the size you want, enter a new piece of text, adjust its size, make the original piece of text have the same size (see the section ''To Make Several Pieces of Text Look Alike''), and then delete the new text.

To Change the Font Family of Text

Select the Change command, move the cursor to the control point of the text (which will be marked with a), and press and release the left button. The menu shown in figure 11 will appear. Select the item Different Font. A menu of the known font families and the item Other will appear. Select the name of the family you want or, if it is not there, select Other. If Other is selected, a small window with

the message ''New family:'' will appear above the sketch window. The caret will be blinking in it. Type the name of a font family, ending with a carriage return. If the selected or entered font family is not available in the size of the selected text element, a message is printed and nothing is changed.

When selecting the control point of the text, you can also select more than one text or text box element (see the section ''To Select Sketch Elements''). If more than one text element is selected, any that have the same size as the first selected text element are changed to the new font family.

Note: the search for fonts encompasses any directories on DISPLAYFONTDIRECTORIES and may take a few minutes. (If font file servers are down or slow, it may take even longer.) If Sketch doesn't find a font that you believe exists, you can make that font the default font, both family and size (see the section ''To Change the Properties of New Text'') and retry the change.

To Change the Justification of Text

Select the Change command, move the cursor to the control point of the text (which will be marked with a), and click the left button. The menu shown in figure 11 will appear. Select one of the items Left Justify, Center Justify, Right Justify, Top Justify, Bottom Justify, Middle Justify, or Baseline Justify. These commands will change where the text appears relative to its control point. Table 1 shows the effects of the different commands on horizontal and vertical justification.

Horizontal \ Vertical	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 justification properties affect the position of text relative to its control point

To Make Several Pieces of Text Look Alike

Select the Change command, hold down one of the shift keys, move the cursor to the control point of the text that looks the way you want, and click the left button. Using the procedure described

in the section ''To Use Menus and Submenus,'' select the text elements you want to change to look like this one. When finished, release all the mouse buttons and the shift key. The menu shown in figure 11 will appear. Select the item Look Same. This will make all the selected text items be the same font size, face, and alignment as the one you selected first. The change is made to both boxed and unboxed text. This command is convenient for making text that was entered at different scales look the same.

To Use Boxed Text

Sketch has the capability of framing text and justifying text within the frame. The element that supports this is called a text 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 between words so that each line fits within the width of the box. If a single 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 box must be enlarged to allow these to be edited.

A text box can be created by boxing a text element (see ''To Put a Box Around Existing Text''), by typing a control-carriage return (see ''To Create a Box to Put Text In''), or by using the Text Box command (see ''To Create a Sized Box to Put Text In''). The justification properties of the text specify the position of the text within the box (see ''To Reposition the Text Within a Box''). The text inside a text box has the same looks properties as a text element (see the sections ''To Use Text in a Sketch'' and ''To Change the Way Text in a Box Looks'').

The frame around the text is called its box. It has control points at its upper-right and lower-left corners. Moving one of these changes the size of the box (see ''To Change the Size of a Text Box''). The box has thickness and dashing pattern properties that affect the frame (see ''To Change the Border Thickness of a Text Box'' and ''To Make a Dashed Border Around a Text Box'') and a filling property that shades the part of the box not occupied by text (see ''To Change the Filling of a Text Box''). Figure 12 shows some examples of text boxes.

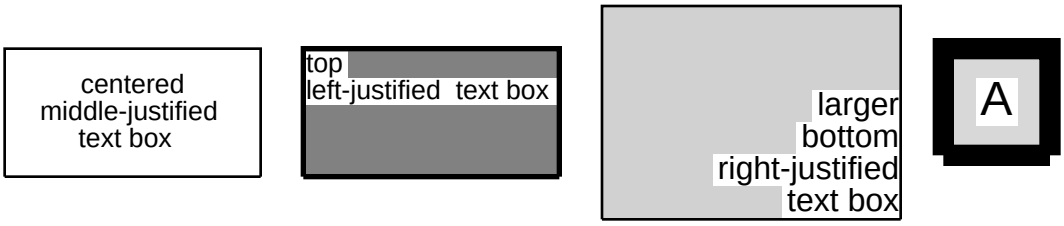


Figure 12. Examples of text boxes

To Put a Box Around Existing Text

Select the Change command from the command menu, move the cursor to the control point of the text you wish to box, and press and release the left button. A large menu titled Change Text How? will appear (see figure 11). Select the Box the Text item. The text will become part of a text box.

To Create a Box to Put Text In

Hold down the control key and press the return key. If the caret is inside a text box, a new text box of the same size will appear below it. Any characters typed will now go into the new box. If the caret is not in a text box, a new box will appear at the current cursor position. Note: you should hold down the control key until the new box appears.

To Create a Sized Box to Put Text In

Select the Text Box command from the command menu, move the cursor to one corner of the desired box location, press and hold the left button, move the cursor to the diagonally opposite corner, and release the button. While you are moving to the opposite corner, a gray outline of the box will be shown. When you release the button, the gray outline will be replaced by a solid one. You can stop this command by releasing the button when the cursor is outside the window.

To Change the Size of a Text Box

Move either control point of the text box using one of the point-moving methods described in the section ''To Move Elements.''

To Change the Border Thickness of a Text Box

Select the Change command, move the cursor to one of the corner points of the text box (which will be marked with a), and press and release the left button. The menu shown in figure 14 will appear. Select the item Box Thickness. This will bring up a menu titled Change Size How? that contains the items Smaller Line, Larger Line, and Set Line Size. Selecting Smaller Line will

make the box outline be one size smaller than it is. Selecting Larger Line will make it one size larger than it is. Selecting Set Line Size will bring up a number pad menu (see figure 13). In this case, you should enter the size in screen points (1/72 of an inch) that you want the box thickness to be. The box thickness can be set to zero with the Set Line Size command, but the Smaller Line command will not make it less than one. If the thickness is zero, the box around the text won't appear, but any filling will remain and the text will still justify itself within the box's boundary.

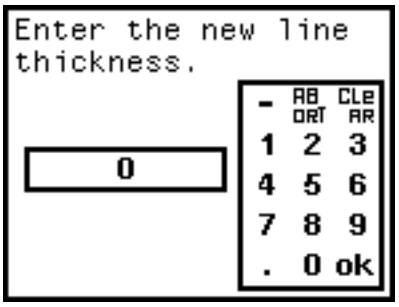


Figure 13. The number pad menu for entering line thickness

To Make a Dashed Border Around a Text Box

You can make the border of a text box dashed by specifying a *dashing pattern* (see the section ''To Make a Dashed Line''). A dashing pattern is a sequence of numbers that indicates how many brush marks should be on and off. To specify a dashing pattern, first select the Change command, then move the cursor to one of the corner points of the text box (which will be marked with a ❑) and press and release the left button. The menu shown in figure 14 will appear. Select the Dashing item. This will bring up a menu titled New Dashing Pattern?, similar to the one shown in figure 34, that contains several dashing patterns and the items Other and No Dashing. Selecting one of the dashing patterns will make the border have that pattern. Selecting the Other item will bring up a series of number pad menus in which you enter, alternatively, the size of the black portion of the pattern and the size of the white portion of the pattern. The pattern can have as many alternations as you like. Number pad menus will continue to appear until you enter zero. When you enter zero, a menu is brought up showing what your new dashing pattern looks like and requesting confirmation. If you like the pattern, select Yes. If you don't like it, select No. If you select No, you will be given a chance to enter another series of sizes. If you select Yes, the box outline will be dashed according to your pattern. The pattern you entered will be remembered and will appear in the dashing menu next time you change the dashing.

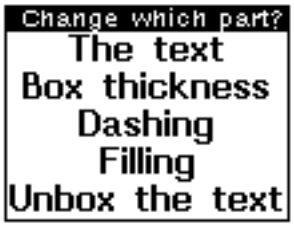


Figure 14. Change menu for text boxes

To Change the Filling of a Text Box

Select the Change command, move the cursor to one of the control points of the text box (which will be marked with a), and press and release the left button. The menu shown in figure 14 will appear. Select the Filling item. From this point, follow the procedure given in the section ''To Change the Filling of a Box.''

To Change the Way Text in a Box Looks

Select the Change command, move the cursor to one of the corner points of the text box (which will be marked with a), and press and release the left button. The menu shown in figure 14 will appear. Select the item The Text. The menu shown in figure 15 will appear. Select one of the items Different Font, Smaller Font, Larger Font, Set Font Size, Bold, Unbold, Italic, or Unitalic. The action of these items is described in the section ''To Change the Way Text Looks.''

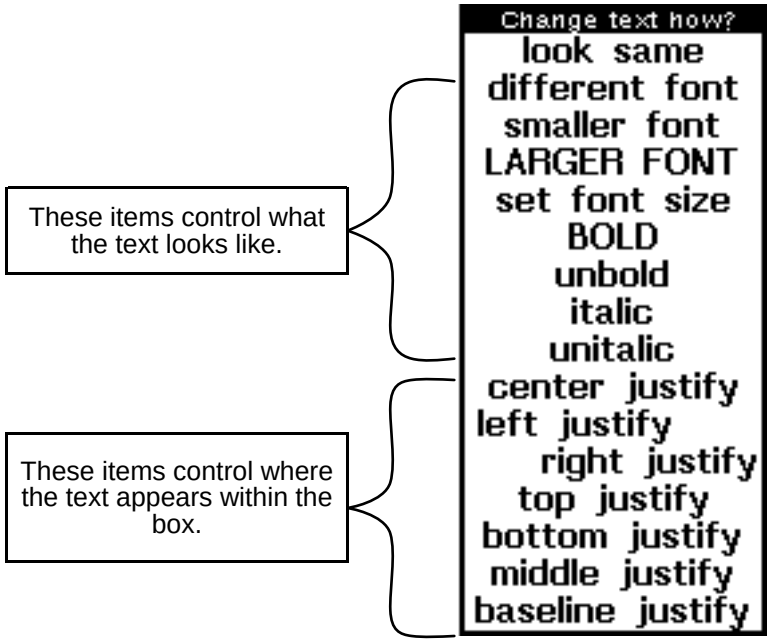


Figure 15. Menu offered for changing boxed text elements

To Remove a Box From Around Text

Select the Change command, move the cursor to one of the corner points of the text box (which will be marked with a), and press and release the left button. The menu shown in figure 14 will appear. Select the item Unbox the Text. The box and all of its properties (such as filling) will be removed. If you want to keep the filling but not display the box, set the border thickness to zero (see the section ''To Change the Border Thickness of a Text Box'').

To Reposition the Text Within a Box

Select the Change command, move the cursor to one of the corner points of the text box (which will be marked with a), and press and release the left button. The menu shown in figure 14 will appear. Select the item The Text. The menu shown in figure 15 will appear. Select one of the items Left Justify, Center Justify, Right Justify, Top Justify, Bottom Justify, Middle Justify, or Baseline Justify. Left Justify will move each line of the text to the left edge of the box. Right Justify will move lines to the right edge. Center Justify will cause each line to be centered between the left and right edges. Top Justify will move the text so that the first line is at the top edge of the box. Bottom Justify will move it so that the last line of text is at the bottom edge. Middle Justify will move it so that the middle of the middle line of text is halfway between the top and bottom edges. Baseline Justify will move it so that the baseline position of the middle line of text is halfway between the top and bottom edges.

To Make the Text in Several Text Boxes Look Alike

The procedure is the same as the one described in the section ''To Make Several Pieces of Text Look Alike.''

To Add Lines to a Sketch

Most sketch elements other than text, such as boxes, circles, and curves, are made up of lines. This section describes all the methods for adding lines, but does not tell you how to change their properties. The line properties are thickness, brush shape, and dashing, and you can change them using the information in the section ''To Change the Way Lines in Elements Look.''

To Add a Line

To add a single line to a sketch, move the cursor into the sketch window and press the middle mouse button. While the middle button is held down, the cursor changes to  mark will

follow the cursor on grid points, described in the section ''To Use the Grid Display''). Move the cursor to where you want one end of the new line and release the middle button. Press and hold the middle button again and move the cursor to where you want the other end. A line will be stretched from the first position to the cursor position and will follow it. When the line is in the right place, release the middle button. If you move outside the window, the stretched line will disappear. If you release the button while the cursor is outside the window, no line is added. This provides a way of aborting if you change your mind while placing the second end of a line. If you move back into the window with the button still down, the line will reappear. If you want to change the position of the first point, click the left button while inside the sketch window, then start this procedure over.

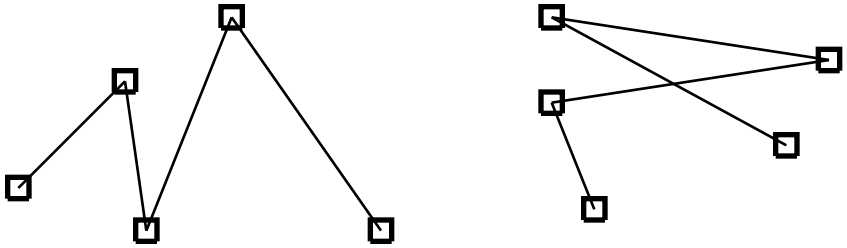


Figure 16. Two examples of connected lines with control points highlighted

To Add a Series of Connected Lines

You can add a series of connected lines using either the mouse or the command. Using the mouse enables you to see and reposition the lines as you draw them, while using the command may sometimes be faster.

With the Mouse

Move the cursor to over the Defaults menu command in the Sketch command menu, press and hold the left button, and slide the cursor out the right side through the triangle. A menu that includes the item Line will appear. Move the cursor over the Line item and slide out its right side. A menu that includes the item Mouse Line Specs will appear. Move the cursor over the Mouse Line Specs item and release the left button. A fourth (and final) menu with the title Connect Middle Button Lines? will appear. Select the Yes item from this menu. This procedure (which you only have to do once) has changed the mode of adding lines with the middle button to construct a series of lines. If you now draw lines as before, a new line will be stretched to the cursor position from the end of the previous line. To start a new series of lines, press either the left or the right mouse button in the sketch window. (A new series of lines is also started when you select a menu command.) You can stop the drawing of an individual line segment by moving the mouse cursor 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.

If you want to change the mode from entering connected lines back to unconnected lines, follow the above procedure but select the No item from the Connect Middle Button Lines? menu.

With the Command

Select the item from the Sketch command menu. The cursor will change to and an will follow the cursor. Move the cursor to each point that the lines go through and click the left mouse button. Each time you specify an endpoint, it is marked with a . After all the points have been specified, move the cursor outside the window and press the left mouse button. After you click outside the window, the line will be drawn connecting the . Figure 16 shows two examples of connected lines.

To Add Boxes to a Sketch

Sketch boxes can be either filled or unfilled; in addition, their borders may vary in thickness and brush shape, or be dashed. To add a box to a sketch, select the command from the Sketch command menu. The cursor will change to . Move the cursor to one corner of the rectangle where you want the box. Press the left button. Holding the left button down, move the cursor to the opposite corner and release the button. While the left button is down, the rectangle will be highlighted in gray. When you release the button, a box will be added. To abort, move the cursor outside the window and click the left button. Note: the specified box must be entirely within the window. Figure 17 shows some examples of boxes.

Figure 17. Three examples of boxes.
The left one has its control points highlighted

To Change the Filling of a Box

Select the Change command from the command menu, then select the box or boxes whose filling you wish to change using the procedure described in the section ''To Select Sketch Elements.'' You can include elements other than boxes as long as the first element you select is a box. The menu shown in figure 18 will appear.

Figure 18. Menu of properties you can change for boxes

Select the Filling item. A menu titled New Filling? similar to the one shown in figure 19 will appear.

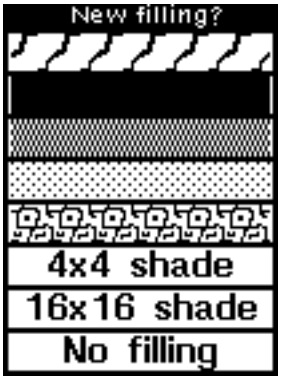


Figure 19. Menu of textures that can fill boxes

If the filling you want is shown on the menu, select it. If you want to remove the filling from a box, select the No Filling item. To create a shade that is not on the menu, select either the 4x4 Shade or the 16x16 Shade item. Selecting either item will cause the shade editor to appear (see figure 20). The 4x4 Shade item will allow you to create a 4-bit-by-4-bit shade. The 16x16 Shade item will allow you to create a 16-bit-by-16-bit shade. Construct the shade you want in the lower part of the window by turning points black with the left button and white with the middle button. Selecting Quit will cause the box to be filled with the newly constructed shade. The shade you created will be added to the menu for future selection. Advanced user note: the function (SK.CACHE.FILLING *SHADE)* can be called to add a filling to the menu.

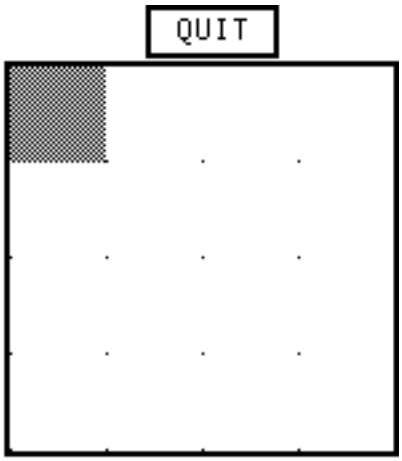


Figure 20. The shade editor

To change the thickness, dashing, or brush shape of a box's border, see the section ''To Change the Way Lines in Elements Look.''

To Add Polygons to a Sketch

Select the command from the Sketch command menu. The cursor will change to and an will follow the cursor. Move the cursor to each vertex of the polygon and click the left button. When you select a point, it is marked with a . When you have selected all the points, move the cursor outside the window and click the left button. The points you selected will become the control points of the polygon. To abort, move the cursor outside the window and click the left button before selecting any points. Figure 21 shows some examples of polygons.

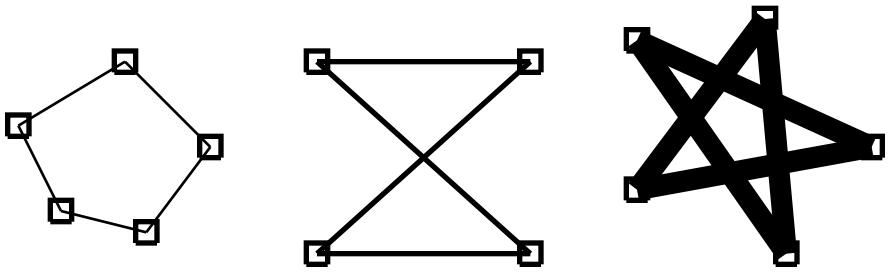


Figure 21. Three examples of polygons with control points highlighted

You can move any of the control points (using one of the point-moving commands described in the section ''To Move Elements,'' below) to change the polygon.

To Add Curves to a Sketch

There are two kinds of curves you can add to a sketch: open curves and closed curves. This section tells you how to add each kind of curve.

To Add an Open Curve

Select the command from the Sketch command menu. The cursor will change to and an will follow the cursor. Move the cursor to the points you want the curve to go through and click the left button. When you select a point, it is marked with a When you have selected all the points, move the cursor outside the window and click the left button. The points where you clicked will become the control points of the curve. To abort, move the cursor outside the window and click the left button before selecting any points. Figure 22 shows some examples of curves.

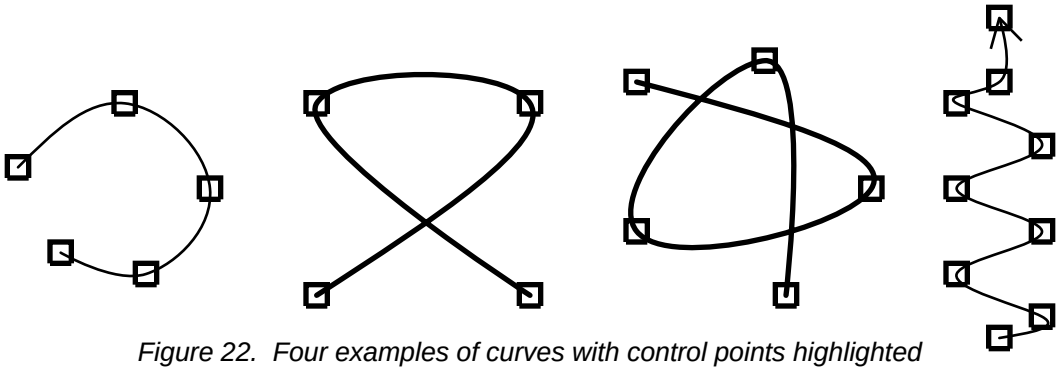


Figure 22. Four examples of curves with control points highlighted

You can move any of the control points (using one of the point-moving commands described in the section ''To Move Elements'') to change the shape of the curve. In general, when you construct a curve, the closer together the points are the sharper the curve is; the farther apart they are, the smoother it is. The best way to learn how the control points affect the shape is to enter lots of different curves and move their points around.

To Add a Closed Curve

Select the command from the Sketch command menu. The cursor will change to and an will follow the cursor. Move the cursor to the points you want the curve to go through and click the left button. When you select a point, it is marked with a When you have selected all the points, move the cursor outside the window and click the left button. The points where you clicked will become the control points of the closed curve. To abort, move the cursor outside the window and click the left button before selecting any points. Figure 23 gives some examples of closed curves.

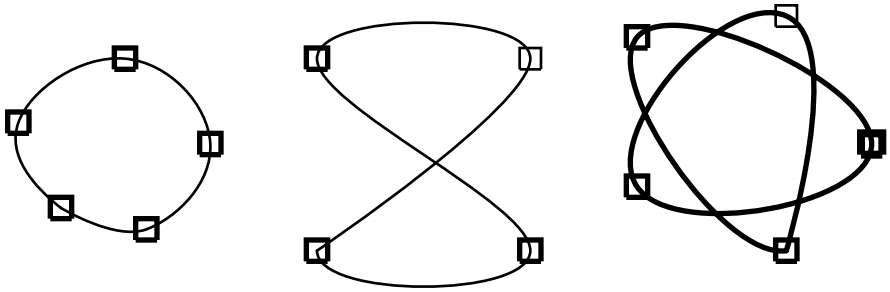


Figure 23. Three examples of closed curves with control points highlighted

You can move any of the control points (using one of the point-moving commands) to change the shape of the closed curve.

To Add Circles to a Sketch

Select the command from the Sketch command menu. The cursor will change to . Move the cursor to the point you want to be the center of the circle and click the left button. The selected point is marked with and the cursor changes to . Move the cursor to a point you want to be on the radius of the circle and click the left button. The circle will be added. The two points you selected are the control points of the circle. Either can be moved using one of the point-moving commands to change the radius and location of the circle. To abort this command, move the cursor outside the window and click the left button. Figure 24 shows two examples of circles.

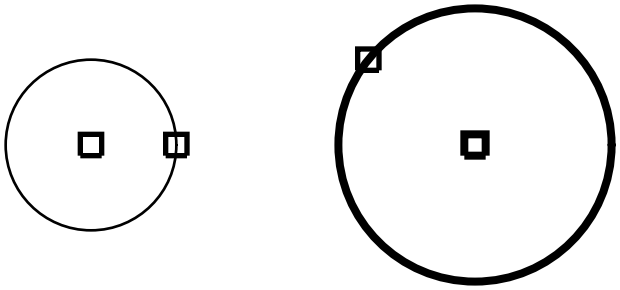


Figure 24. Two examples of circles with control points highlighted

To Add Ellipses to a Sketch

Select the command from the Sketch command menu. The cursor will change to . Move the cursor to the point you want to be the center of the ellipse and click the left button. The selected point is marked with and the cursor changes to . Move the cursor to the point you want to determine one radius and the orientation of the major axis of the ellipse (see figure 25). Click the left button. The selected point is marked with and the cursor changes to . Move the cursor to any point that is the same distance from the center as you want the second radius to be and click the left button. The ellipse will be added.

The control points of the ellipse are the center and first radius point you selected and the point on the ellipse at the minor radius. Any of them can be moved using one of the point-moving commands to change the size, orientation, and location of the ellipse. To abort this command, click the left button with the cursor outside the window.

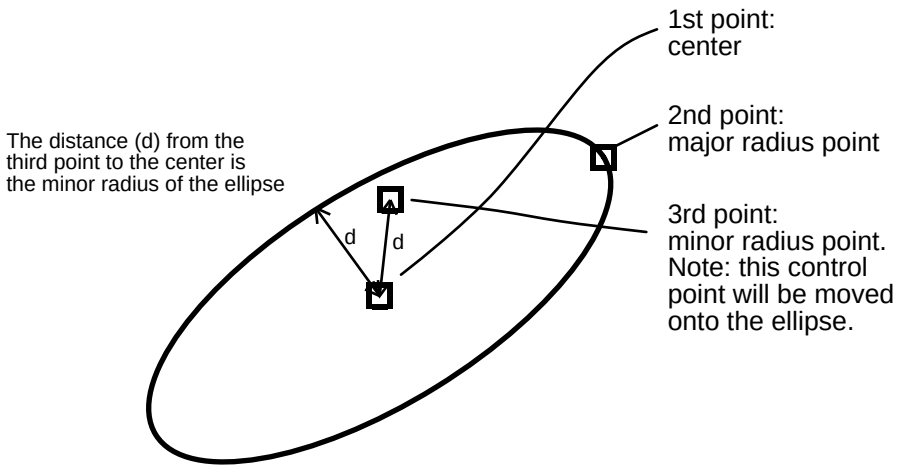


Figure 25. The control points for an ellipse

To Use Arcs in a Sketch

In Sketch, partial circles are provided by the arc command. An arc is characterized by three control points (see figure 26) and a direction. The shape and angle of the arc can be changed by moving any of the control points (using one of the point-moving commands). The angle of the arc can also be changed by setting the number of degrees the arc spans. (See the section ''To Set the Number of Degrees an Arc Spans,'' below.) The direction determines whether the arc is traversed in a clockwise or a counterclockwise direction from the starting point. An arc has

thickness (size), brush shape, and dashing properties; it can also have arrowheads.

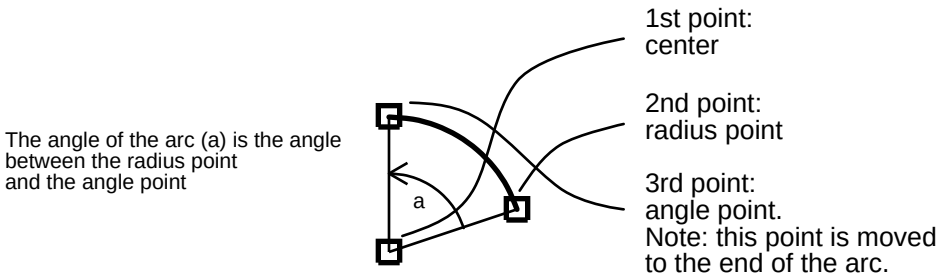


Figure 26. The control points of an arc

To Add an Arc

Select the command from the Sketch command menu. The cursor will change to . Move the cursor to the center of the arc and click the left button. The selected point is marked with and the cursor changes to . Move the cursor to one end of the arc and click the left button. This point determines the radius of the arc and its first end (see figure 26). The arc will begin at this point. The selected point is marked with and t he cursor changes to . Move the cursor to the other end of the arc and click the left button. The arc will be added. To abort this command, click the left button with the cursor outside the window.

To Set the Number of Degrees an Arc Spans

Select the Change command, move the cursor to one of the control points of the arc (which will be marked with a), and click the left button. The menu shown in figure 27 will appear.

Figure 27. Menu of ways to change an arc

Select the Angle item. A number pad menu titled Enter Arc Angle in Degrees will appear (see figure 28). Enter the number of degrees that the arc should span by selecting digits from the number pad. When you are done, select the OK item. The selected arc (or arcs) will be changed to span the indicated number of degrees. The third control point (the angle point) is moved to accomplish this. To abort the command, select the Abort item from the number pad.

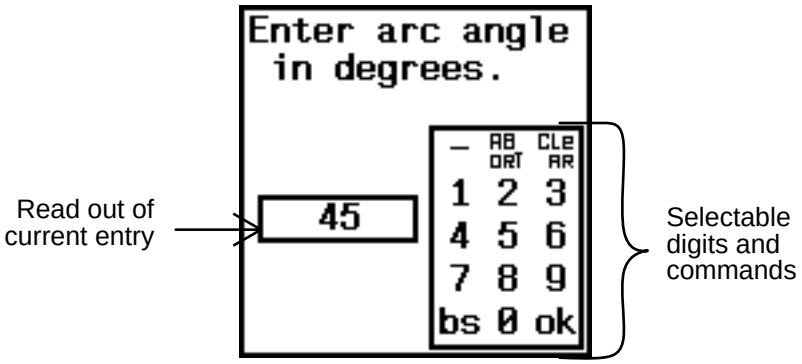
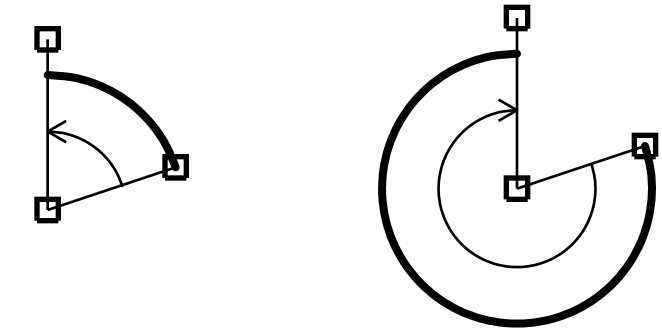


Figure 28. Number pad menu for changing the angle of an arc

To Reverse the Direction of an Arc

Select the Change command, move the cursor to one of the control points of the arc (which will be marked with a), and click the left button. The menu shown in figure 27 will appear. Select the Direction item. A menu titled Which Way Should the Arc Go? with the items Clockwise and Counterclockwise will appear. Select Clockwise if you want the arc to go in a clockwise direction. Select Counterclockwise if you want the arc to go in a counterclockwise direction. Figure 29 shows the same arc with different directions.



Counterclockwise Clockwise

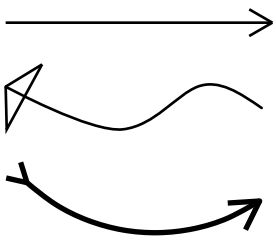
Figure 29. The direction of an arc

To Use Arrowheads in a Sketch

Arrowheads can be added to lines, open curves, and arcs. An arrowhead can be added to either or both ends of an element. It is then a property of the element and moves with it if it moves.

An arrowhead has a shape, a size, and an angle (see figure 30). The default arrowhead shape, size, and angle specify what a newly added arrowhead looks like. If you want to add several arrowheads that look alike, it is easiest to change the default arrowhead properties (see the section ''To Change the Properties of New Arrowheads'') before you add the arrowheads. The shape, size,

and angle of arrowheads on existing elements can be changed using the Change command.



Size: 10, angle: 30, v-shape

Size: 16, angle: 60, triangle shape

Size: 8, angle: 150, v-shape, and
Size: 12, angle: 30, v-shape

Figure 30. Sample arrowheads

To Add an Arrowhead to an Existing Element

Select the Change command from the command menu, then select the element or elements you wish to add an arrowhead (or arrowheads) to using the procedure described in the section ''To Select Sketch Elements.'' You can include elements that do not allow arrowheads (such as text or circles) as long as the element first selected does. A menu will appear that contains all of the properties that can be changed in the first element you selected. It will include the item Arrowheads. Select it. The menu shown on the left in figure 31 will appear.

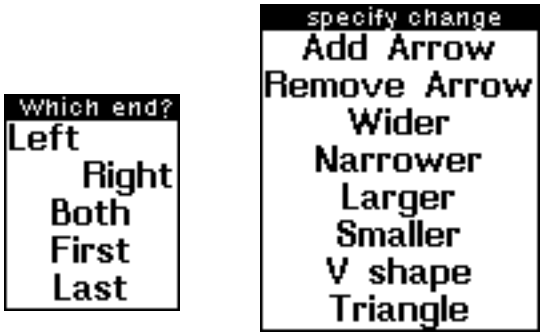


Figure 31. The menus for changing arrowheads.
The left one specifies which end of the line or curve will be changed.
The right one specifies how it changes

This menu allows you to specify the end or ends of the selected element(s) to which the arrowhead(s) will be added. Selecting Left will add the arrowhead to the leftmost end of the element (or the topmost if both ends have the same *x* position). Selecting Right will add the arrowhead to the rightmost end of the element (or the bottommost if both ends have the same *y* position). Selecting Both will add the arrowhead to both ends of the element. Selecting First will add the arrowhead to the end of the element that was entered first when this element was added. Selecting Last will add the arrowhead to the end of the element that was entered last.

After you select one of these items, the menu shown on the right in figure 31 will appear. Select the item Add Arrow. Arrowheads will be added to the specified ends of the selected elements that do not

already have arrowheads. To abort this operation, click the left button outside any menu instead of selecting an item.

To Remove an Arrowhead

Select the Change command from the command menu, then select the element or elements you wish to remove an arrowhead (or arrowheads) from using the procedure described in the section ''To Select Sketch Elements.'' You can include elements that do not have arrowheads as long as the element you select first does allow them. A menu will appear that contains all the properties that can be changed in the first element you selected. It will include the item Arrowheads. Select it. The Which End? menu shown in figure 31 will appear. Select the item that describes the end or ends (Left, Right, Both, First, or Last) from which the arrowhead(s) should be removed. (These items are described in the section ''To Add an Arrowhead to an Existing Element.'') After you select one of these items, the Specify Change menu shown in figure 31 will appear. Select the item Remove Arrow. Arrowheads will be removed from the specified ends of the selected elements that have arrowheads. To abort this operation, click the left button outside any of the menus instead of selecting an item.

To Change the Way an Arrowhead Looks

Select the Change command from the command menu, then select the element or elements whose arrowhead(s) you wish to change using the procedure described in the section ''To Select Sketch Elements.'' You can include elements that do not have arrowheads as long as the first element you selected allows them. A menu will appear that contains all the properties that can be changed in the first element you selected. It will include the item Arrowheads. Select it. The menu shown on the left in figure 31 will appear. Select the item that describes the end or ends on which the arrowheads to be changed occur. (These items are described in the section ''To Add an Arrowhead to an Existing Element.'') After you select an item, the menu shown on the right in figure 31 will appear. See figure 30 for some examples of arrowheads that may help you understand the following instructions.

Selecting the item Wider will increase the angle of the specified arrowhead by 10 degrees. Selecting the item Narrower will decrease the angle of the specified arrowhead by 10 degrees. Selecting the item Larger will increase the length of the specified arrowhead by two screen points. Selecting the item Smaller will decrease the length of the specified arrowhead by two screen points. Selecting the item Triangle will add a base to the arrowhead. Selecting the item V-Shape will remove the base from the arrowhead. To abort this operation, click the left button outside any menu instead of selecting an item.

If you want to change several properties of some arrowheads, it may be easier to set the default arrowhead specifications to be like the arrowhead you want (see the section ''To Change the Properties of New Arrowheads''), remove the existing arrowheads, and then add the arrowheads again. The newly added arrowheads will have the default properties.

To Indicate That New Elements Should Have Arrowheads

Move the cursor over the Defaults command, press and hold the left button, and slide the cursor out the right side of the menu. Another menu will appear. In this new menu, with the left button still held down, position the cursor over the Line item and roll out its right side. A third menu will appear. In this menu, position the cursor over the Add Arrowhead item and release the left button. Two of the menus will disappear, and the menu titled Which End? shown on the left in figure 31 will appear. From this menu select the end of the elements you want to have arrowheads. Usually you will want to select Last. After selecting an item, whenever you add a line, curve, or arc, it will have an arrowhead on the specified end or ends.

To indicate that arrowheads should no longer be added to newly created elements, follow the above procedure but select the Neither item from the Which End? menu.

To Change the Way Lines in Elements Look

Lines, polygons, curves, closed curves, boxes, ellipses, circles, and arcs have thickness (size), brush shape, and dashing properties. You change these properties using the Change command. Figure 32 shows some examples of different-sized lines.

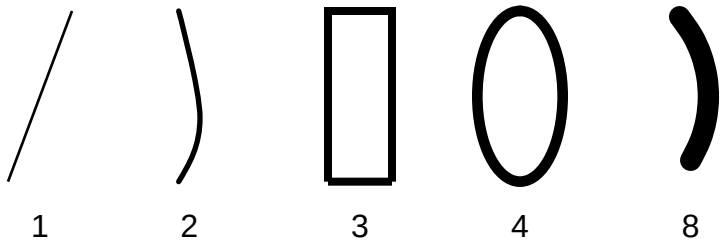


Figure 32. Examples of different sizes of lines

To Change the Size of a Line

Select the Change command from the command menu, then select the element(s) you wish to change using the procedure described in the section ''To Select Sketch Elements.'' You can include elements that do not contain lines as long as the element first selected does; the change will not affect the others. A menu will appear that contains all the properties that can be changed in the first element you selected. Select the item Size. The menu shown in figure 33 will appear. Selecting the item Smaller Line will make all the lines one point thinner. Selecting the item Larger Line will make all the lines one point thicker. Selecting the item Set Line Size will bring up a number pad menu with the title Enter the New Line Thickness. Enter the size you want the lines to be by selecting the digits as you would on a calculator. When you have entered the number, select OK; all the lines will be made that

thickness. To abort the command, select the item Abort from the number pad.

Figure 33. The menu of ways to change the line size of an element

To Make a Dashed Line

Select the Change command from the command menu, then select the element(s) you wish to change using the procedure described in the section ''To Select Sketch Elements.'' You can include elements that do not contain lines as long as the element first selected does; selected elements without lines will be unaffected by the command. A menu will appear that contains all the properties that can be changed in the first element you selected. Select the item Dashing. A menu similar to the one shown in figure 34 will appear.

Figure 34. The menu of dashing patterns

Selecting one of the dashing patterns will make all the lines in the selected element(s) dashed with that pattern. Selecting the item No Dashing will make all the lines be solid; that is, it will remove the dashing from them. Selecting the item Other will prompt you for a new dashing pattern.

A dashing pattern is a sequence of numbers that indicates how many brush marks should be on and off. For example, the pattern (1 4 3 8) is , that is one on, four off, three on, eight off, repeated. When you select Other, a number pad menu with the title Number of Points On will appear. Enter the number of points you want to have on. When you have finished, select OK. A number pad menu with the title Number of Points Off will appear. Enter the number of points you want to have off. When you have finished, select OK. Number pads will continue to appear, giving you a chance to specify as long a dashing pattern as you like. After you have entered the last number in your dashing pattern, select OK when the number pad display has zero in it. A menu with the title Is This Pattern OK?, similar to the one shown in figure 35, will appear.

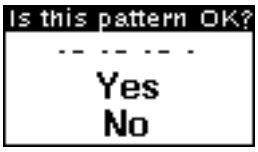


Figure 35. The menu presented to confirm a new dashing pattern

The first item will show the pattern you entered. If this is what you wanted, select the item Yes or the pattern; all the lines in the selected elements will change to that pattern. This pattern will also appear in the menu of dashing patterns the next time you change the dashing of an element. If you want to enter a different pattern, select the item No and you will be prompted for another dashing pattern. If you want to abort, select No and then select Abort from the number pad that appears. Selecting Abort from any number pad will abort the command.

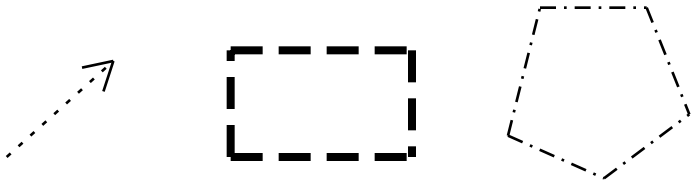


Figure 36. Examples of different dashing patterns for lines

Note: most printers do not support the dashing of splined curves, so curves, circles, ellipses, and arcs will not have dashed lines on hard copy. The effect will only be visible on the display.

To Change the Brush Shape of a Line

Select the Change command from the command menu, then select the element(s) you wish to change using the procedure described in the section ''To Select Sketch Elements.'' You can include elements that do not contain lines as long as the first element you selected does. A menu will appear that contains all the properties that can be changed in the first element you selected. Select the item Shape. The menu titled Pick a Shape shown in figure 37 will appear. Select the brush shape you want. When you have selected one, all of the lines will be painted with that brush. To abort the command, select outside any of the menus.

Figure 37. The menu of brush shapes

Note: because most printers do not support all of the available brush shapes, the effect may be visible on the display only.

To Change the Way New Elements Look

The properties an element has when it is first added to a sketch are called the *default* properties. For example, there is a default size that determines how wide newly added lines, curves, boxes, etc., will be. All these defaults can be changed using the Defaults command and subcommands (see figure 38). If you want to add a collection of elements that are different from the standard, changing the default is often the easiest way to do it. For example, if you want a bunch of extra-thick arrows, you could change the default properties of new lines to have a thickness of two and an arrowhead on the last point specified before you enter the lines for the arrows. Any defaults that you change are saved when the sketch is saved.

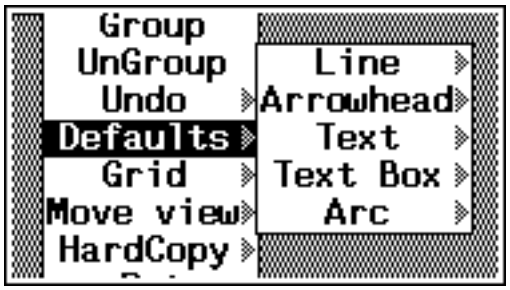


Figure 38. Submenu for the Defaults command

To Change the Properties of New Text

1. Move the cursor over the Defaults command, press the left button, and slide out the right side through the triangle. The middle menu shown in figure 39 will appear. Move the cursor over the Text item and slide out the right through the triangle. The right menu shown in figure 39 will appear.

2. Selecting the item Font Size will prompt you for the size that new text should have; supply it using the same procedure described in the section ''To Change the Size of Text.'' Selecting the item Font Family will prompt you for the family that new text should have, which you specify using the procedure described in the section ''To Changea the Font Family of Text.'' If the specified font cannot be found in the current default size, an error message is printed and the default is not changed. Selecting the item Horizontal Justification will prompt you for whether the new text should be left, right, or center justified. Selecting the item Vertical Justification will prompt you for whether the new text should be top, bottom, middle, or baseline justified. For more information about text justification, see the section ''To Change the Justification of Text.'' Selecting the item Bold and/or Italic will prompt you for the bold and italic properties that new text should have.

To Change the Properties of New Text Boxes

Move the cursor over the Defaults command, press the left button, and slide out the right side through the triangle. The middle menu shown in figure 40 will appear. Move the cursor over the Text Box item and slide out the right through the triangle. The right menu shown in figure 40 will appear.

Selecting the item Horizontal Justification will prompt you for whether the text in new text boxes should be left, right, or center justified. Selecting the item Vertical Justification will prompt you for whether the text should be top, bottom, middle, or baseline justified. For more information about text justification, see the section ''To Reposition the Text Within a Box.'' The font size, family, and bold and italic properties for new text boxes are the same as for text. See the section ''To Change the Properties of New Text.'' The line thickness of the box is the same as the thickness of lines, so to change it see the section ''To Change the Properties of New Lines.''

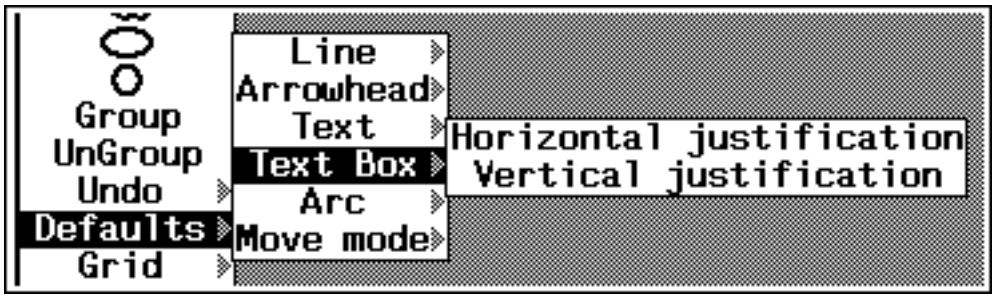


Figure 40. Submenu to set the default position of text inside a text box

To Change the Properties of New Lines

Move the cursor over the Defaults command, press the left button, and slide out the right side through the triangle. The menu shown in figure 38 will appear. Move the cursor over the Line item and slide out the right through the triangle. A menu containing the items Size, Shape, Add Arrowhead, and Mouse Line Specs will appear. Selecting the item Size will prompt you for a number that will become the thickness of any new lines, curves, circles, etc. Selecting the item Shape will prompt you for a brush shape that will become the shape of any new lines, curves, circles, etc. Selecting the item Add Arrowhead will prompt you for which end or ends, if any, of new lines, curves, and arcs should automatically get arrowheads. To change the characteristics new arrowheads have, see below. Selecting the item Mouse Line Specs enables you to choose whether lines created by middle buttoning in the window should be connected.

To Change the Properties of New Arcs

Move the cursor over the Defaults command, press the left button, and slide out the right side through the triangle. A menu that contains (among others) the item Arc will appear (see figure 41). Still holding down the left button, move to over Arc and slide out the right side through the triangle. A menu with the items Clockwise and Counterclockwise will appear (see figure 41). Selecting Clockwise will make new arcs go from their radius point to their angle point in a clockwise direction. Selecting Counterclockwise will make new arcs go from their radius point to their angle point in a counterclockwise direction.

The line thickness of arcs is the same as the thickness of lines. See ''To Change the Properties of New Lines'' if you want to change arc thickness.

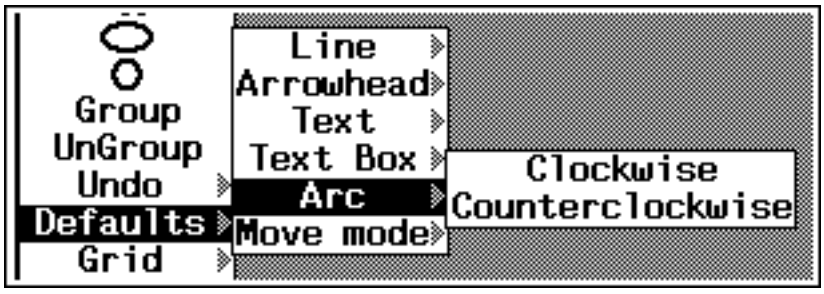


Figure 41. Submenu to change the default direction of arcs

To Change the Properties of New Arrowheads

Move the cursor over the Defaults command, press and hold the left button, and slide the cursor to the right through the triangle. The menu shown in figure 42 will appear. In this new menu, with the left button still held down, position the cursor over the Arrowhead item and slide it to the right again. A menu containing the commands Size, Angle, and Type will appear (see figure 42).

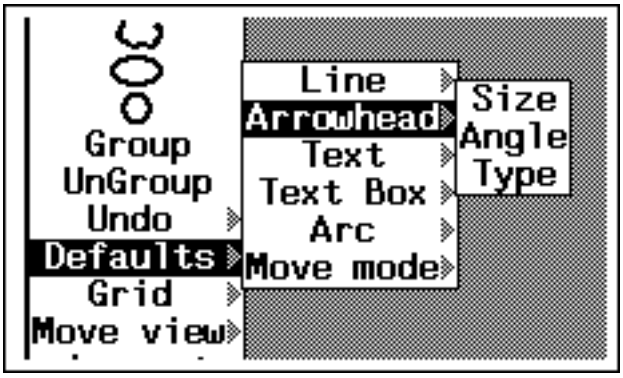


Figure 42. Menu of ways to change the default properties of arrowheads

From this new menu, select the arrowhead property you want to change. Selecting Size will bring up a number pad menu titled New Arrowhead Size in Screen Pts and giving the current default arrowhead size (length of the edges). Enter the number you want to become the size of new arrowheads, then select OK. You can abort the Size command by selecting Abort from the number pad menu.

Selecting Angle will bring up a number pad menu titled New Head Angle in Degrees, which gives the current number of degrees of the angle between the edges of new arrowheads. Enter the angle you want, then select OK. To abort, select the Abort item from the number pad menu.

Selecting the item Type will bring up a menu with the items V-Shape and Triangle, from which you can select the type of end you want new arrowheads to have. If you select V-Shape, your arrowheads will consist of two lines from the head. If you select

Triangle, new arrowheads will be triangles (two lines from the head and a line connecting their endpoints).

After this, whenever you add an arrowhead it will have the specified property.

To Use Bit Maps in a Sketch

You can include bit maps and other types of image objects in Sketch drawings. This section describes the procedures for dealing with bit maps because they are a particularly useful kind of image object, but many of the procedures described here apply to other image objects as well. You can place a bit map in a sketch with the standard copy-select mechanism. A bit map has a single control point at its lower-left corner and can be moved, copied, and deleted like other elements. Advanced user note: applying the Change command to 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.

To Insert a Bit Map From the Screen

Move the cursor into the sketch window and click the left button. A caret (^) will appear. (If it doesn't appear, click again.) Move the cursor into the background (i.e., so it is not in a window). Hold down the copy key. On 1108 and 1186 keyboards, this can be either shift key or the Copy key; on Alto-style keyboards, it is either shift key. A menu with the single item Snap will appear. Select it.

The cursor will change to . Move the cursor to one corner of the region of the screen you want to include in the sketch. Press the left button. Holding the left button down, move the cursor to the opposite corner and release the button. While the left button is down, the region will be highlighted in gray. When you release the button, the message ''Move the figure into place and press the left button'' will appear in a small window above the sketch window. If this doesn't happen, you probably forgot to click in the sketch window first, and the bit map was inserted into whatever window was active. When the message appears, move the cursor into the sketch window and place the bit map image where you want it. When it is positioned, click the left button to insert the bit map.

To Insert a Bit Map of a Pop-Up Menu

Images of pop-up menus are often useful in illustrating documentation (see, for example, figures 38 and 42). To insert a pop-up menu in a sketch, you must break the process that is popping it up using the following procedure. While the pop-up menu is visible, type the help interrupt character. Initially this is control-G (that is, hold the control key down and type G); however some systems move it onto control-H. When you have typed the help interrupt character, a menu containing the names of all the current processes will appear. Select the process that has popped up the menu, which is usually marked with an asterisk. It is often

the process Mouse. If you selected the correct process, a break window will appear and the menu will still be on the screen. If the menu disappears, you broke the wrong process; move the cursor into the break window that appeared, press the middle button, and select OK from the menu that appears. This will continue the process you did break. Bring up the pop-up menu again, type the help interrupt character, and select a different process from the menu. When you get the pop-up menu image to stay up, follow the procedure described above in ''To Insert a Bit Map From the Screen.'' Important: when you have finished getting the image, move the cursor into the break window that appeared, press the middle button, and select OK from the menu that appears. This will continue the process that popped up the menu. If you forget this, strange things will happen when you next use the pop-up menu.

It is often helpful to consider the background onto which the pop-up menu will appear. This is because you often get parts of the background when you copy a menu image. And the bit map editor Trim command (see below and figure 43) only trims away white space. So if there are black background bits, you will have to edit them out using the bit map editor (see the next section). This step can sometimes be avoided by changing the background to white (by typing (CHANGEBACKGROUND WHITESHADE) into the executive window). It is also helpful to move other windows away from the area where the pop-up menu will appear.

To Touch Up a Bit Map

Move the cursor over the bit map's image in the sketch window and press the left button. The menu shown in figure 43 will appear.

Select the Hand Edit item. The cursor will change into and a large box outline will appear. This outline is the region the bit map editor will occupy. Move the box to the place on the screen where you want the bit map editor window to reside and click the left button. The bit map editor window will appear at that location (see figure 44).

Figure 43. Menu of commands to edit a bit map. You obtain this menu by pressing the left button when the cursor is over a bit map image in a sketch window

Edit the image by pressing the left or middle button in the large area at the bottom of the window. The image can be scrolled using the normal scroll bars if not all of it appears in the editing area. To quit, press the middle button while in the gray area at the upper-right part of the window. A menu will appear. Select OK to have the changes you made put back into the sketch. Select Stop if you want your changes disregarded. After you exit the bit map editor, the image in the sketch window is often incorrect. See the section ''How to Clean Up the Display'' for instructions on making it pretty again.

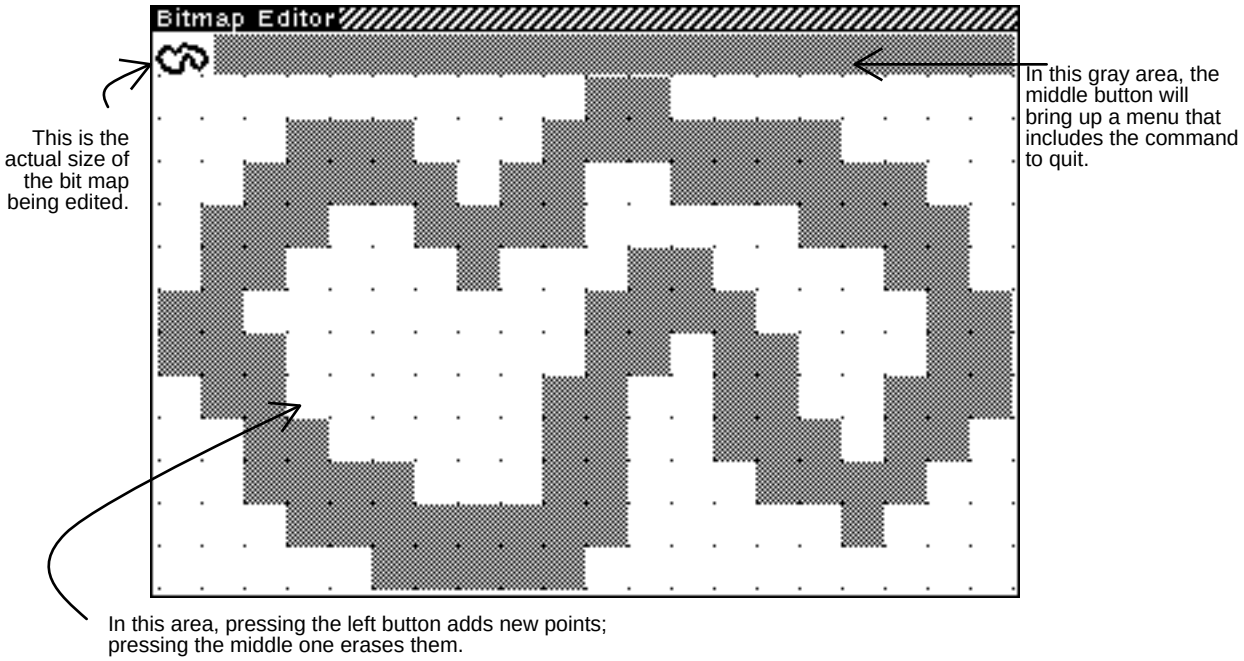


Figure 44. A bit map editor window

Another useful bit map editor command is Trim, available from the Operations on Bitmaps menu shown in figure 43. Trim will remove all the edge rows and columns that contain only white bits, making it easier to place lines and text around the bit map and saving storage space.

To Put a Border Around a Bit Map

Move the cursor over the bit map's image in the sketch window and press the left button. The menu shown in figure 43 will appear. Select the Add Border item. This will prompt you for the number of bits you want in the border, then allow you to edit a four-by-four shade that will be put in the border. You can add multiple borders. For example, many of the bit maps in this document have two points of white surrounded by one point of black.

For a complete description of the bit map editor, see the EditBitMap documentation in the *Lisp Library Packages Manual.*