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INTO DETAILED
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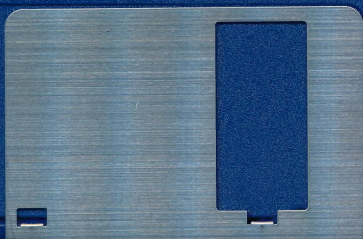
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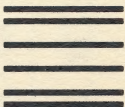
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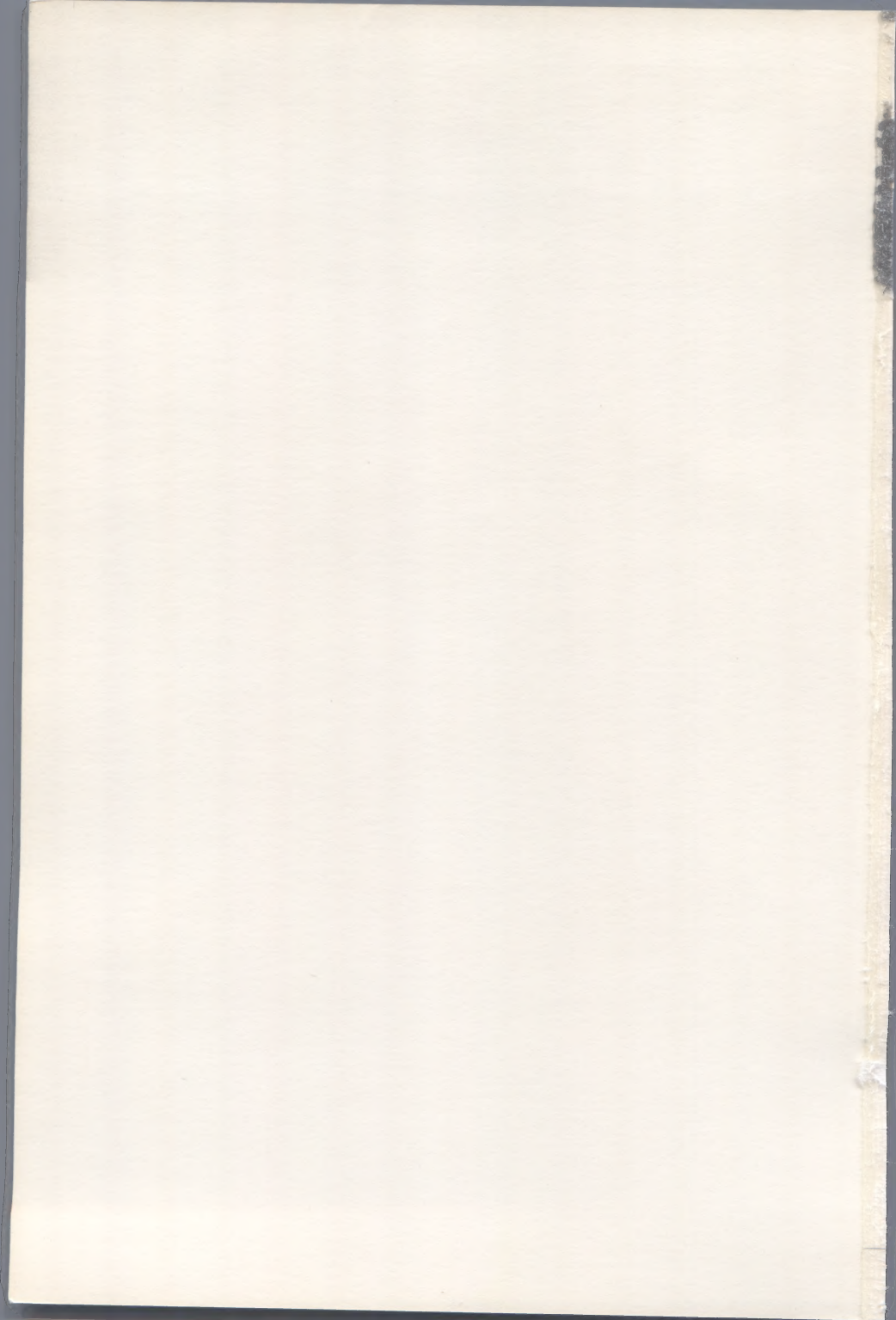
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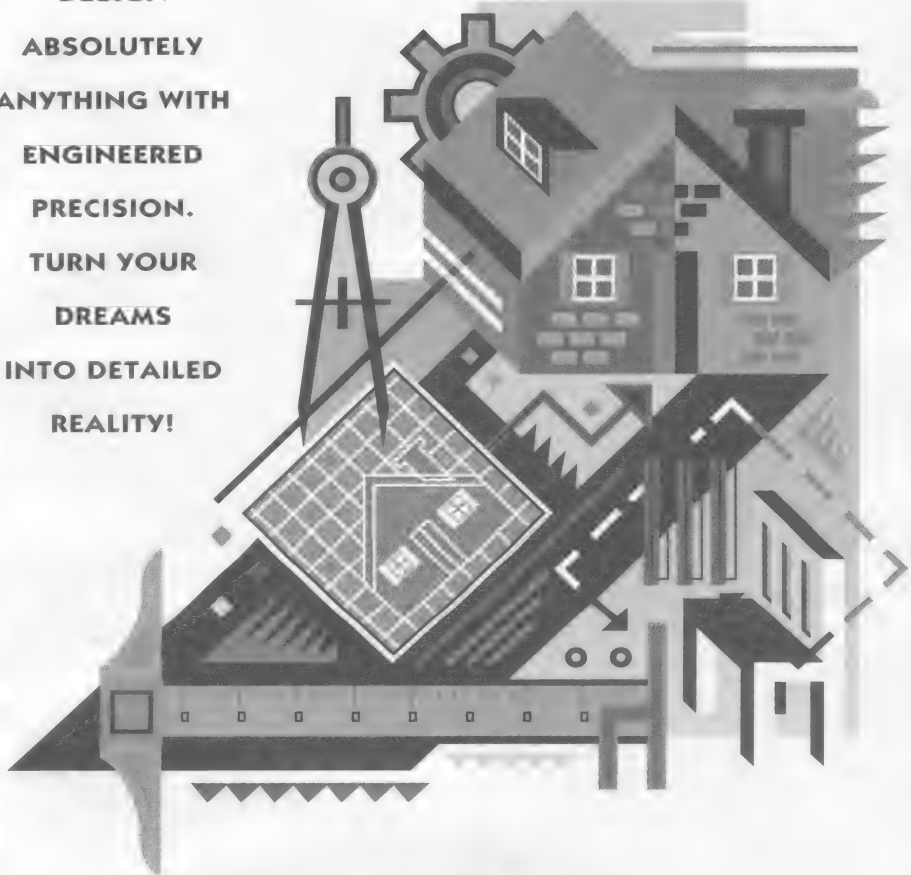
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Table Of Contents

Basics

This chapter discusses the basic layout, on how **KeyCAD Complete** for Mac works. The general layout of the Program Start Up Window is displayed with all of the proper names of tools, menus, readouts, etc. Each toolbox found within the program is explained in a general overview of how those particular tools work.

This chapter is not intended to provide a step by step explanation of each toolbox and readout. To gain a more detailed explanation of how to use specific tools, menus or commands, please refer to the appropriate chapter in this manual.

Window Layout

Menus

File Edit Layout Options Window Layers Text

Untitled1

Tools:

Toolbox Menu

Reduce / Enlarge Button

Title Bar

Fit To Window

Actual Size

Axis Lines

Snap To Grid

Grid Lines

Current Color

Eye Dropper

Unjoin

Join

Unlock

Lock

Ungroup

Group

Flip Horizontal

Flip Vertical

Mirror Horizontal

Scale

Scroll Bars

Resize Button

Color

100% 1" = 1"

◄► X: 0.58   ◄► W: 0.19   100%   RAD.: 0.29   ⟁ -350° 59"
◄► Y: -0.83   ◄► H: 0.14   100%   DIR.: 0.57

Readouts

Edit Toolbox

Draw Toolbox

Origin Point

Zoom %

100%

Edit Toolbox

The Edit toolbox contains tools that you use on previously designed objects. There are only two tools within the Edit toolbox that do not edit the shape of predrawn objects. These are the Zoom tool and the Text tool.

Remember that the following tools require that an object or points within an object be selected before you perform the Edit function you have choosen. These tools are Resize, Skew, Rotate, Fillet, and Chamfer. The Selection tool and the Point Select tool are used for selecting the objects or groups of points you wish to edit.

The Edit tools use the mouse and keyboard entry when working with objects. When using the mouse, use a click and drag method. If you use the keyboard entry you must first have selected the objects or points. Then, double click on the Edit tool of your choice. The following Edit tools are the only tools that support keyboard entry. They are: Selection, Point Select, Resize, Skew, Rotate, Fillet and Chamfer tools. The Trim, Zoom and Text tools do not require any keyboard entry.

Selection Tool

Point Select Tool

Resize Tool

Skew Tool

Rotate Tool

Fillet Tool

Chamfer Tool

Trim Tool

Zoom Tool

Text Tool
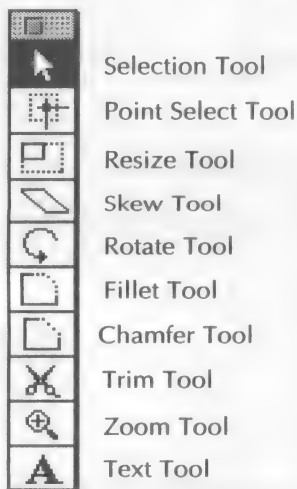
Edit Toolbox

The following is a picture of the Snap To tools as they appear in the program. The names have been listed for the appropriate tool icon. The name indicates the Snap To command that is to be performed when using that particular tool. These tools should be used in all precise alignment of objects as well as object start or end-points.

Drag Zone

Close Button

Any Point

End-Point

Point On

Center

Corner

Intersection

Perpendicular

Line Center

Percentage

Absolute
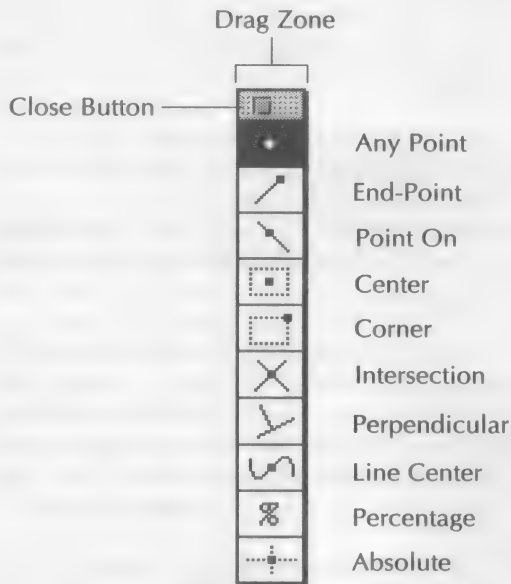
Snap To Toolbox

NOTE: Refer to the *Snap To Tools* section of this manual for a detailed explanation on how to use these tools.

Dimension Toolbox

The Dimension tools are designed to help create dimension lines that appear with witness lines (also called extension lines), which automatically represent the correct dimension value or measurement. A dimension may contain the size of a particular object or the distance between two separate objects. You can create dimension lines for diagonal lines that measure the vertical or horizontal distance and even the length of the angular line.

Dimension tools as they appear in the program. ———————

Linear

Parallel

Angular

Diameter

Radius

Leader Lines

Dimension Toolbox

One of the most important factors in using these dimension tools, is that they are designed to work in combination with the Snap To tools. This assures you of an accurate dimension between two designated points.

Readouts

Nudge Absolute Buttons

Nudge Incremental Buttons

Close Button

Drag Zone

X: 0.58
Y: -0.83

W: 0.19
H: 0.14

100%
100%

RAD.: 0.29
DIA.: 0.57

∠ -350° 59"

X, Y Coordinates (Absolute Coordinates)

Width and Height Display (Incremental Coordinates)

Object Percentage Size

Radius and Diameter Display

Angle Display
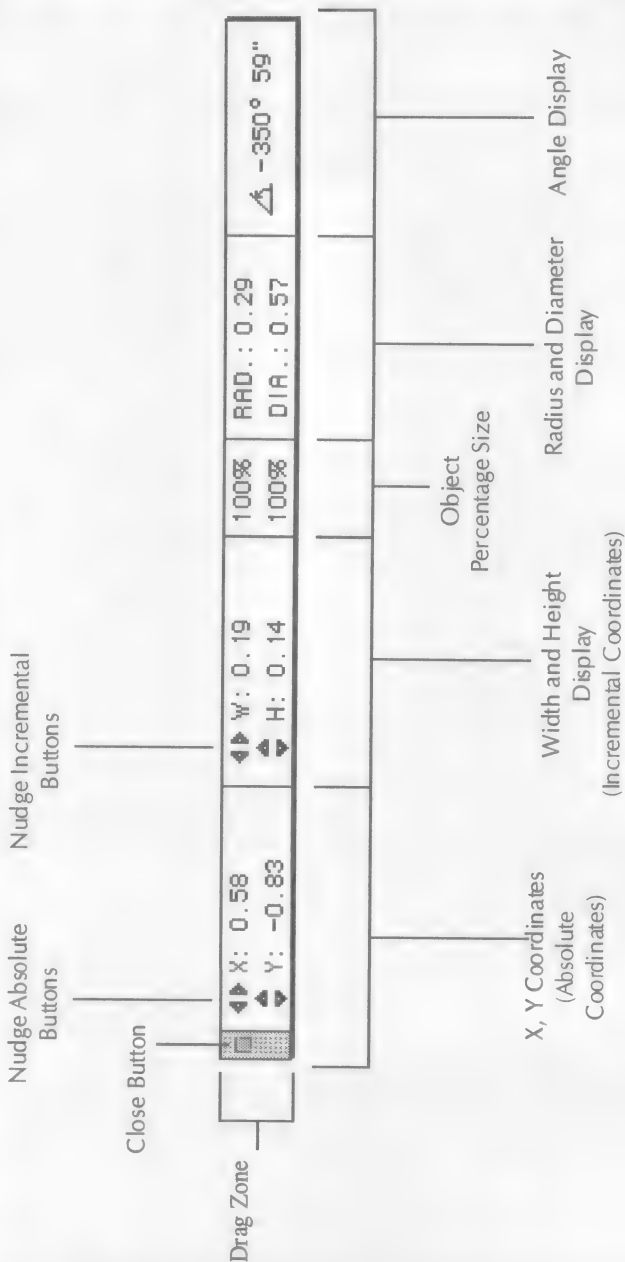
Readouts (Position Info)

In addition to using the Snap To tools for locating specific points on your design, you may also use the Readouts found at the bottom of your screen. The Readouts are designed to help you in specific point locations, angles of lines, and distance or lengths of objects. Readouts are primarily designed to be used with the mouse movements on the screen.

Think of the Readouts as a set of gauges that update automatically with accurate information as you move the pointer, draw, edit, select, or reposition objects. The Readouts are designed to work with English or Metric measurement and display feet and inches, or decimal equivalence.

Refer to the Readouts to help draw or edit any object. For example, as you position the cursor to draw an object, the Readouts display the X and Y coordinates of your mouse cursor, which help you locate the exact spot to begin drawing. As you rotate objects, you can check the degree of rotation while watching the Readouts angle display.

Absolute Coordinates

Note that you have two sets of coordinates. One set reads X, Y coordinates and the other reads W, H coordinates. The X, Y displays are called the Absolute Coordinates. This means that they track the mouse location from the point of origin of the screen. The X, Y coordinates assist you on accurate location of the start and end-point of the drawing or editing of an object.

Absolute Nudge   ◀▶ X: 0.58
Buttons ───────────   ▲
                       ▼ Y: −0.83
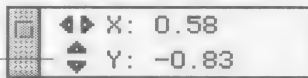
Absolute Coordinates

Incremental Coordinates

The Incremental Coordinates are displayed with the letter (W) for the Width and (H) for the Height of any object drawn.

Select a Draw or Edit tool; click to start the selected function. The W, H readout is automatically set to zero(0) to track the actual movement of the mouse when drawing or editing an object.

NOTE: The W,H or Incremental Readouts only display and track the start and end-point of your mouse movements.

Incremental Nudge
Buttons

⬛ W : 0.19
⬛ H : 0.14
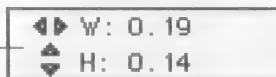
Incremental Coordinates

Nudge Buttons

The Absolute and Incremental Nudge buttons are shown in the two previous figures. These buttons move a selected object by setting any nudge increment. Set the nudging rate under the Nudge subheading found under the **Edit** menu at the top of your screen. The program defaults to one pixel nudge rate.

The Absolute Nudge buttons move the selected object according to the nudge rate. This does not change the size of the object, but rather changes the location of the object.

The Incremental Nudge buttons change the width and height of any selected object. The center of the selected object is used as a reference point, and nudges according to the current nudge rate.

Percentage Readouts

The Percentage readouts are used mainly for the resizing of selected objects. When you draw an object, the percentage display shows 100%, when you release the mouse button. This means that the object you have drawn is at 100% size. If you then resize the object using the Resize tool, you have the option of resizing by percentage versus using the coordinates. The readouts display the width and height percentages.

Percentage displays —————————— 100%
                                                      100%

Radius and Diameter Readouts

When you are creating arcs or circles, the Radius and Diameter readouts display an accurate measurement of the radius or diameter of the object you are drawing.

Radius display —————————— RAD.: 0.29
                                                  DIA.: 0.57
Diameter display ——————————

Angle Readouts

This section of the Readouts window, tracks the angular movement of the cursor. It is useful when creating angular lines or rotating objects to a specific angle.

Angle display ——————— △ -350° 59"

Menu Bar

Mirror

Flip Vertical

Flip Horizontal

Group

Ungroup

Lock

Unlock

Join

Unjoin

Fit to Window

Actual Size

Tools:

Toolbox Pull-Down Menu

Axis Line On or Off

Snap to Grid

Grid Lines On or Off

Current Color

Eyedropper

Color
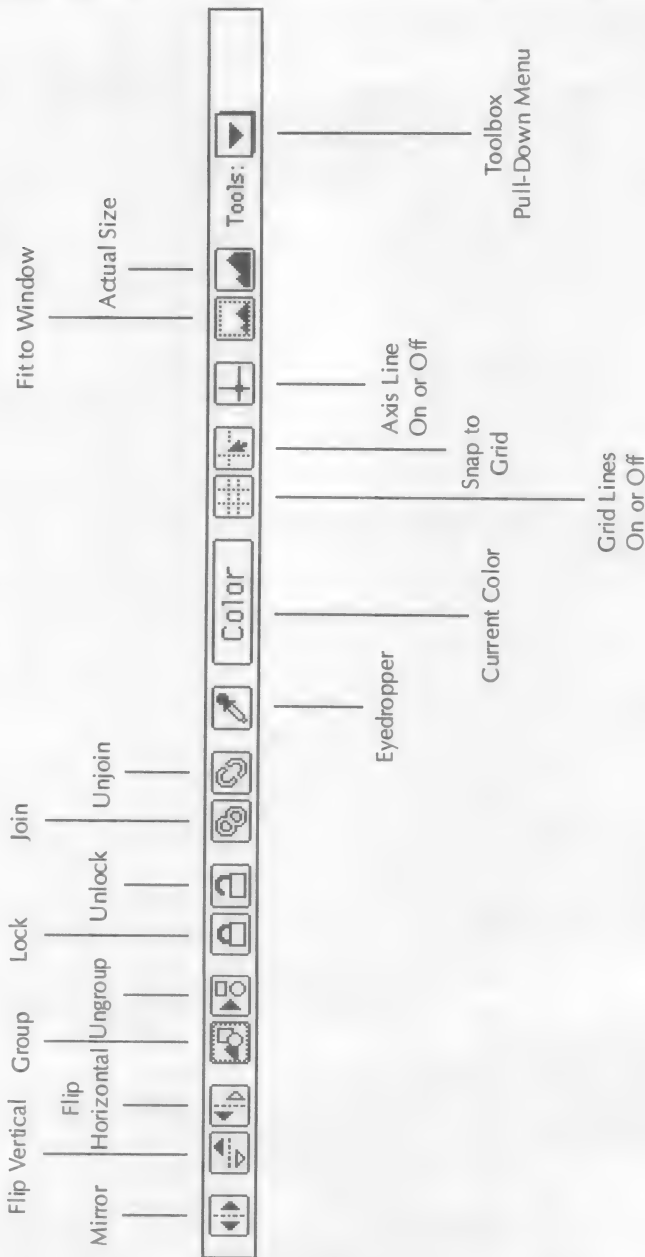
Menu Bar

The Menu Bar permits more efficient work within your design. The
Menu Bar can be turned on or off as necessary. To turn the Menu Bar
on or off, first pull-down the **Layout** menu and then select the Menu
Bar command. Hold down the Command-M keys to turn the Menu
Bar on or off.
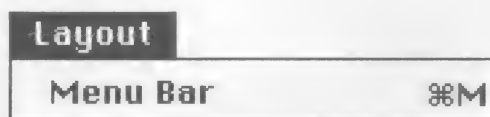
Layout

Menu Bar   ⌘M

The commands, tools, and options found within the Menu Bar can be
accessed within the various menus found at the top of your screen.

The buttons and pull-down menus have been designed with minimal
size. They are placed along the edge of the title bar to minimize space
utilization and allow an unobstructed design environment.

If you are using a monitor that is smaller than the width of the Menu
Bar, the program cuts off the options furthest to the right. It omits one
option at a time, until the width of the Menu Bar fits within your screen
size.

The following pages provide a brief definition of each option found
within the Menu Bar. Please refer to the Menu to access further details
on selected options. The Menus provide detailed examples on how
to use these options while creating your design. Refer to the *Contents*
Section at the begining of the manual for a list of commands contained
within each menu.

Mirror
This function permits you to duplicate and flip a selected object. The mirrored object is slightly offset from the original. To use the Mirror command, first select the object then click on the Mirror button within the Menu Bar. You can Mirror individual objects or groups of objects.

Flip Vertical
This button allows you to Flip selected objects along the vertical axis. It is comparable to flipping the selected object upside down. You can Flip individual objects or groups of objects.

Flip Horizontal
This button allows you to Flip selected objects along the horizontal axis. It is comparable to flipping the selected object to the right. You can Flip individual objects or groups of objects.

Group
This button allows you to consolidate a set of selected objects as one grouped object. A grouped set of objects is treated as a single object, rather than several individual objects.

Ungroup
The Ungroup button automatically divides a grouped object into individual objects.

Lock
This button allows you to Lock the characteristics and location of a selected object or groups of objects, so that you cannot change them.

Unlock
This button allows you to Unlock selected objects that you have previously locked.

Join
This button allows you to connect (Join) all selected lines or arcs that share an overlapping (connected) end-point.

Unjoin
This button allows you to disconnect all selected lines or arcs that have been Joined together.

Eyedropper
The Eyedropper button allows you to select the current color from any color within your design. Once you click the Eyedropper button on a color within your design, that color then becomes the current color. The color you have clicked on is then displayed in the Color button.

Current Color
This button displays the current color within the program. Click once on the button to select the color picker.

Grid Lines On or Off
This button allows you to turn the Grid Lines on or off. This function is dependent on the current status of the Grid Lines when you click the button. Set the Grid spacing under the **Grid** pop-up menu found under the **Layout** menu.

Snap To Grid
This button allows you to quickly turn the Snap To Grid option on or off.

Axis Lines On or Off
This button allows you to toggle the Axis Lines, on or off. The Axis Lines represent the Origin point. This is the reference source for all Absolute coordinates and Readouts.

Fit to Window
This button allows the program to automatically fit the entire design within your current window size. This is useful for the overall layout of a design.

Actual Size
Click on this button to display your design at its actual size. This is useful when you have Zoomed In or Out and wish to return to Actual Size without using the Zoom tool or Menu command. To access the keyboard equivalent for Actual Size, press the Command-E keys. The Menu command is found under the **Options** menu.

Tools: ▼   **Toolbox Pull-Down Menu**
This pull-down menu allows you to turn on or off any of the toolboxes found within the program.
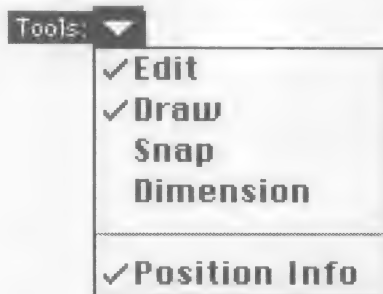
Toolbox Pull-Down Menu

Edit Toolbox

The Edit tools offer the ability to edit or change any object that has been created within the program, in addition to designs that were imported from elsewhere. If you are working on imported designs, verify that the design is in a vector format, NOT a raster format such as paint files. The way that the Edit tools work, is by selecting the individual or groups of points that you wish to edit. You may select points by clicking on the individual vertex points of the object or by dragging a selection rectangle around the points you wish to edit.

The Edit tools offer you the following types of functions: Selecting Objects, Individual point selection, Resizing of objects, Skewing objects to any angle, Rotating objects from 0 to 360 degrees, Fillet and Chamfer capabilities, Trimming of objects, Zooming and Text.

To maintain a high level of accuracy, you may combine the Edit tools with the Snap To tools which are also found within the program. The Snap To tools are designed to work in conjunction with all of the tools found within the program. You may refer to the *Snap To Tools* section of this manual for more details concerning these tools.

This section of the manual offers you a detailed explanation of each tool capability as well as some step by step instructions on how to use the Edit tools.

Edit Tools and Individual Names

The following example is a complete list of all the Edit tools and the proper name for each tool. It is very important to learn their proper names.

▣ ▸	Selection Tool
⊕	Point Select Tool
▱	Resize Tool
◹	Skew Tool
↻	Rotate Tool
▢	Fillet Tool
◿	Chamfer Tool
✂	Trim Tool
⊕	Zoom Tool
A	Text Tool

Edit Tools

Selection Tool

The Selection tool is primarily used for repositioning selected objects to any location within your design. This tool allows you to select and move individual or groups of objects anywhere within your design area.

This tool is the first tool in the Edit toolbox, and is sometimes called a *Cursor* tool. The tool works in two different fashions when selecting objects. First, you can simply click on any part of an object therefore highlighting the object. (You may add more objects by holding down the Shift key when clicking on additional objects.)   The second method of selection is to drag a selection rectangle around the object or group of objects that you wish to select.

If you have a specific location that you want to type when moving objects you may do so by using Keyboard Entry. This is explained further in this section under the subheading *Keyboard Entry*.

Selecting Objects

One of the most common ways of selecting objects is to click on a part of the object you wish to select. After clicking on the object, the vertex points become highlighted. Once the points are highlighted you can then place the cursor on top of a line within the object and hold down the mouse button, then begin dragging the object to any location on the screen. When dragging the object a ghost line appears, which represents the boundary lines of the object or objects selected.

NOTE: You can maintain a perfect horizontal or vertical movement while holding down the Shift key once you have started dragging the object.

Example 1

The following example provides further explanation on how to use the Selection tool by clicking on the object of your choice.

Step 1

Create a simple object as shown below, then place the cursor on top of the object as shown and click the mouse button once.

Click mouse once

Step 2

Once you have clicked the mouse button, the vertex points of the object are highlighted as shown below.
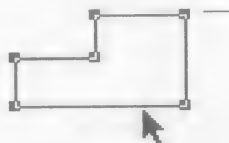
— Selected vertex points

Step 3

Now that the object is selected, you can begin to move it. While keeping the cursor on top of the selected object hold down the mouse button and begin dragging the object to a different location. The ghost lines then appear to help you align the object with other objects. You can maintain a perfect horizontal or vertical movement while holding down the Shift key once you have started dragging the object.

Ghost lines

Example 2

The following example provides further explanation on how to use the Selection tool with a selection rectangle.

Step 1

Create a simple object as shown below, then click on the Selection tool within the Edit toolbox. Now place the cursor near the object (as shown below) and hold down the mouse button while dragging the mouse. This creates the selection rectangle and therefore selects any objects within the selection rectangle. This works well when you want to select multiple objects to be moved together.

Selection Rectangle
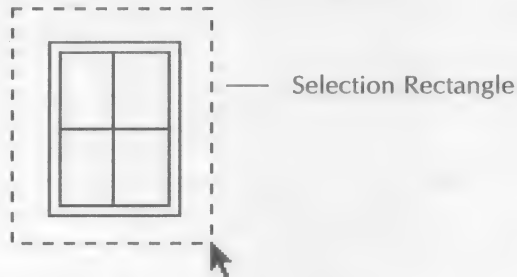
Step 2

Once you have selected the objects, the vertex points of the objects are highlighted as shown below.
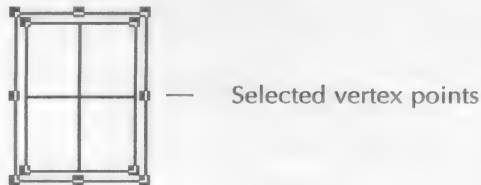
Selected vertex points

Step 3

Now that the object is selected, you can begin to move it. While keeping the cursor on top of the selected object hold down the mouse button and begin dragging the object to a different location. The ghost lines then appear to help you align the object with other objects. You can maintain a perfect horizontal or vertical movement while holding down the Shift key.

Keyboard Entry with Selection Tool

When using the Selection tool you have the option of using Keyboard Entry. This means that if you have a specific location you wish to move an object to, you can do so easily. To access the Selection tool Dialog box, simply double click on the Selection tool icon.

When moving an object, you must first select one. If you have not selected an object, you must first snap to a point on the object, then press the Enter key. This allows the program to determine which point of the object should be placed at the new coordinates. When snapping to the point of your choice be sure to use the Snap To tools within the Snap To toolbox to assure complete accuracy when moving the object. The Dialog box lets you choose from Cartesian or Polar coordinates.

```
┌─────────────────────────────────┐
│  Selection Tool                 │
│  ─────────────────────────────  │
│          Coordinates            │
│    ◉ Cartesian    ○ Polar       │
│                                 │
│         X: [0.00    ]           │
│         Y: [0.00    ]           │
│                                 │
│    ( Cancel )    (( OK ))       │
└─────────────────────────────────┘
```
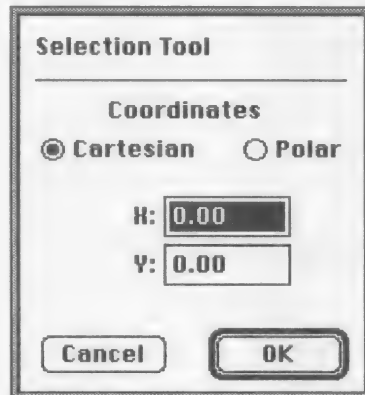
Selection Tool Dialog box

NOTE: The typed coordinates are relative to the object's current position.

[⊹] Point Select Tool

The Point Select tool is primarily used for individually repositioning selected points to any location within your design. To maintain perfect accuracy in working with the Point Select tool, combine this tool with the Snap To tools. This tool is the second tool in the Edit toolbox, and is also known as a *Cursor* tool.

If you prefer not to use the mouse when moving selected points you have the option to specify any X, Y coordinates of your choice by using Keyboard Entry. *Keyboard Entry* is explained in greater detail within this section.

Selecting points with the Point Select tool

This tool works in two different ways when selecting objects. First click on any individual vertex point within an object; therefore highlighting just that point. (You may add more individual points by holding down the Shift key when clicking on additional vertex points.)

The second method of selection is to drag a selection rectangle around the individual point or groups of points that you wish to select.

Selection
Rectangle

When the points are highlighted, place the cursor on top of a selected point within the object, hold down the mouse and move these points to any location on the screen. When dragging these points, a ghost line appears representing the boundary lines of the points you have selected. You can maintain a perfect horizontal or vertical movement while holding down the Shift key once you have started dragging the selected points.

Example

The following example shows how the Point Select tool can help in editing your designs. A simple closet layout has been created for this purpose. It is possible to use a design of your choice or create a similiar design to the one below.
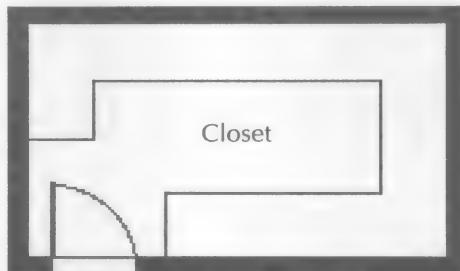
Example of a Closet Layout

Step 1

After you have created a design, select the Point Select tool from the Edit toolbox. Now drag a selection rectangle around the end of the closet as shown below. Once selected, the individual points are highlighted. Now move these selected points.
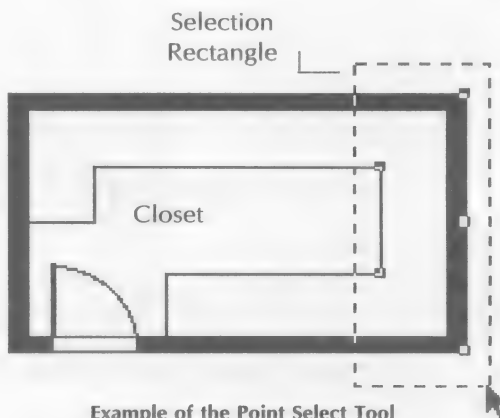
Example of the Point Select Tool

Step 2

Place the Point Selection tool cursor on top of a highlighted point as shown below. After placing the cursor on top of the point, hold down the mouse button and drag the selected points to the left. Watch the readouts at the bottom of your screen for precise movement. Remember that you can hold down the Shift key to constrain your movement horizontally.

Closet

Hold down mouse button
and drag to the left
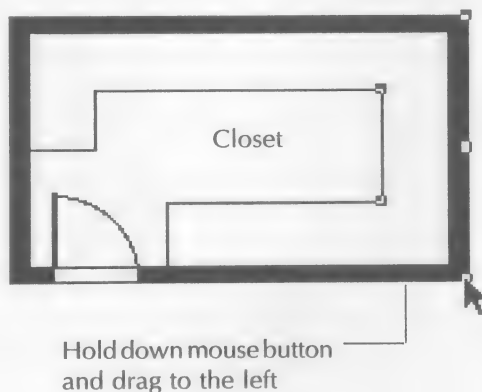
Step 3
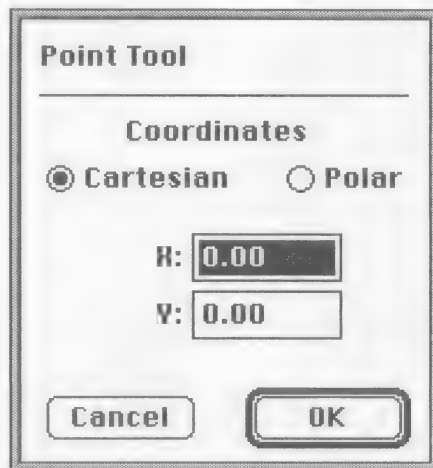
Once you have reached a desired distance, release the mouse button and your design is automatically updated to reflect the changes. This is a very useful tool for updating previously drawn designs.

Closet
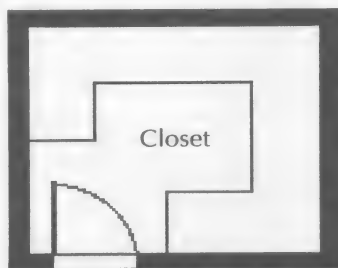
Keyboard Entry with Point Select Tool

The Point Select tool has the option of using Keyboard Entry for a very precise movement. This means that if you wish to move any point or group of points to a specific location (XY Coordinates) , you can do so easily. To access the Point Select tool Dialog box, simply double click on the Point Select tool icon.

It is important to remember that when moving selected points using Keyboard Entry, you must first select the points you wish to move. After selecting the points, you must first snap to one of the selected points, then press the Enter key. This allows the program to determine which point of the object should be placed at the new coordinates. When snapping to the point of your choice be sure to use the Snap To tools within the Snap To toolbox for complete accuracy when moving the selected points. The Dialog box allows you choose from Cartesian or Polar coordinates, as well as Relative or Absolute reference coordinates.

```
┌──────────────────────────────────────┐
│  Point Tool                          │
│  ──────────────────────────────────  │
│            Coordinates               │
│     ◉ Cartesian      ○ Polar         │
│                                      │
│           X: ┌──────────┐            │
│              │ 0.00     │            │
│              └──────────┘            │
│           Y: ┌──────────┐            │
│              │ 0.00     │            │
│              └──────────┘            │
│                                      │
│     ┌─────────┐   ┌──────────┐       │
│     │ Cancel  │   │    OK    │       │
│     └─────────┘   └──────────┘       │
└──────────────────────────────────────┘
```

Point Select Dialog box

NOTE: The Absolute coordinates that you enter are in reference to the point of origin of the working design. The program initially sets the origin to the lower left-hand corner of the design.

⊡ Resize Tool

When using the Resize tool you have the ability to change the horizontal and vertical widths of any object. Also when using the Resize tool you can choose from the mouse or Keyboard Entry.

In using the mouse, you simply click and drag the corner of the object you wish to resize. You can watch the readouts at the bottom of your screen to maintain any specific size. While resizing objects, ghost lines appear for visual representation.

If you choose to use Keyboard Entry, you must first select the object and then double click the Resize tool icon to access the Keyboard Entry Dialog box. Once the Dialog box appears you can then numerically enter the width and height of the object.

Selecting an object for resizing

First select the Resize tool from the Edit toolbox, then place the cursor on the object of your choice and click the mouse button. The points of the object then become highlighted and you are ready for resizing.

If you have multiple objects that make up one design and you wish to resize all of them at one time, drag a selection rectangle around those objects to highlight the object vertex points.
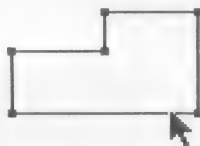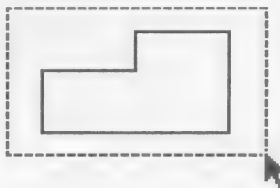
Point and click   Selection Rectangle

Example

The following example shows you how to resize the window you just created. Notice that the window is made up of multiple objects such as lines and rectangles. Therefore, when you select the window, drag a selection rectangle around the entire window as shown below, to highlight the points within the window.

Step 1

First, drag the selection rectangle around the window to highlight the points within the window.
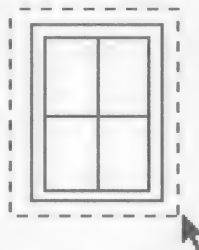
Selection Rectangle

Step 2

Be sure that the Resize tool is selected, then place the cursor on top of the corner point as shown below. This is the point you need to drag for resizing the window. The opposite point that you grab is used as the anchor point when resizing. This means that the point stays in its original position, while dragging the other point.

Anchor point——
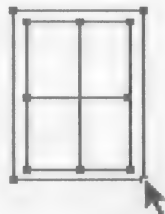
—— Point being dragged

Step 3

Now hold down the mouse button and begin dragging. The ghost lines appear as a visual reference for resizing the window. Watch the readouts at the bottom of your screen to maintain a specific size. Once you have reached the desired size, release the mouse button.

Ghost lines
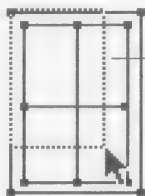
Window after resizing

Drag the mouse to the
desired size

Keyboard Entry with Resize Tool

When resizing objects you have the option to use numeric Keyboard Entry. This is very helpful when you need to resize an object to a specific size.

To access the Resize tool Dialog box, simply double click the Resize tool icon. When using Keyboard Entry with the Resize tool, you must first have an object selected. The Resize Dialog gives you the option to resize by percentage or by object size. You can choose from which part of the object you want to resize.
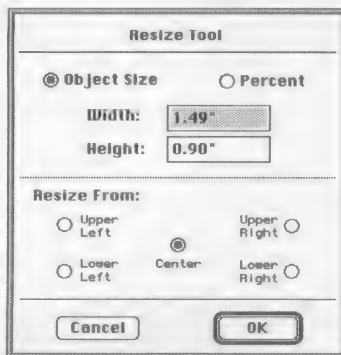
Resize Tool Dialog box

Skew Tool

This tool is designed to give any selected object a skewed angle. When this tool is used, the selected object takes on an angular shape.

The Skew tool supports the mouse as well as numeric Keyboard Entry. When using the mouse, first select the entire object so that the vertex points are highlighted. Next place the mouse cursor on top of a highlighted vertex point; then click and drag to a desired angle. When using the mouse a ghost line appears to give you a visual representation of the object as it is being skewed. You can watch the readouts at the bottom of your screen to obtain any necessary angle.

Example

Step 1

Create a shape similiar to the one shown below. Then select the object so that the vertex points are highlighted. Now place the cursor on the top point of the triangle, then click and drag the cursor to the left as shown below.

Ghost lines
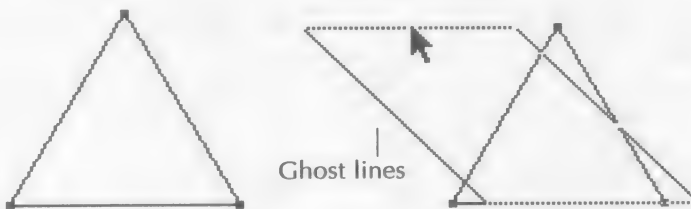
Step 2

Once you have reached a desired distance or angle release the mouse button. This example shows a triangle skewed to a 30 degree angle.

Skewed Object

Keyboard Entry with Skew Tool

The second method of using the Skew tool would be with numeric Keyboard Entry. Using Keyboard Entry is useful when you need to skew an object to a specific angle.

Before accessing the Skew tool Keyboard Entry Dialog box, select an object. Then simply double click on the Skew tool icon and the Dialog box appears. Once the Dialog box appears type in the angle of your choice and click the OK button. Your selected object is automatically updated to reflect the new changes. The Dialog box offers you the option to choose which direction to skew the object. Choose from Up, Down, Left or Right. The Distance entry determines how far you skew the object.

Skew Tool Dialog box

Rotate Tool

By using the Rotate tool you can rotate any object from 0 to 360 degrees. All objects rotate from the center of the object that you have selected. Rotating objects can be performed by two methods; the mouse or Keyboard Entry.

The following example shows how to use the Rotate tool with your mouse.

Example

Step 1

First you need to create an object similiar to the one shown below or use an object of your choice. Once you have completed this step, select the object so that the vertex points are highlighted. Select the object by clicking directly on the object or by dragging a selection rectangle around the object.
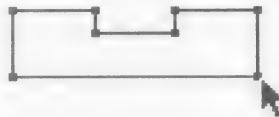
Highlight object

Step 2

Place the cursor on the corner vertex point, then click and drag the mouse in a counter clockwise direction. Once you start to drag the mouse a ghost line appears representing the boundaries of the object. After you reach the desired rotation release the mouse button. Watch the readouts at the bottom of your screen for the degrees of rotation.

Begin dragging
the mouse

Rotated object

Keyboard Entry with Rotate Tool

You have the option to rotate any object or groups of objects by using numeric Keyboard Entry. You must select an object before accessing the Keyboard Entry Dialog. After selecting an object, double click on the Rotate tool icon. Once the Dialog box appears you can type in any degree of rotation. You also have the option to choose from Degrees or Radians. After you enter the correct information click on the OK button.

NOTE: The program allows you to rotate individual objects or groups of objects when using Keyboard Entry. Be sure to have all the necessary objects selected before accessing the Dialog box.
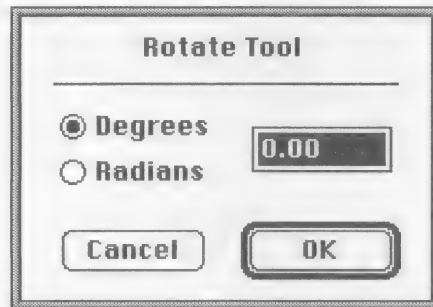
Rotate Tool Dialog box

Fillet Tool

When using the Fillet tool, you can add a radius to any object that you may have created. Remember that the Fillet tool works with corner points of an object. What this means is that before you can apply a fillet with the Fillet tool, the corner point you are selecting must be joined together or made of enclosed objects such as rectangles, squares, polygons, etc. The example shown below gives a further explanation.

Example 1

With the two lines shown below, the Fillet tool cannot be used to apply a radius between the end-points of the two lines. In this instant you would use the Arc tool from the Draw toolbox, then snap each end of the arc to the end-points of the two lines. For more information concerning the Arc tool please refer to the *Draw Tools* section under the Arc tool subheading.

Arc tool

Use Arc tool to apply a radius between two separate end-points

Draw Toolbox

The rectangle shown below is the type of object you use the Fillet tool with. The reason the Fillet tool works on the rectangle is because the corner points are joined together and make up just one vertex point rather than two as shown above.

You can apply the Fillet tool to corner vertex points which are joined

Using the Fillet tool

The following example guides you through the proper usage of the Fillet tool. This tool works with the mouse and enables you to enter a precise radius with the numeric Keyboard Entry.

Example 2

Step 1

First, create a shape similiar to the one below or use a shape you have already created. The shape shown below has been created with the Rectangle tool. After creating a shape, select the Fillet tool from the Edit toolbox and click on the corner vertex point as shown below.

Click on corner vertex point ——
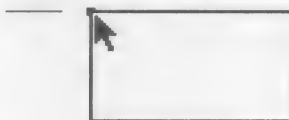
Step 2

Now hold down the mouse button and begin dragging the cursor towards the center of the rectangle as shown below. You can watch the readouts at the bottom of your screen to maintain a specific radius. Once you have reached the desired radius, release the mouse button. The design is automatically updated to reflect the filleted corner.

Drag cursor towards the center
of the rectangle

Release mouse button to
display the radius

Keyboard Entry with Fillet Tool

The Fillet tool has the ability to type in the radius with numeric Keyboard Entry. The Dialog box allows you to type in the exact radius and to select from a *Standard* fillet or an *Inverse* fillet.
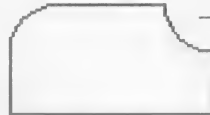
Standard Fillet ————   ———— Inverse Fillet

The Fillet tool can select points in two ways. One is to place the Fillet tool cursor on top of the corner point you wish to select and click the mouse button one time. The second method is to use the Fillet tool and drag a selection rectangle around the point(s) you wish to apply a fillet to.

When using the Keyboard Entry with the Fillet tool, you must select the point(s) before activating the Dialog box. To access the Fillet tool Dialog box first select the points then double click on the Fillet tool icon. After you have entered the correct radius and chosen the standard or inverse fillet, click the OK button.

Fillet Tool

Radius: 0.00

◉ Standard Fillet
◯ Inversed Fillet

Cancel   OK
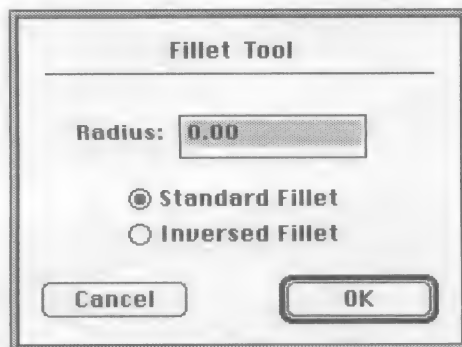
Fillet Tool Dialog box

Chamfer Tool

When using the Chamfer tool, you can quickly apply an angular corner to any object you have created. Remember that the Chamfer tool works with the corner points of an object. What this means is that before you can apply a chamfer with the Chamfer tool, the corner point you are selecting must be joined together or made of enclosed objects such as rectangles, squares, polygons, etc. The example below gives you further explanation.

Example 1

With the two lines shown below, the Chamfer tool cannot be used to apply a radius between the end-points of the two lines. In this instance you would use the Line tool from the Draw tools, then snap each end of the line to the end-points of the separated lines. For more information concerning the Line tool please refer to the *Draw Tools* section under the Line tool subheading.

Line tool

Draw Toolbox

Use Line tool to apply a chamfer between two separate end-points ———

The rectangle shown below is the type of object you use with the Chamfer tool. The reason the Chamfer tool works on the rectangle is because the corner points are joined together and make up just one vertex point rather than two as shown above.

You can apply the Chamfer tool to corner vertex points which are joined ———

Using the Chamfer Tool

The following example guides you through the proper usage of the
Chamfer tool. This tool works with the mouse and enables you to enter
a precise length and angle of the chamfered corner, when using the
numeric Keyboard Entry.

Example 2

Step 1

First create a shape similiar to the one below or use a shape you have
already created. The shape below has been created with the
Rectangle tool. After creating a shape, select the Chamfer tool from
the Edit toolbox and click on the corner vertex point as shown below.

Click on corner vertex point ———

Step 2

Now hold down the mouse button and begin dragging the cursor
towards the center of the rectangle as shown below. You can watch
the readouts at the bottom of your screen to maintain a specific length.
Once you have reached the desired chamfer, release the mouse
button. The design is automatically updated to reflect the chamfered
corner.

Drag cursor towards the center ———
of the rectangle
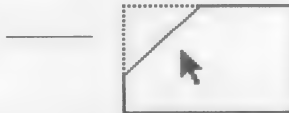
Release mouse button to ———
display the chamfer
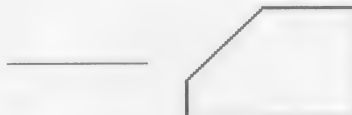
Keyboard Entry with Chamfer Tool

The Chamfer tool has the ability to type in the angle and length of angle with numeric Keyboard Entry. The Dialog box allows you to type in the exact angle as well as the length of the chamfer.

The Chamfer tool can select points in two ways. One is to place the Chamfer tool cursor on top of the corner point you wish to select and click the mouse button one time. The second method is to use the Chamfer tool and drag a selection rectangle around the point(s) to which you wish to apply a chamfer.

When using the Keyboard Entry with the Chamfer tool you must select the point(s) before activating the Dialog box. To access the Chamfer tool Dialog box first select the points then double click on the Chamfer tool icon. After you have entered the correct angle and length, click the OK button.
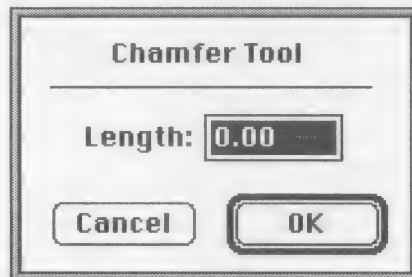
Chamfer Tool Dialog box

✄ Trim Tool

The Trim tool is useful for cutting objects or trimming away segments of objects that would otherwise require you to redraw, resize or edit in some fashion. The Trim tool quickly assists you in the cutting of lines, rectangles, polygons as well as the outlines of arcs or circles.

When you select the Trim tool from the Edit toolbox, your cursor turns into a crosshair. When you place the crosshair on a line and click the mouse button, the Trim tool inserts a vertex point therefore breaking the line.

The following example explains how to properly use the Trim tool. This trims the excess hangover on the object.

Example

Step 1

First select the Trim tool from the Edit toolbox and place the cursor at the point you wish to trim the excess line, as shown below. Then click the mouse button.

Excess hangover to be trimmed

Place cursor at trim point and click mouse

Step 2

Once you have clicked the mouse, a highlighted vertex point appears. This indicates that the program has trimmed the excess line at the highlighted point.

Trimmed point ⎯⎯⎯⎤

Step 3

After trimming the line as explained in the previous steps, you can then delete the excess line. To delete the excess line, first select the Selection tool from the Edit toolbox and click once on the excess line, then press the Delete key on your keyboard.

Trimmed object

NOTE: Be sure that when you press the Delete key, no other objects are selected simultaneously. If any objects other than the trimmed line are selected and you press the Delete key, all selected objects are then removed.

Zoom Tool

Zoom + icon

Zoom - icon

Regional Zoom

The Zoom tool allows you to change the level of enlargement or reduction of the drawing view. It would be the same as using a magnifying glass when looking at your design. It is very useful to zoom in on a drawing for a close view of details or to zoom out for an overview of the drawing layout.

The program offers several ways to use the Zoom tool for zooming in or out. You can also set the percentage of zoom within the Preference Dialog found under the **Edit** menu.

When you initially start the program, the Zoom tool is defaulted to a plus sign in the center of the icon. This indicates that this tool is set to zoom in. You can change the plus sign to a minus sign by holding down the *Option* key **after** you have selected the Zoom tool, thus allowing you to zoom out.

Another way to use the Zoom tool is to click and drag with the Zoom tool, therefore creating a Regional zoom. This means that the area within the selection rectangle while dragging the Zoom tool, magnifies to the full screen size.

Zooming In

Select the Zoom tool from the Edit toolbox and place it over the point you wish to zoom in on, then click the mouse button. You can set the percentage of zoom, which determines the degree by which the screen zooms each time you click the mouse. (The Zoom Percentage setting is found in the Preference Dialog under the **Edit** menu.)

Place Zoom tool at the　———
point you wish to zoom in
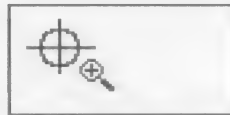
Zooming Out

Select the Zoom tool from the Edit toolbox and place it over the point you wish to zoom out. You can set the percentage of zoom, which determines the degree by which the screen zooms each time you click the mouse. The Zoom Percentage setting is found in the Preference Dialog under the **Edit** menu.

Once you selected the Zoom tool, hold down the Option key to change the magnifying glass from a + (plus) to a - (minus). Now click the mouse button and the screen zooms out. You may repeat this process as many times as necessary.

Place Zoom tool
at the point you
wish to zoom out
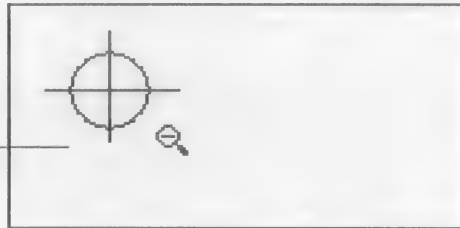
Regional Zoom

To use this method of zooming, first select the Zoom tool from the Edit toolbox. Now hold down the mouse button and drag a selection rectangle to select the part of the design you want to magnify. The area identified within the selection rectangle is displayed to the maximum size of the screen. The magnification factor is determined by the size of the area selected.

Drag a selection rectangle
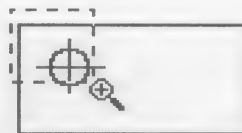
Text Tool

This tool allows you to add captions and paragraphs of text to any drawing, for easy edit and reposition. You can mix fonts, font sizes, font styles, and the color of text.

```
 Text
    Font          ▶
    Size          ▶
    Style         ▶
 ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄
 ✓Align Left
    Align Right
    Align Center
```
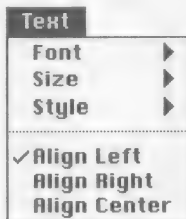
Text Menu

Before you type text within a design, choose the font, font size, font style, and text alignment that are appropriate for your document. The program supports any Macintosh font that you have installed within your system. **KeyCAD Complete** also supports TrueType and PostScript fonts. You can align text along the left or right margins, or center it between margins.

KeyCAD Complete's pop-up menus make for fast access when selecting the text of your choice. To access the pop-up menus, pull down the **Text** menu and drag the mouse cursor on top of a menu selection such as: *Font*, *Size*, or *Style*.

Adding Text to a document

1. Choose a font from the **Font** menu.
2. Choose a font size from the **Size** menu.
3. Choose a font style from the **Style** menu
4. Choose align Left, Right, or Center from the **Text** menu.
5. Choose the **Color** of your choice.

After making your choices, select the Text tool from the Edit toolbox and add text to any part of your design. **KeyCAD Complete** defaults to Geneva 12-point text with left alignment when the program is initially started.

Moving Text Blocks

The creation of a text block allows you to move the text to a location of your choice. To do this, select the Selection tool from the Edit toolbox, and click on the text that you have already created.

Click on the text to ———————
highlight text block

> Moving a
> text block

Editing Text within a Text Block

You may select text within a text block for editing purposes. To select part of a text object, first select the Text tool from the Edit toolbox. Then select the letters or words you wish to edit by dragging through the text. After you select the text, it becomes highlighted. You can now edit the highlighted text. Remember that you can have multiple styles, sizes, and colors within the same text block.

Drag I-beam through the text
to highlight individual words
or letters ———————

> Selecting text within
> a text block
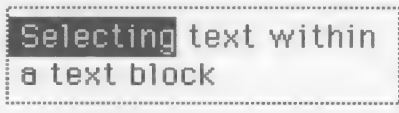
Deleting a Text Block

You can easily delete an entire text block at one time. First, select the Selection tool from the Edit toolbox. Then, click once on the text block you wish to delete and press the *Delete* key.

Draw Tools

The Draw tools are used in the construction of basic shapes, that can be combined together to create complex shapes. The Draw tools consist of rectangles, squares, circles, ovals, polygons, multigons, arcs, lines, and free-formed splines. The Draw toolbox automatically appears to the left side of your window when the program is first started, but you can relocate the toolbox to any position on the screen.

To select a tool for drawing with the mouse, simply click one time on the tool of your choice. Then click and drag the mouse to construct the selected object.

If you want to access the Draw tools Numeric Keyboard Entry Dialog, you double click on the tool icon, and the Numeric Keyboard Entry Dialog appears.

These two methods of selection work the same for all Draw tools.

The Draw toolbox can be turned on or off for your convenience. You can turn on or off toolboxes under the Tools pull-down menu on the Menu Bar, or the Toolbox pop-up menu found under the **Windows** menu.

Combining Draw Tools with Snap To Tools

The Draw tools are designed to work in conjunction with the Snap To tools. This allows you to precisely snap to end-points, midpoints, tangents, etc. when starting and finishing the objects found in the Draw toolbox.

▢ Rectangle / Square Tool

The Rectangle / Square tool is designed to draw both rectangles and squares when selecting one tool icon. **KeyCAD Complete** defaults to the Rectangle tool. If you want to draw squares, select the tool icon and hold down the Shift key when using the tool, to draw perfect squares.

Squares   Rectangles

Rectangle Tool combined with Snap To Tools
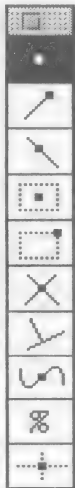
The Rectangle / Square tool can be used with the Snap To tools, therefore allowing you to start or end the rectangle or square from another object center, midpoint, end-point, percentage point, etc. Remember that you can start and finish any rectangle or square from **any** of the Snap To tools. Use the Tab key to change Snap To tools when dragging the mouse to create selected objects.

You can also choose to draw the rectangle or square from the objects center point. You can choose the Draw from Center option under the **Layout** menu. When you select this option, the tool draws the object double the size of the Incremental Readouts or the distance you drag the mouse (width and height).

Draw from Center

Draw from Center is located under the Layout menu

Drawing a Rectangle/Square with the Mouse

The following instructions explain how to construct a rectangle or square, while using the mouse.

☐ First, select the Rectangle/Square tool from the Draw toolbox.

☐ Now, place the cursor at the start point of your choice, and click and drag the mouse until you reach the desired size. Watch the readouts at the bottom of your screen for the object size. The **W** indicates the objects width, and the **H** indicates the object height.

Absolute Readouts   Incremental Readouts
                                     (Object Size)

```
◄▷ X:  0.58      ◄▷ W:  0.19
⌃⌄ Y:  -0.83     ⌃⌄ H:  0.14
```

The Absolute coordinates display the object size added to the Absolute coordinates of the start point. This means that the coordinates are calculated from the Origin point (Axis Lines Intersection).

The Incremental readouts display the object size in relation to the start point.

Using Keyboard Entry with Rectangle/Square Tool
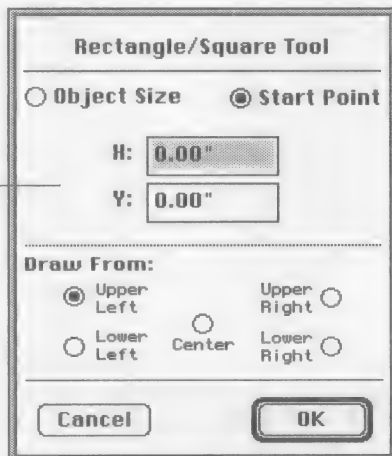
You can access the Rectangle/Square tool Numeric Keyboard Dialog, if you double click on the tool icon. After you double click, a Dialog box appears, allowing you to numerically enter the object size and start point.

After you double click on the tool and the Numeric Entry Dialog box appears, it disregards the mouse actions and the object is drawn to the numeric information you enter into the Dialog box. You can set the object width, height and angle as well as the start point of the rectangle or square.

Start Point

When setting the start point, first select the Start Point button, notice that the Dialog box information changes to coordinate positions. When you enter the coordinate positions you can also set the start point to be at a selected point on the object such as, Upper Left, Upper Right, Lower Left, Lower Right, or Center point of the rectangle or square. The start point is always relative to the Absolute Point of your document.

Start Point
coordinates

Rectangle/Square Tool

○ Object Size   ● Start Point

H: `0.00"`

Y: `0.00"`

Draw From:

● Upper Left   ○ Upper Right

○ Lower Left ○ Center ○ Lower Right

[Cancel]   [OK]

Rectangle/ Square Tool Dialog box

Object Size

When you click on the Object Size button the Dialog changes, so that you can enter the object's width and height. Remember that the Object Size information is drawn from the selected Draw From and Start Point coordinates.

If you select the Draw From Center option, the width and height are reduced to half the actual size.

Object Size Info ─

> **Rectangle/Square Tool**
>
> ● **Object Size**   ○ **Start Point**
>
> **Width:**   `0.00"`
>
> **Height:**   `0.00"`
>
> **Draw From:**
>
> ● Upper Left   Upper Right ○
>   ○ Center
> ○ Lower Left   Center Lower Right ○
>
> [Cancel]   [OK]
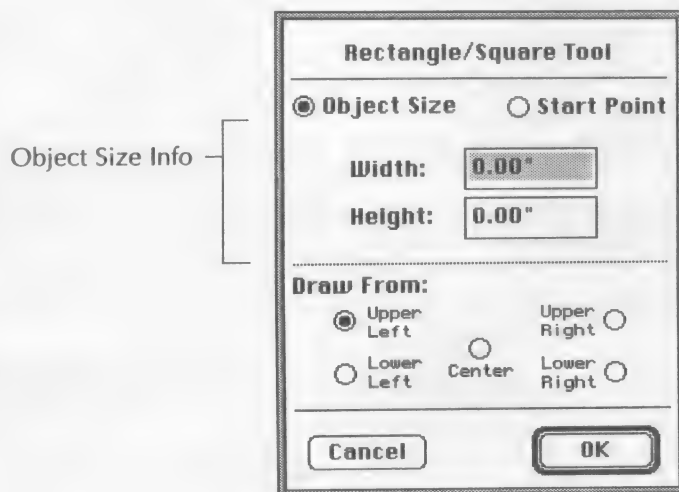
Object Size Dialog box

Circle / Oval Tool

The Circle / Oval tool is designed to draw both circles and ovals while selecting one tool icon. **KeyCAD Complete** defaults to the Oval tool. If you want to draw perfect circles, select the tool icon and hold down the Shift key when using the tool to draw perfect circles.
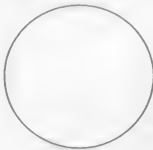
Circle   Oval

Circle/Oval Tool combined with Snap To Tools

The Circle / Oval tool can be used with the Snap To tools, therefore allowing you to start or end the objects from another object center, midpoint, end-point, percentage point, etc. Remember that you can start and finish any circle or oval from **any** of the Snap To tools. Use the Tab key to change Snap To tools when dragging the mouse to create selected objects.

You can also choose to draw the circle or oval from the object center point. You can choose the Draw From Center option under the **Layout** menu. When you select this option, the tool draws the object and doubles the size of the Incremental readouts or the distance you drag the mouse (width and height).

Draw from Center

Draw from Center is located under the Layout menu

Drawing a Circle or Oval with the Mouse

The following instructions explain how to construct a circle or oval, while using the mouse.

❒ First, select the Circle/Oval tool from the Draw toolbox.

❒ Now, place the cursor at the start point of your choice, and click and drag the mouse until you reach the desired size. Watch the readouts at the bottom of your screen for the object size. The **W** indicates the object width, and the **H** indicates the object height.

Absolute Readouts   Incremental Readouts
(Object Size)

| ◀▶ X: 0.58 | ◀▶ W: 0.19 |
| ⬘ Y: -0.83 | ⬘ H: 0.14 |

The Absolute coordinates display the object size added to the Absolute coordinates of the start point. This means that the coordinates are calculated from the Origin point (Axis Lines Intersection).

The Incremental Readouts display the object size in relation to the start point.

Using Keyboard Entry with Circle/Oval Tool

You can access the Circle/Oval tool Numeric Keyboard Entry Dialog box, if you double click on the tool icon. After you double click a Dialog box appears, allowing you to numerically enter the object size and start point.

After you double click on the tool and the Numeric Keyboard Entry Dialog appears, the Dialog box disregards the mouse actions and the object is drawn to the numeric information you enter into the Dialog box. You can set the objects width, height and angle as well as the start point of the circle or oval.

Start Point

When setting the start point, first select the Start Point button, notice that the Dialog box info changes to coordinate positions. When you enter the coordinate positions you can also set the start point to be at a selected point on the object such as Top, Left, Right, Center and Bottom of the circle or oval. The start point is always relative to the Absolute Point of your document.

Start Point
coordinates

Oval / Circle Tool

○ **Radius**   ○ **Diameter**
○ **Object Size**   ● **Start Point**

H: `0.00`
Y: `0.00`

Draw From: Top
                  ○

        Left ○   ●   ○ Right
                 Center

                   ○
                 Bottom

[**Cancel**]   [**OK**]
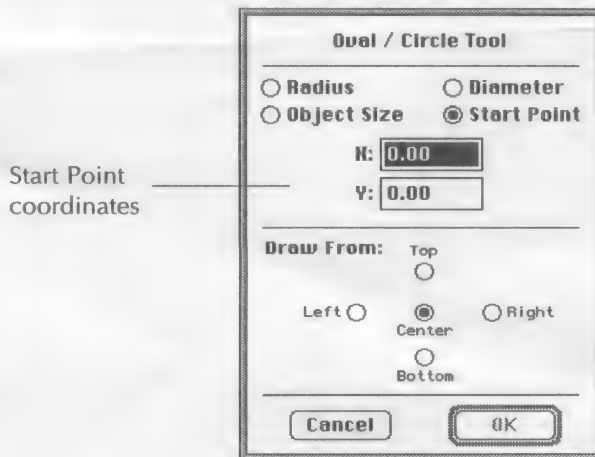
Oval / Circle Tool Dialog box

Object Size

When you click on the Object Size button the Dialog changes, so that you can enter the object width, height, and angle. Remember that the Object Size info is drawn from the selected Draw From and Start Point coordinates.

The Circle/Oval tool has the options of using Radius, Diameter or Object Size for creating the object. Select one of the options after you have set the Start Point and Draw From options.

If you select the Draw From Center option, the width and height of the circle or oval, are reduced to half of the actual size.

Object Size —
Info

Oval / Circle Tool

○ **Radius**   ○ **Diameter**
◉ **Object Size**   ○ **Start Point**

Width: 0.00
Height: 0.00

Draw From: Top
                  ○

         Left ○   ◉   ○ Right
               Center
                  ○
               Bottom

Cancel   OK
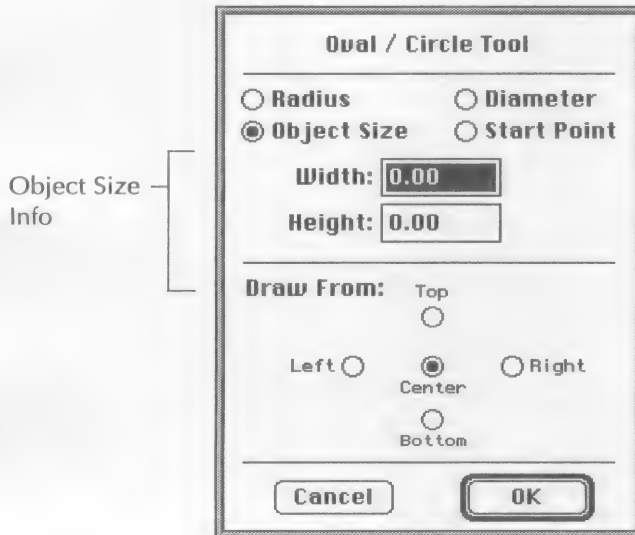
Oval / Circle Dialog box

Polygon Tool (Open and Closed)

The Shift key together with the Polygon tool constrain each segment to a perfect Horizontal or Vertical line.

The Polygon tool is designed to draw Open or Closed polygons, that can contain many individual sides. Polygon shapes are often closed shapes, which means that the last line connects with the beginning point of the polygon. Closed polygons include triangles, parallelograms, stars, octagons, and many other shapes.

Closed Polygon

Open Polygon
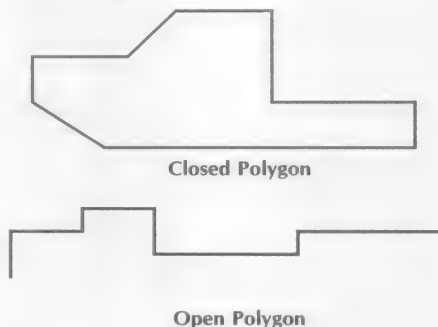
Polygon Tool combined with Snap To Tools

The Polygon tool can be used with the Snap To tools, therefore allowing you to start or end polygons from another object's center, midpoint, end-point, percentage point, etc. Remember that you can start and finish any polygon from **any** of the Snap To tools. Use the Tab key to change Snap To tools when dragging the mouse to create selected polygons.

To use a Snap To tool with the polygons start point, first select the Snap To tool of your choice, then select the Polygon tool and place the start point. To finish the polygon at a specific Snap To tool, press the Tab key to change the Snap To tool while drawing the polygon, and double click at the desired end-point.

Creating a Polygon with the Mouse

☐ First, select the Polygon tool from the Draw toolbox, then place the crosshair cursor at the desired start point.

☐ Now, click the mouse button one time, to set the first point. Then drag the mouse to the second point location and click the mouse button. Repeat this process as many times as necessary.

☐ When you are finished with the polygon, double click the mouse button to end the polygon. If the end-point is within a 10 pixel radius of the start point, the polygon is automatically closed. If you double click outside of the 10 pixel radius, the polygon ends at the point you click, creating an open polygon.

Once you have created either an Open or Closed Polygon, you can fill it with any of the fill patterns available. You can change the line type and size that makes up the boundaries of the polygon. You can change lines from under the **Layout** menu, in the pop-up menu called Lines.

| Lines ▶ | Types... |
| | Size... |

Lines pop-up menu

You can also change the color of the polygon by selecting the polygon and then choosing a new color from the color picker. If you have filled the polygon and change colors, the fill then reflects the color changes, therefore allowing for colored fills.

Using Keyboard Entry with the Polygon Tool

When using the Polygon tool you have the option of using numeric Keyboard Entry, instead of the mouse. To access the Dialog box, double click on the Polygon tool icon.

Within the Polygon tool Dialog box, you can choose from Open or Closed polygons and set the start point of the polygon and the number of points within the polygon. You can also choose from Cartesian or Polar coordinates. The Dialog box also displays which point you are entering, as well as the total number of points making up the polygon.

After you have entered a point coordinate press the Enter Point button, place and add the new point to the polygon. Continue adding points as necessary. Once you have the desired number of points, click on the End Polygon button,to   automatically end the polygon you are working on. Click the OK button to close the Dialog box.

```
┌─────────────────────────────────────┐
│          Polygon Tool               │
│ ─────────────────────────────────── │
│      ● Open      ○ Closed           │
│ ─────────────────────────────────── │
│            Coordinates              │
│   ● Cartesian         ○ Polar       │
│                                     │
│          X: [0.00    ]              │
│          Y: [0.00    ]              │
│ ─────────────────────────────────── │
│  (Enter Point)    □ End Polygon     │
│                                     │
│        Current Point:  1            │
│   (Cancel)        ( OK )            │
└─────────────────────────────────────┘
```

Polygon Dialog box

⬡ Multigon Tool

The Multigon tool is designed to draw objects that contain any number of sides, with each side even in length. This tool is used when you want to create octagons, pentagons, triangles, etc. This tool saves a lot of time in creating various multigons. Other programs usually use the Polygon tool for creating multigons.

KeyCAD Complete defaults the Multigon tool to contain five even sides. You can change the number of sides in the Preference Dialog, which is found under the **Edit** menu.

Different objects created with the Multigon tool

Multigon Tool combined with Snap To Tools

The Multigon tool can be used with the Snap To tools, therefore allowing you to start or end the multigon from another object center, midpoint, corner, percentage point, etc. Remember that you can start and finish any multigon from **any** of the Snap To tools. Use the Tab key to change Snap To tools when dragging the mouse to create your multigon.

You can also choose to draw the multigon from the object's center point. You can choose the Draw From Center option under the **Layout** menu. When you select this option, the tool draws the multigon and doubles the size of the Incremental Readouts or the distance you drag the mouse (width and height).

Draw from Center

**Draw from Center is located under the
Layout Menu**

Drawing a Multigon with the Mouse

The following instructions explain how to construct a multigon, while using the mouse.

❑   First, set the number of sides you want in your multigon. You can set the number of sides within the Preference Dialog under the **Edit** menu.

❑   Second, select the Multigon tool from the Draw toolbox.

❑   Now, place the cursor at the start point of your choice, and click and drag the mouse until you reach the desired size. Watch the readouts at the bottom of your screen for the multigons width. The **W** indicates the object width, and the **H** indicates the object height.

NOTE: The start and end-point of the Multigon can snap to any of the Snap tool options.

Absolute Readouts   Incremental Readouts
                                        (Object Size)

```
◀▶ X:  0.58        ◀▶ W:  0.19
≜  Y: -0.83        ≜  H:  0.14
▽                  ▽
```

The Absolute coordinates display the object size added to the distance your cursor is from the absolute point of your document. The Absolute readouts track the mouse movement in relation to the Origin point. This means that the coordinates are calculated from the Origin point (Axis Lines Intersection).

The Incremental Readouts display the object size in relation to the start point or the distance you drag the mouse.

Using Keyboard Entry with the Multigon Tool

You can access the Multigon tool Numeric Keyboard Entry Dialog box, if you double click on the tool icon. After you double click, a Dialog box appears, allowing you to numerically enter the object size and start point.

After you double click on the tool, the Numeric Keyboard Entry Dialog box appears. It disregards the mouse actions and the object is drawn to the numeric information you enter into the Dialog box. You can set the object width and angle as well as the start point of the multigon. The Draw From button is the point on the multigon, which is placed at the Start Point coordinates.

Start Point

When setting the start point, first select the Start Point button, notice that the Dialog box information changes to coordinate positions.

X: `0.00"`   Left – Right

Y: `0.00"`   Up – Down

Start Point coordinates

When you enter the coordinate positions you can also set the start point to be at a selected point on the object such as Top, Left, Right, Center and Bottom of the multigon. The start point is always relative to the Absolute Point of your document. If you choose the Center Draw From point, the multigon doubles the width you type in the Total Width Entry box. The Angle is in reference to the start point, and if you enter an angle it draws the entire multigon at the specified angle.
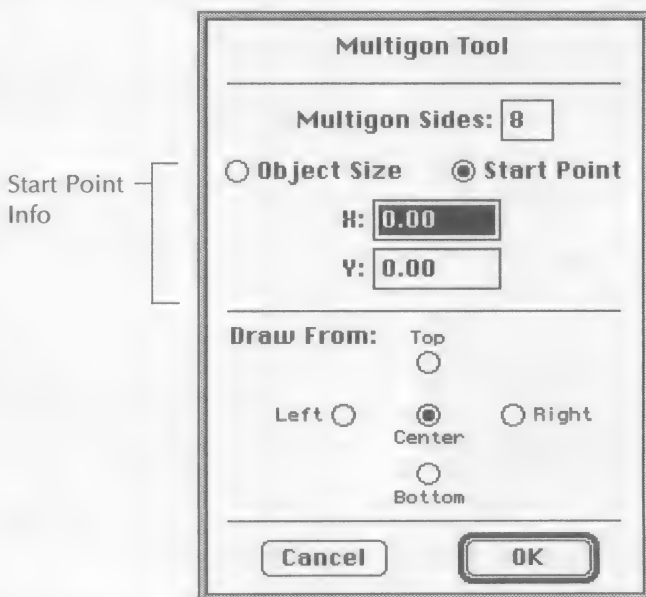
Object Size

When you click on the Object Size button, the Dialog changes, so that you can enter the multigons width and angle. Remember that the Object Size information draws from the selected Draw From and Start Point coordinates.

The Multigon tool Dialog has the option to enter the number of sides that make up the multigon. Remember, that each side is even in length. You can also enter the Total Width of the multigon, as well as the angle that the object is to be drawn.

If you have selected the Draw From Center option, the width and height of the multigon, is twice the Total Width entry.

```
                    ┌─────────────────────────────────┐
                    │          Multigon Tool          │
                    │  ─────────────────────────────  │
                    │                                 │
                    │     Multigon Sides:  [ 8 ]      │
                    │                                 │
                    │  ○ Object Size    ● Start Point │
Start Point ┐       │         H: [ 0.00 ]             │
Info        │       │         Y: [ 0.00 ]             │
            │       │  ─────────────────────────────  │
            ┘       │  Draw From:     Top             │
                    │                  ○              │
                    │      Left ○     ●      ○ Right  │
                    │               Center            │
                    │                  ○              │
                    │                Bottom           │
                    │  ─────────────────────────────  │
                    │   ( Cancel )      [  OK  ]      │
                    └─────────────────────────────────┘
```

Multigon Tool Dialog box

Click on the OK button once you have entered the correct information. You can choose the Cancel button to exit the Dialog and cancel the multigon drawing.

Arc Tool

The Arc tool is designed to draw both elliptical and 90 degree arcs, while selecting one tool icon. **KeyCAD Complete** defaults to the elliptical Arc tool. If you want to draw perfect circular arcs, select the tool icon and hold down the Shift key when using the tool.

Elliptical Arc   Circular Arc

Arc Tool combined with Snap To Tools

The Arc tool can be used with the Snap To tools, therefore allowing you to start or end the arc from another object center, intersection, end-point, percentage point, etc. Remember that you can start and finish any arc from **any** of the Snap To tools. Use the Tab key to change Snap To tools when dragging the mouse to create selected objects.
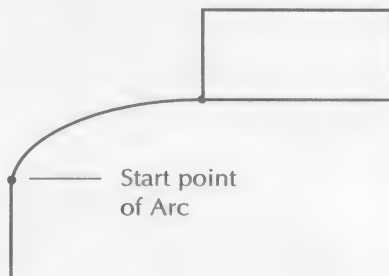
Start point
of Arc

The example above shows how the Arc's start point was snapped to the end-point of a line, and the end-point of the Arc was snapped to the corner point of the rectangle.

Using the Arc Tool with the Mouse

You can create arcs in two ways while using the mouse button. The two types of arcs are elliptical arcs and perfect 90 degree arcs.

Creating an Elliptical arc

Elliptical arc

☐ First, select the Arc tool from the Draw toolbox.
☐ Now, place the crosshair cursor at the desired start point, then click and drag the mouse. Note how the arc follows the crosshair cursor, allowing you to change the length and height of the arc.
☐ Once you have reached the desired arc, release the mouse button.

Note: You can snap the start and end-point of the arc to any of the Snap To tool options.

Creating a Circular arc

90 degree arc

☐ First, select the Arc tool from the Draw toolbox.
☐ Then, place the crosshair cursor at the desired start point.
☐ Now, click and hold down the mouse button while dragging the mouse. When dragging the mouse hold down the Shift key and release the mouse button. A straight line from the start point to the cursor appears representing the radius of the arc.
☐ Drag the cursor in a clockwise or counter clockwise direction and watch the arc being created. Press the mouse button one time to end the arc.

Using Keyboard Entry with the Arc Tool

You can access the Arc tool Numeric Keyboard Entry Dialog box, if you double click on the tool icon. After you double click a Dialog box appears, allowing you to numerically enter the radius and degree of arc, and set the start point.

After you double click on the tool the Numeric Keyboard Entry Dialog box appears. It disregards the mouse actions and the arc is drawn to the numeric information you enter into the Dialog box. You can set the arc radius and degree of length, and you can choose from Elliptical or Circular arcs.

Elliptical Arc

When selecting the Elliptical arc button, the Dialog prompts you to type in the X, Y coordinate start and end-points for the arc you are creating.

Circular Arc

If you select the Circular arc button, your End-Point Entry boxes change to Radius, Start Angle, and Arc Angle. When creating the circular arc, you must first set the start point of the arc, and then the radius and degree of length for the arc.

```
┌─────────────────────────────────┐
│             Arc Tool            │
│  ● Elliptical     ○ Circular    │
│           Start Point           │
│        H: ┌──────────┐          │
│           │ 0.00"    │          │
│           └──────────┘          │
│        Y: ┌──────────┐          │
│           │ 0.00"    │          │
│           └──────────┘          │
│─────────────────────────────────│
│            End Point            │
│   Relative H: ┌──────────┐      │
│               │ 0.00"    │      │
│               └──────────┘      │
│   Relative Y: ┌──────────┐      │
│               │ 0.00"    │      │
│               └──────────┘      │
│─────────────────────────────────│
│   ( Cancel )      ▐  OK  ▌      │
└─────────────────────────────────┘
```

Arc Tool Dialog box

Line Tool

The Line tool is designed to draw lines at any angle or length. You can draw a line by clicking on the Line tool icon and positioning the cursor where you want the line to begin. The cursor then becomes a crosshair showing the exact position where the line begins or ends. If you want to draw perfect horizontal or vertical lines, select the tool icon and hold down the Shift key when using the tool.
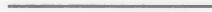
Horizontal Lines   Vertical Lines

When creating a line, drag the cursor in the direction the line is to be created. As long as you hold down the mouse button, you can lengthen or shorten the line and change its angle.

Line Tool combined with Snap To Tools
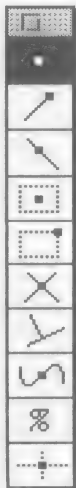
The Line tool can be used with the Snap To tools, allowing you to start or end any line from another object center, midpoint, end-point, percentage point, etc. Remember that you can start and finish any line from **any** of the Snap To tools. Use the Tab key to change Snap To tools when dragging the mouse to create lines.

For example, start the line from the end-point of another line and finish the line at the center point of a circle, by changing Snap To tools after you set the start point of the line.

Using Keyboard Entry with the Line Tool

You can access the Line tool Numeric Keyboard Entry Dialog box, if you double click on the tool icon. After you double click a Dialog box appears, allowing you to numerically enter the length, angle and start point.

After you double click on the Line tool and the Numeric Keyboard Entry Dialog box appears. It disregards the mouse actions and the line is drawn to the numeric information you enter into the Dialog box. You can set the lines length and angle as well as the start point.

When setting the start point, first select the Start Point button. Notice that the Dialog box information changes to coordinate positions. These coordinates allow you to set the start and end-points of the line. You can choose from Cartesian or Polar coordinates for drawing the line. If you select the Polar coordinates, you must still set a start point for the line you are drawing.

- ❑ Cartesian coordinates allow you to set the start and end-point at any X, Y coordinates.

- ❑ Polar coordinates allow you to enter the length and angle of the line. You must still set the start point coordinates for the line you are creating.

Once you have entered the correct information, click on the OK button to complete the new line.

You can click on the Cancel button to cancel the line drawing operation.

Spline Tool

The Shift key together with the Spline tool constrain each spline segment to a perfect horizontal or vertical line.

The Spline tool is designed to draw Open or Closed free-formed splines, that can contain many individual spline segments. Choose the Spline tool when you want to create a curve that passes through specific points in your design. You must specify the points that **KeyCAD Complete** should use to draw the curve. Then **KeyCAD Complete** calculates and draws the free-formed curve for you.

Closed Free-Formed Spline

Open Free-Formed Spline

Spline Tool combined with Snap To Tools

The Spline tool can be used with the Snap To tools, therefore allowing you to start or end curved splines from another object center, midpoint, end-point, percentage point, etc. Remember that you can start and finish any open or closed spline from **any** of the Snap To tools. Use the Tab key to change Snap To tools when dragging the mouse to create selected splines.

To use a Snap To tool with the Spline tool start point, first select the Snap To tool of your choice, then select the Spline tool and place the start point. To finish the Spline at a specific Snap To tool, press the Tab key to change the Snap To tool while drawing the spline, and double click at the desired end-point.

Creating a Free-Formed Spline with the Mouse

To start drawing a free-formed spline, position the cursor on the first point of the spline. Click the mouse button and move the mouse, the mouse button does not have to be held down. A line follows the mouse movement. Position the pointer on the next point that the curve should pass through and click the mouse button again. Another line begins from the previous point. You can continue moving the mouse and clicking to specify the number of points you want.

When you are finished specifying the number of points, double click the mouse button. **KeyCAD Complete** automatically draws the curved lines through the points you have placed.

After you have created a spline, you can change the tension value of the spline to loosen or tighten the curves that pass through the points. The Smoothing pop-out menu is found under the **Edit** menu. From the pop-up menu you can choose Smooth, Unsmooth and the Tension Dialog boxes.
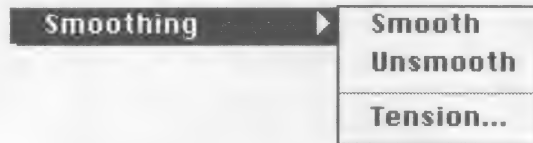
Smoothing pop-up menu
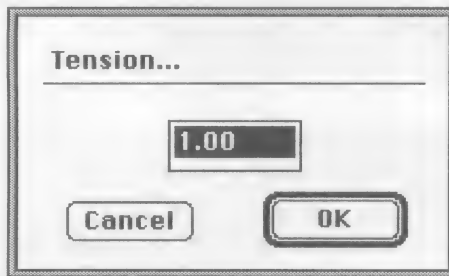
Tension Dialog box

Using Keyboard Entry with the Spline Tool

When using the Spline tool you have the option of using numeric Keyboard Entry, instead of the mouse. To access the Dialog box, double click on the Spline tool icon.

Within the Spline tool Dialog box, you can choose from Open or Closed splines and set the start point of each spline and the number of points within the free-formed spline. You can also choose from Cartesian or Polar coordinates. The Dialog box displays which point you are entering, as well as the total number of points making up the spline.

After you have entered a point coordinate, press the Enter Point button, to place and add the new point to the free-formed spline. Continue adding points as necessary. Once you have the desired number of points, click on the End Spline button to automatically end the spline you are working on. **KeyCAD Complete** draws the curved lines through the points. Click the OK button to close the Dialog box.

Spline Dialog box

Dimension Tools

The Dimension tools are very important for drafting or creating any type of blueprint. The tools found within the Dimension toolbox consist of Linear, Parallel, Angular, Diameter, Radius, and Leader Line tools.

The Dimension toolbox can be turned on or off and can be relocated for faster access. You can access the Dimension toolbox from under the **Tools** pull-down menu found on the **Menu Bar**. You can also turn it on or off from under the **Window** menu using the **Toolboxes** pop-up menu. A check mark ✓ indicates if the toolbox is on or off.
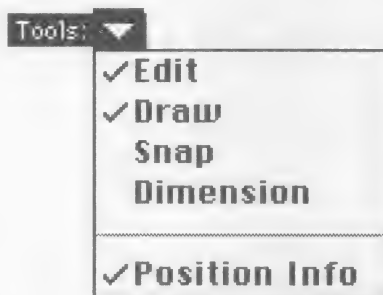
Tools pull-down menu

Combining Dimension Tools with Snap To Tools

Some of the Dimension tools can be used with the Snap To tools. The Dimension tools that work with the Snap To tools are Linear, Parallel, Angular, and Leader Line. The Diameter and Radius tools automatically snap to the points of the object you have dimensioned.

The following is a complete list of the Dimension tools found within
the toolbox.

  Linear Tool

  Parallel Tool

  Angular Tool

  Diameter Tool

  Radius Tool

  Leader Line Tool

Dimension Options

The dimensions that appear when using the dimension tools, have several options available. These options are designed to give your design a more custom look. The options available appear in the Dimensioning pop-up menu found under the **Layout** menu. These options consist of Arrows In, Arrows Out, Arrowheads choices, Center Text, Text Frame, Single Tolerance, Double Tolerance, Limiting Tolerance, and the Tolerance Values Dialog box. The Tolerance Values Dialog is discussed in the **Layout** *Menu* chapter under the *Tolerance Values* sub-chapter.

You can access the Dimensioning options pop-up menu under the **Layout** menu.
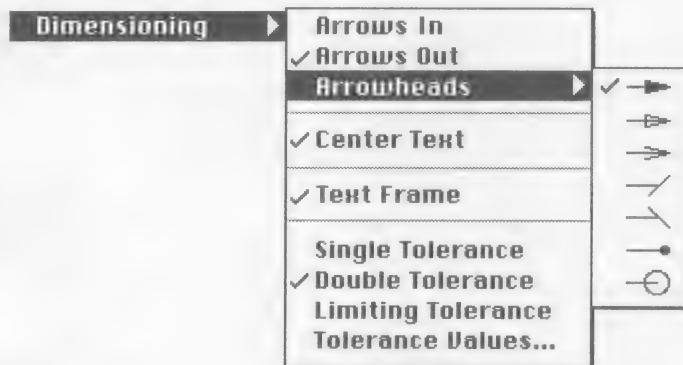
Dimensioning Options pop-up menu

Changing dimension colors

You can change the color of any complete dimension including, text, arrowhead lines, and witness lines. First, select the dimension and its witness lines and then choose a new color from the color picker.

Changing font size and style

Drag the Text tool over the text within your dimension, therefore highlighting the text, and choose the font size or style from the **Text** menu.

Dimension Examples

The following examples display how the different options affect your dimensions.

|←—— 1.472" ——→|

Arrows In option

→| 0.946" |←

Arrows Out option

|←——— 1.770" ———→|

Text Frame option

|← 1.770" −0.500 →|
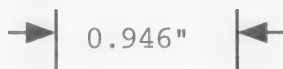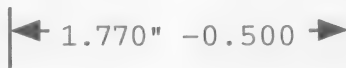
Single Tolerance option

|← 1.770" +0.500 →|
              −0.500

Double Tolerance option

|←—— 2.270" ——→|
     1.270"
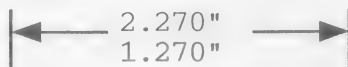
Limiting Tolerance option

Linear Dimension Tool

The Linear Dimension tool automatically calculates the dimensions between any two points and displays the correct distance between those points. For example, you can dimension lines, squares, rectangles, sides of polygons as well as the distance between objects. The Linear tool is designed to display only horizontal dimensions i.e., the horizontal distance between any two points.
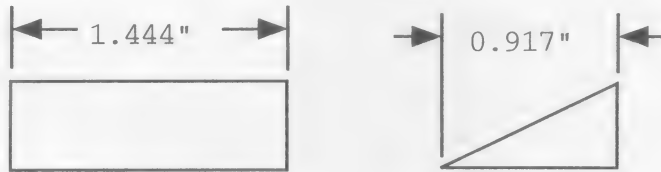
Linear dimension examples
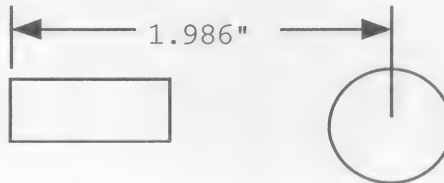
Linear dimension between two objects

NOTE: The examples above show a dimension that displays the actual distance between any two points. The Linear tool snaps to any of the Snap To tools.

How to use the Linear Dimension Tool

❑ First, select the Linear tool from the Dimension toolbox.

❑ Select the Snap To tool that you wish to snap to the first
point of the dimension.

❑ Then, place the cursor near the point from which you
want to start the dimension. Now click, hold down the
mouse button and drag the cursor to the second point of
the dimension, and release the mouse button near the
point.

❑ Now you can drag the dimension text out away from the
object and then click one time to set the dimension
distance.

When using the Snap To tools, you can dimension from the end-point
of one object to the center point of another object. You can start and
end a dimension from any two combinations of the Snap To tools.

Remember that the Linear Dimension tool always displays the
dimension perfectly horizontal.

You can apply any of the dimension options within the Dimensioning
pop-up menu to any linear dimension.
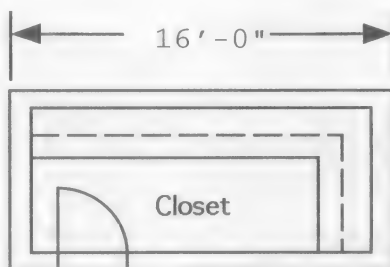
Example of Linear Dimensioning

⬜ **Parallel Dimension Tool**

The Parallel Dimension tool automatically calculates the dimension between any two points and displays the correct distance between those points. For example, you can dimension lines, squares, rectangles sides of polygons as well as the distance between objects. The Parallel tool is designed to display only parallel dimensions i.e., the parallel offset of the actual length between any two points.
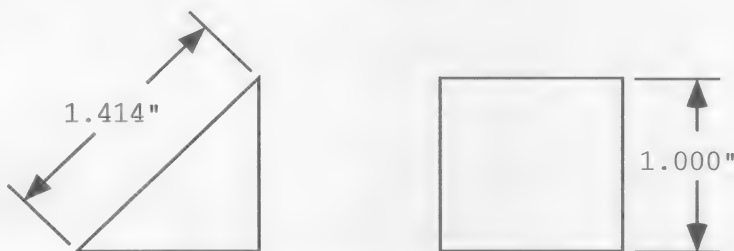
Parallel dimension examples
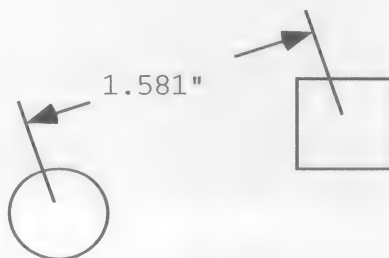
Parallel dimension between two objects

NOTE: The examples above show the dimension that displays the actual length between any two points. The Parallel tool snaps to any of the Snap To tools, allowing you to start and end at different points of any two objects.

How to use the Parallel Dimension Tool

❑ First, select the Parallel tool from the Dimension toolbox.

❑ Select the Snap To tool that you wish to snap to the first point of the dimension.

❑ Then, place the cursor near the point you from which you want to start the dimension. Now, click, hold down the mouse button and drag the cursor to the second point of the dimension, and release the mouse button near the point.

❑ Now you can drag the dimension text out away from the object and then click one time to set the parallel dimension distance.

When using the Snap To tools, you can dimension from the midpoint of one object to the corner point of another object. You can start and end a dimension from any two combinations of the Snap To tools.

Remember that the Parallel Dimension tool always displays the dimension perfectly parallel to the line or imaginary line between two objects.

You can apply any of the dimension options within the Dimensioning pop-up menu to any parallel dimension.

1.581"

Imaginary line or
actual length between
the two center points
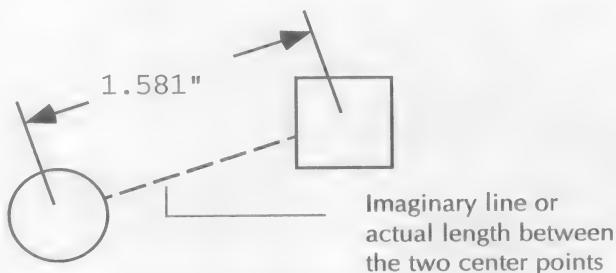
Angular Dimension Tool

The Angular Dimension tool automatically calculates the dimension between any two points that create an angular dimension and displays the correct angle between those points. For example, you can dimension triangles, angles of pentagons, sides of polygons as well as the angle between objects. The Angular tool is designed to display only angular dimensions between any two points.
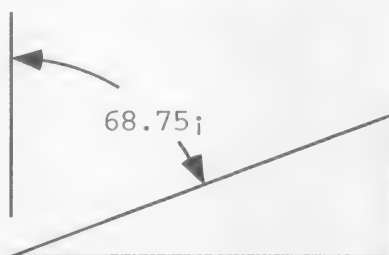
Angular dimension examples
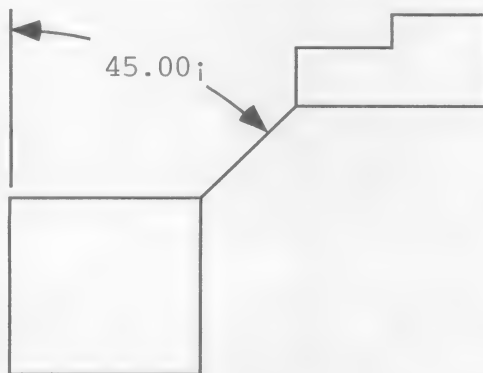
Angular dimension between two objects

NOTE: The examples above show the dimension that displays the actual angle between any two points. The Angle tool snaps to any of the Snap To tools, allowing you to start and end at different points of one or two objects.

How to use the Angle Dimension Tool

☐ First, select the Angle tool from the Dimension toolbox.

☐ Select the Snap To tool that you wish to snap to the first point of the angled dimension.

☐ Then, place the cursor near the point from which you want to start the dimension. Now click, hold down the mouse button and drag the cursor along the angled line, to the second point of the dimension, and release the mouse button near the point

```
                                    ──────────── Click once when you
         45.00¡                     reach desired offset distance

                                    ──────────── First Point

                                    ──────────── Second Point
```
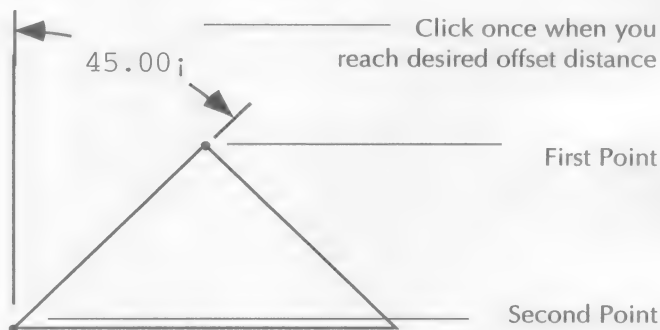
☐ Now you can drag the dimension text out away from the object, while in a circular motion to reach any angle. Then click once to set the angled dimension distance.

When using the Snap To tools, you can accurately snap to the end-points of the angled line you are dimensioning.

The Angle Dimension tool only displays angular dimensions.

You can apply any of the dimension options within the Dimensioning pop-up menu to any Angle dimension.

⟨⟩ Diameter Dimension Tool

The Diameter Dimension tool automatically calculates the dimension of any circle's diameter and displays the correct diameter information of the circle. The Diameter tool is used only for dimensioning the diameter of a circle. This tool does not require that you use a Snap To tool. The Diameter tool automatically snaps to the circle boundary points.
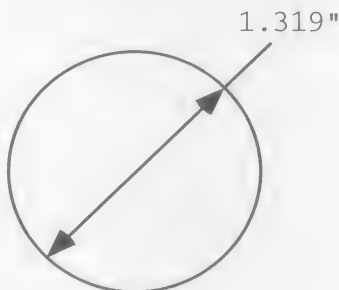
Diameter dimension of a circle

NOTE: The examples above show the Diameter Dimension of a circle. The Diameter tool automatically snaps the circle's boundary line, allowing you to quickly display the diameter of any circle.

How to use the Diameter Dimension Tool

☐ First, select the Diameter tool from the Dimension toolbox.

☐ Then, place the cursor near the circle's boundary line. Now click, hold down the mouse button and drag the cursor in a circular motion around the edge of the circle, and release the mouse button near the point.
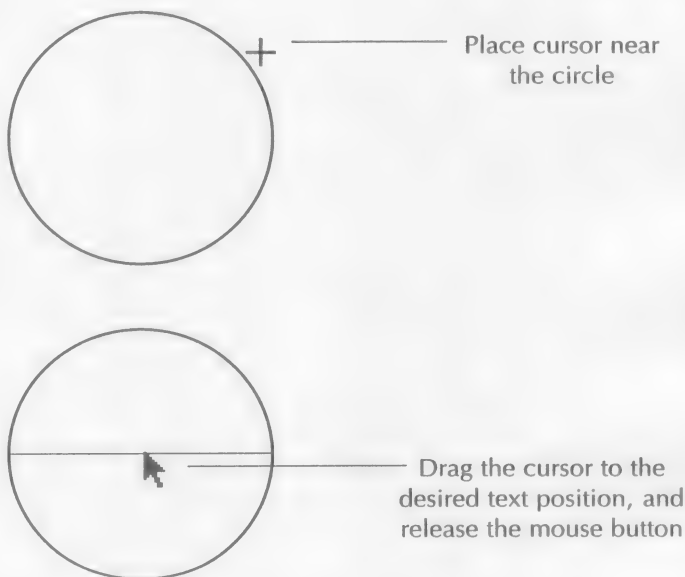
Place cursor near the circle

Drag the cursor to the desired text position, and release the mouse button

☐ Now you can drag the dimension text to any position on the dimension line and release the mouse button. Where the position of the mouse is when you release the button, is the position of the dimensions text.

You can apply any of the dimension options within the Dimensioning pop-up menu to any diametrical dimension.

⟡ Radius Dimension Tool

The Radius dimension tool automatically calculates the dimension of any arc radius, circle, or fillet and displays the correct radius information on the screen. The Radius tool is used only for dimensioning the radius of a 90 degree arc, radius of a circle, or the fillet of an object. This tool does not require that you use a Snap To tool. The Radius tool automatically snaps to the radius start point by clicking the mouse near the radius you are dimensioning.

0.514"   0.805"

Radius dimension of a Circle   **Radius of an Arc**

1.000"
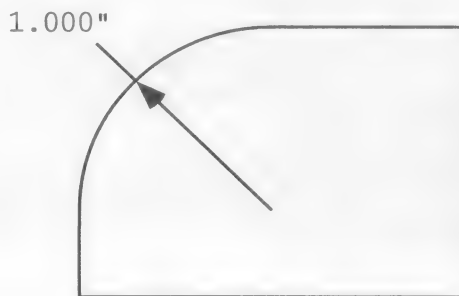
Radius of a Fillet

NOTE: In the examples above the radius dimension display three different types of radiuses. The Radius tool automatically snaps the radius start point allowing you to quickly display the radius of any circle, fillet, or 90 degree arc.

How to use the Radius Dimension Tool

☐ First, select the Radius tool from the Dimension toolbox.

☐ Then, place the cursor near the radius boundary line.
Now click, hold down the mouse button and drag the
cursor in a circular motion around the edge of the arc,
circle, or fillet and release the mouse button near the point
you wish to lock the radius dimension to. The Radius tool
automatically snaps to the start point.

Place cursor near
the arc and hold down
the mouse button

Start Point
of Radius

☐ Now you can drag the dimension text to any position on
the dimension line and release the mouse button. Where
the position of the mouse is when you release the button,
is the position of the dimensions text.

Drag the cursor to the
desired text position,
and release the mouse
button

You can apply any of the dimension options within the Dimensioning
pop-up menu to any radius dimension. You can also change the font
size, style or color.

Leader Line Tool

The Leader Line tool is used for special quotes or parts of your design that need a line with an arrow at the beginning of the line.

.500 radius typ.
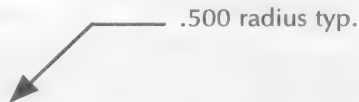
Leader Line example

The Leader Line tool can be combined with the Snap To tools, so that you can snap to specific points of other objects.

How to use the Leader Line tool

☐ First, select the tool from the Dimension toolbox.

☐ Now place the tool at the point from which you wish to start.

☐ Then click, hold down the mouse button, and drag the cursor to a desired length. Now release the mouse button and drag the mouse to the end-point you wish, and click the mouse button one time.

The Leader Line tool has three points you have to place in order to create the leader line.

2nd Point

3rd Point
End-Point

1st Point
Start Point
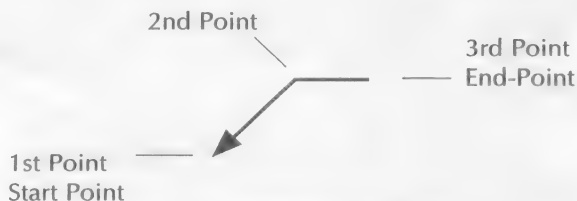
Creating A Leader Line

Snap To Tools

Almost all technical and engineered drawings require you to draw lines, circles and rectangles in a very precise location, in specific relationships to each other. For example, you may need to start a line at the intersection of two different objects, or draw a line perpendicular to another line. **KeyCAD Complete** provides you with the Snap To tools to help you in locating the precise points required in creating a very detailed and accurate design.

The Snap To toolbox has the option of being turned on or off and can be relocated for added convenience. The Snap To toolbox does not appear on the screen when you first start the program. You can access all toolboxes under the *Toolbox* subheading found under the **Window** menu at the top of your screen. A check mark (✓) beside the toolbox name indicates that it is active.

The Snap To tools have been designed to work in combination with the Edit, Draw, and Dimension tools found within the program. When using the Snap To tools with the Draw tools you can quickly start a line from the end-point of another line and then finish the line at the center of a circle. Using the Snap To tools with other tools ensures that the line or object created starts and ends in the precise location desired.

You can also set the sensitivity that determines how close the mouse cusor must be to an object for the program to snap to a specific point. The sensitivity setting is found in the Preference Dialog under the **Edit** menu.

tab

When using the Snap To tools you can change tools while dragging the mouse, by pressing the Tab key. This is so you can start drawing or editing with one Snap To tool and end with another.

The following is a picture of the Snap To tools as they appear in the program. The names have been listed for the appropriate tool icon. The name indicates the Snap To command that is performed when using that particular tool. These tools should be used in the precision alignment of objects as well as with the start and/or end-points of objects.

Drag Zone

Close Button

Any Point

End-Point

Point On

Center Point

Corner Point

Intersection Point

Perpendicular

Line Center

Percentage

Absolute Point
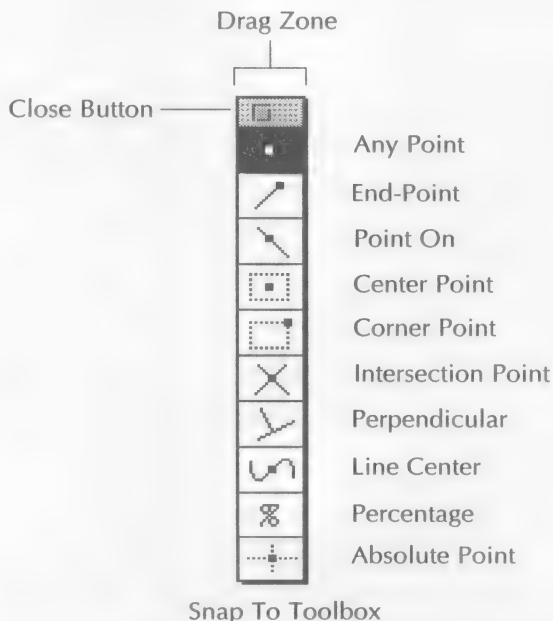
Snap To Toolbox

NOTE: Remember, by combining these tools with the Draw, Dimensioning, and Edit tools you have more precise control of the tools function. Always use the Snap To tools before Joining objects.

Any Point

KeyCAD Complete defaults to the Any Point Snap To tool, when you first start the program. This allows you to choose any point within your document to set a point. **KeyCAD Complete** supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the selected tool's appropriate function, allowing you to see where the end-point is to be placed prior to releasing the mouse button. on the Any Point tool you see no ghost lines.

NOTE: If the Snap To Grid option is on, you can only snap to points on the current grid setting. If the Snap To Grid option is turned off, you can locate a point at any coordinate within your current document.

Changing Snap To Tools

You can change the Snap To tool at any time while pressing the Tab key. This is helpful if you want to start with the Any Point Snap To tool and end with another Snap To tool.

When using the Any Point Snap to tool, the cursor always snaps to the point on the screen, at the time you click the mouse button.

Setting Tool to Lock or Reset

You can set the Any Point tool to a locked position, so that it does not reset after you set the first point. Double clicking Locks the tool to a black background and single clicking results in a gray background in the Reset mode.

✎ End-Point

Use the End-Point Snap To tool to quickly connect the object you are creating to the End-Point of another object. The End-Point Snap To tool supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the end-point you are closest to, allowing you to see where the end-point is to be placed before you release the mouse button.

Anytime the End-Point Snap To tool is selected, the cursor automatically snaps to the closest end-point. Any point within an object can be considered an end-point.

The following examples show how objects can have several end-points within one object.
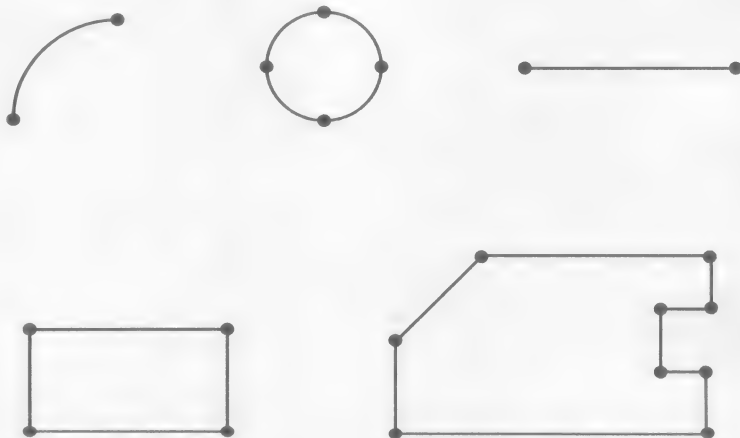
The tool snaps to any end-point if you are within the sensitivity range of the end-point being snapped. Sensitvity can be set in the Preference Dialog, found under the **Edit** menu.

NOTE: If the Snap To Grid option is turned off you can then snap to the closest end-point of the object you are nearest. If the Snap To Grid option is on, you can only snap to points on the current grid setting.

Changing End-Point Snap To Tool

You can change the End-Point Snap To tool at any time during your design process, by pressing the **Tab** key. This is helpful if you want to start with the End-Point tool, and end the object with a different Snap To tool, such as the Center tool.

Setting End-Point Tool to Lock or Reset

The End-Point tool can be set to a locked position, to prevent resetting after you set the first point. Double clicking Locks the tool to a black background while a single click on the tool results in a gray background in the Reset mode.

Point On

Use the Point On Snap To tool to connect the objects you are drawing to a point on another object. The point the tool snaps to, is the closest calculated point at the current position when you release the mouse button. The Point On Snap To tool supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the closest point within the object, allowing you to see where the point is to be placed before you release the mouse button.

Anytime the Point On Snap To tool is selected, the cursor automatically snaps to the closest point within the nearest object. Any point within an object is considered a point. The tool snaps to any point if you are within the sensitivity range of the point you are snapping to. Sensitivity can be set in the Preference Dialog, found under the **Edit** menu.

NOTE: If the Snap To Grid option is on, you can only snap to points on the current grid setting. If the Snap To Grid option is turned off you can snap to the closest vertex point within the object nearest to the mouse cursor.

Changing Snap To Tools

You can change the Snap To tool at any time while pressing the Tab key. This is helpful if you want to start with the Point On Snap To tool, and end with a different Snap To tool, such as the End-Point Snap To tool.

Setting Tool to Lock or Reset

Set the Point On tool to a locked position, to prevent resetting after the first point is set. Double clicking Locks the tool to a black background while a single click sets the tool in a gray background in the Reset mode.

⊙ Center Point

Use the Center Point Snap To tool to connect the objects you are drawing to the center point of another object. The tool snaps to the center point of the closest object in relation to its current position, when you release the mouse button. The Center Point Snap To tool supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the closest center point of an object, allowing you to see where the point is to be placed before you release the mouse button.

Anytime the Center Point Snap To tool is selected the cursor automatically snaps to the closest center point within the nearest object. The tool snaps to any center point of an object, if you are within the sensitivity range of the object you are snapping to. Sensitvity can be set in the Preference Dialog, found under the **Edit** menu.

NOTE: If the Snap To Grid option is on, you can only snap to points on the current grid setting. If the Snap To Grid option is turned off you can then snap to the closest point.

Changing Snap To Tools

You can change the Center Point Snap To tool at any time while pressing the Tab key. This is helpful if you want to start with the Center Point Snap To tool, and end with a different Snap To tool, such as the Corner Point Snap To tool.

Setting Tool to Lock or Reset

You can set the Center Point tool to a locked position, so that it does not reset after you set the first point. Double clicking Locks the tool to a black background while a single click on the tool results in a gray background in the Reset mode.


⬚ Corner Point

Use the Corner Point Snap To tool to connect the objects you are drawing to the corner point on another object. Lines have two end-Points that **KeyCAD Complete** identifies as corner points. The corners of other objects such as, rectangles, arcs, circles, and ellipses, are at the corners of the rectangular boundary lines.

Corner point
of a circle

Corner
point of a rectangle

The tool snaps to the corner point of the object which is closest to the current position at the moment you release the mouse button. The Corner Point Snap To tool supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the closest corner point of an object, allowing you to see where the point will be placed before you release the mouse button.

When the Corner Point Snap To tool is selected the cursor automatically snaps to the closest corner point within the nearest object. The tool snaps to any corner point of an object, if you are within the sensitivity range of the object you are snapping to. Sensitivity can be set in the Preference Dialog found under the **Edit** menu.

NOTE: If the Snap To Grid option is on, you can only snap to points on the current grid setting. If the Snap To Grid option is turned off you can then snap to the corner point.

Changing The Corner Point Snap To Tool

You can change the Corner Point Snap To tool at any time while pressing the Tab key. This is helpful if you want to start with the Corner Point Snap To tool, and end with a different Snap To tool, such as the Perpendicular Point Snap To tool.

Setting Tool to Lock or Reset

You can set the Center Point tool to a locked position, so that it does not reset after you set the first point. Double clicking Locks the tool to a black background while a single click on the tool results in a gray background in the Reset mode.

☒ Intersection

The Intersection Snap To tool should be used when you want to connect the start or end-point of an object where two other objects intersect. An intersection is defined as any point where the lines of two objects meet or cross.

Intersection point

Intersection point
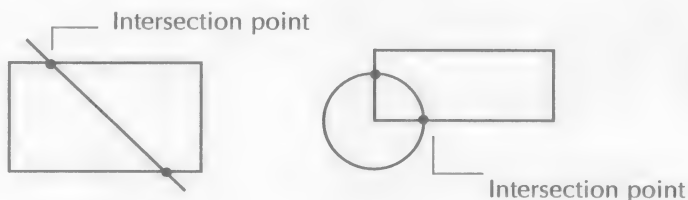
When using the Intersection tool, you can snap to any intersection point of two objects.

The Intersection Snap To tool supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the closest intersection of any two objects, allowing you to see which intersection the point is to be snapped to before you release the mouse button.

The Intersection tool snaps to any intersection point of any two objects, if you are within the sensitivity range of the intersection you are snapping to. Sensitivity can be set in the Preference Dialog found under the **Edit** menu.

NOTE: If the Snap To Grid option is on, you can only snap to the closest points on the current grid setting. If the Snap To Grid option is turned off you can then snap to any intersection point of two objects.

Perpendicular

This tool should be used when you need a line automatically drawn perpendicular to other objects within a design.

The following examples show lines drawn perpendicular to other types of objects.
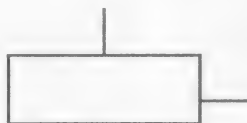
Rectangle   Open or Closed Polygons

Line   Circle

To draw a line perpendicular to an object.

☐   First, select the Line tool from the Draw toolbox.

☐   Then, select the Perpendicular Snap To tool.

☐   Now, place your mouse cursor near the object you want the line to be perpendicular to, click and drag the mouse to the desired line length and release the mouse button.

You can also designate that a line be perpendicular to an object you are finishing the line at. As you are dragging the line to the object you wish to be perpendicular to, before releasing the mouse button make sure the Snap To tool selected is the Perpendicular tool. Now when you release the mouse button near the object, the end-point of the line becomes perpendicular to the object.

NOTE: If the Snap To Grid option is on, you can only snap to points on the current grid setting. If the Snap To Grid option is turned off you can then have lines snap perpendicular to other objects.

Changing the Perpendicular Snap To Tool

You can change the Perpendicular Snap To tool at any time after you have started drawing a line, by pressing the Tab key.

Setting Tool to Lock or Reset

You can set the Perpendicular tool to a locked position, so that it does not reset after you set the first point. Double clicking Locks the tool to a black background while a single click on the tool results in a gray background in the Reset mode.

Line Center

The Line Center tool automatically sets the start or end-point of a line at the exact midpoint of a line or free-formed spline. This tool always snaps to the midpoint, which is always located between any two end-points.

The following examples further explain how one object may have more than one line within the object. This means that the Line Center tool snaps to any midpoint between any two points.
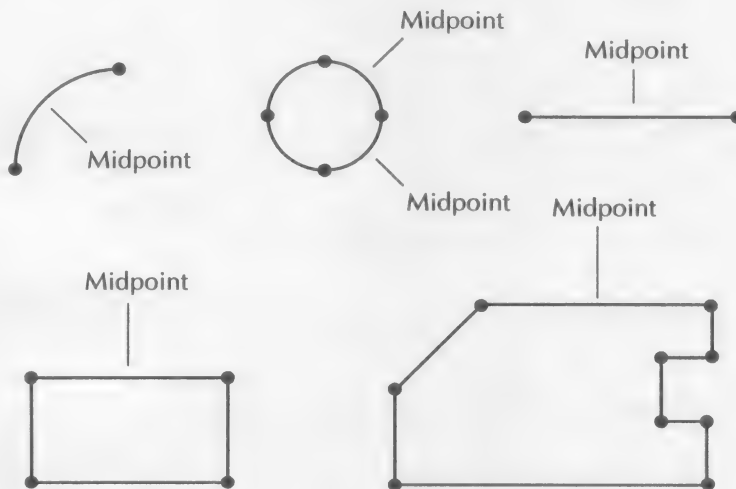
To draw a line at another line midpoint, first select the Line tool from the Draw toolbox and then select the Line Center tool. Now place the mouse cursor near the object you wish to snap to. Click and drag the mouse away from the object, and the line start point automatically snaps to the line center point of the object. Remember that the line center is located between any two points with a line between them. The line can be straight or curved.

You can also designate the end-point of the line you are drawing, to finish at the line center point of another object. As you are dragging the line to set its end-point, be sure that the Line Center Snap To tool is selected, before releasing the mouse button. Now, when your mouse cursor is near the object you wish to set the end-point at, release the mouse button. **KeyCAD Complete** automatically snaps the end-point of the line to the line center point.

The Line Center Snap To tool supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the line center point you are closest to. Therefore allowing you to see where the line center will be placed before you release the mouse button.

**NOTE**: If the Snap To Grid option is on, you can only snap to points on the current grid setting. If the Snap To Grid option is turned off you can then have lines snap to line center points of other objects.

Changing The Line Center Snap To Tool

You can change the Line Center Snap To tool at any time after you have started drawing a line, by pressing the Tab key.

Setting Tool to Lock or Reset

You can set the Line Center tool to a locked position, so that it does not reset after you set the first point. Double clicking Locks the tool to a black background while a single click on the tool results in a gray background in the Reset mode.

⌘ Percentage

When using this tool, it allows you to locate a point on a line, arc, or polygon by specifying a percentage value of the line. The percentage indicates a distance along the length of the line. The start point is considered 0% and the end-point is 100%. A point located at 40% of the line's length can be specified and **KeyCAD Complete** automatically locates that point.

```
     0%      25%     50%     75%     100%

     |       |       |       |       |
     |       |       |       |       |
    ─────────────────────────────────
     |                               |
     |                               |

   Start Point                  End-Point
```
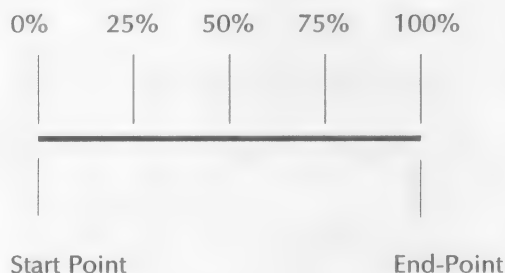
You can set the percentage snap value in the Preference Dialog, which is found under the **Edit** menu.

To draw a line starting at a percentage point of another line, first select the line tool from the Draw toolbox. Then select the Percentage Snap To tool, place the mouse cursor near the line you wish to snap the start point to, and click and drag the mouse away from the line. **KeyCAD Complete** automatically snaps the start point, to the percentage snap point of the line you selected.

The previous paragraph explained how to snap the start point of a line. The same principle applies to the end-point of the line you are creating. As you are dragging the line, change the Snap To tool to the Percentage tool. Then position the end-point of the line, near the line you want to snap to and release the mouse button.

The Percentage Snap To tool supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the percentage point you are closest to. This allows you to see where the percentage point is placed before you release the mouse button.

NOTE: If the Snap To Grid is on, you can only snap to points on the current grid setting. If the Snap To Grid option is turned off, you can then have lines snap to any percentage point that you have set for the percentage tool.

Changing The Percentage Snap To Tool

You can change the Percentage Snap To tool at any time after you have started drawing a line, by pressing the Tab key.

Setting Tool to Lock or Reset

You can set the Percentage tool to a locked position, so that it does not reset after you set the first point. Double clicking Locks the tool to a black background while a single click on the tool results in a gray background in the Reset mode.

Sensitivity Settings

The Percentage tool snaps to any percentage point of any line, if you are within the sensitivity range of the percentage point you are snapping to. Sensitivity Snap To setting can be found in the Preference Dialog, which is found under the **Edit** menu.

⊞ Absolute Point

The Absolute Point tool always snaps objects, start or end-points of objects to the Absolute point of a design. The absolute point is the same as the point where the X, Y - Axis lines meet; it can also be referred to as the Origin point. The absolute point is always equal to X - 0 and Y - 0. This is the reference point for all absolute readouts. The absolute point is located at the lower left corner of a design when the program is first started.

The absolute point is a great point of rotation. It is used for rotating and duplicating objects simultaneously, thus giving you a point of rotation that can be located at any point within a design. This is because the Axis Lines can be moved to any location.

Rotate objects around
the Absolute Point (Origin Point)
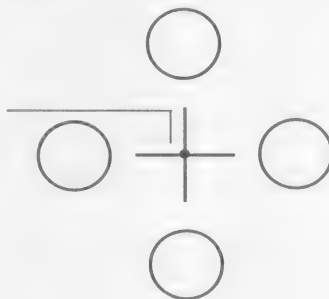
The Absolute Point Snap To tool supports an interactive snap to function. This means the ghost line of the object you are drawing or editing snaps to the current absolute point within your document, allowing you to see where the end-point of the drawn line is to be placed before release of the mouse button.

To draw a line from the absolute point, first select the Line tool from the Draw toolbox. Then select the Absolute Snap To tool and place the mouse cursor near the absolute point on the document. By clicking and dragging the mouse, the start point of the line automatically snaps to the absolute point.

You can also designate the end-point of the line you are drawing, to finish at the absolute point within your document. As you are dragging the line to set its end-point, be sure that the Absolute Point Snap To tool is selected, before releasing the mouse button. Now, when your mouse cursor is near the absolute point in your document, release the mouse button. **KeyCAD Complete** automatically snaps the end-point of the line to the absolute point.

NOTE: If the Snap To Grid option is on, you can only snap to points on the current grid setting. If the Snap To Grid option is turned off, you can then have lines snap to the absolute point that you have set within your document.

Changing The Absolute Snap To Tool

You can change the Absolute Point Snap To tool at any time after you have started drawing a line or moving an object, by pressing the Tab key.

Setting the Absolute Point Tool to Lock or Reset

You can set the Absolute Point tool to a locked position, so that it does not reset after you set the first point. Double clicking Locks the tool to a black background while a single click on the tool results in a gray background in the Reset mode.

Sensitivity Settings

The Absolute Point tool snaps to any absolute point coordinate that you have currently set within your document, if you are within the sensitivity range of the absolute point you are snapping to. Sensitivity of Snap To settings can be found in the Preference Dialog under the **Edit** menu.

File Menu

The **File** menu contains the following commands: New, Open, Close, Save, Save As, Import (file formats), Export (file formats), Open and Save Symbols, Paper Size, Page Setup,Plot, Print, and Quit.

Some of the **File** menu commands can be accessed with keyboard equivalents, when combining the Command key with the appropriate key, as shown below. The following pages in this chapter explain the proper uses for these menu commands.

```
┌─────────────────────────┐
│ File                    │
├─────────────────────────┤
│  New             ⌘N     │
│  Open...         ⌘O     │
├─────────────────────────┤
│  Close           ⌘W     │
│  Save            ⌘S     │
│  Save As...             │
├─────────────────────────┤
│  Import          ▶      │
│  Export          ▶      │
├─────────────────────────┤
│  Open Symbol...         │
│  Save Symbol...         │
├─────────────────────────┤
│  Paper Size...          │
│  Page Setup...          │
│  Plot...                │
│  Print...        ⌘P     │
├─────────────────────────┤
│  Quit            ⌘Q     │
└─────────────────────────┘
```

File Menu

New

The New command allows you to open a new document as shown below. The new document is untitled and has only one layer. The title bar automatically displays "*Untitled1*", which means that the document has no name. If you wish to name the document, you must first save the document to name it. If you choose not to name the document, and open another new document, then the number **1** of "*Untitled1*" changes as you open each new document.

KeyCAD Complete supports multiple documents, meaning that you can use the New command even if a document is previously opened. The new documents appear on top of each other, without replacing the previous document. In order to change the names of the new documents, save them.
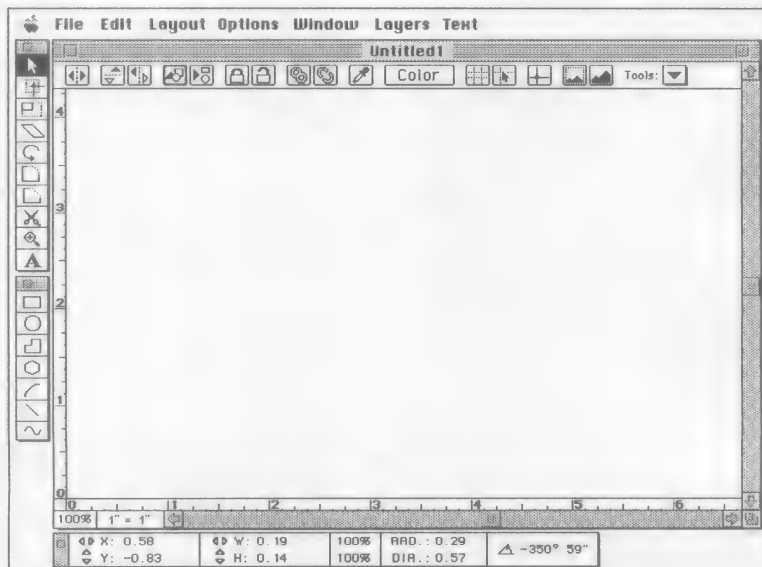
New Untitled Document

Open...

This command allows you to open previously created documents. To access this command you can select the Open command from the **File** menu, or you may press the Command - O keys. After you have chosen the Open command, a Dialog appears allowing you to select the name of the file to be opened.

On the appearance of the Dialog box select the document you want from the list in the box. The list contains the names of each **KeyCAD Complete** file and folder on the current drive. If you have more file names than what can fit in the window, use the scroll bars to find the file or folder name required.

If you decide not to open a file, you may click the Cancel button, to return to where you left off when first selecting the Open command. You may refer to the Macintosh User Manual under *Opening Documents and Folders*.
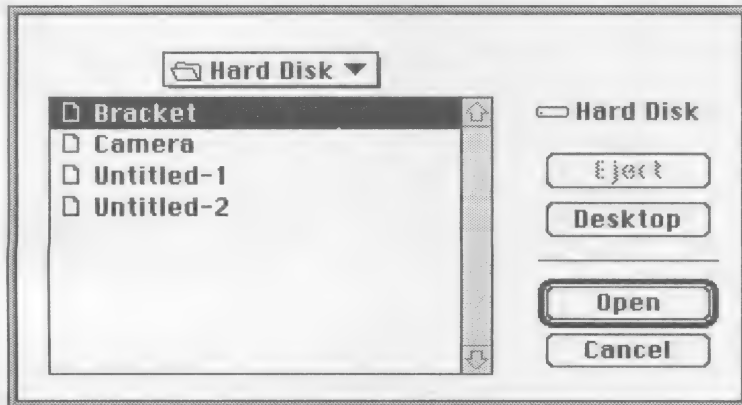
Open Dialog box

Close

The Close command is used to close the currently active document.
The Close command is found under the **File** menu or you can choose
to press the Command - W keys to activate the Close command. (One
of the quickest ways to close a window is to click on the Close button,
found in the upper-left corner of the window.)

Other open documents are not affected by the Close command. To
close a window that is not active, click on the window first to activate
it and then choose the Close command.

If at anytime you have made changes to a currently active document
since the last time you saved it, a message Dialog appears asking if you
want to save the new changes before closing the window or document.

If you decide to close all opened documents or windows, you will see
an empty desktop with **KeyCAD Complete** still open.

Save changes to "Untitled-7" before closing?

Yes

No   Cancel
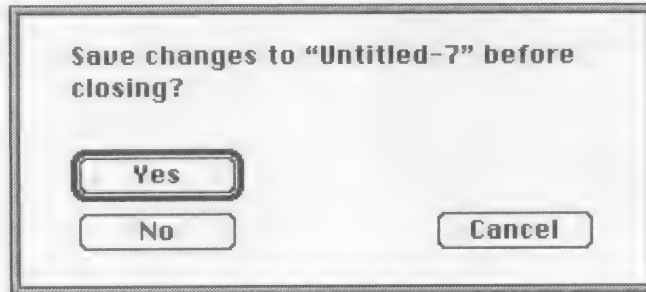
Close Document Warning Dialog box

Save

This command saves a copy of the current document you are working on. The Save command is found under the **File** menu, or you may access the Save command by pressing the Command - S keys.

When choosing the Save command, only the document that is active is saved. The program always saves the file to the currently selected folder or drive. If you have several windows open, you must activate the window that contains the document you wish to save, before selecting the Save command.

If you are working on an untitled document, a Dialog box appears asking you to name the document. The example below shows the Save Dialog.
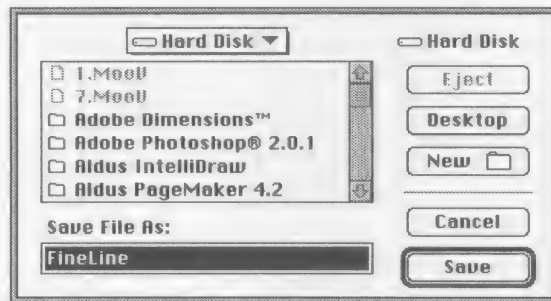
Save Dialog box

Once the Dialog appear, you can then type a name and either click the Save button or press the Return key. If your current disk does not have sufficient room, a message appears asking you to save the document to another disk.

If you have saved the document earlier and then choose the Save command, you see neither Dialog nor message. The Save command automatically updates the current document by replacing the version on the disk with the version currently active on the screen.

Save As...

When you want to update the most recent changes of your current document, choose the Save command. You use Save As when you want to save a copy of the current document without affecting or replacing the version currently within your window.

The Save As command saves a file or document under a different name, folder, or on a different disk drive. You can use Save As to save a new file or document for the first time. The Save As command is found under the **File** menu at the top of your screen.

```
┌──────────────────────────────────────────────────┐
│  ┌─────────────────────────────┐                  │
│  │  🗁 Hard Disk ▼  │          ⊂⊃Hard Disk        │
│  │ ┌────────────────────────┐↕ ┌──────────────┐   │
│  │ │ ▫ Bracket            │  │ │    Eject     │   │
│  │ │ ▫ Camera             │  │ └──────────────┘   │
│  │ │ ▫ FloorPlan          │  │ ┌──────────────┐   │
│  │ │ ▫ Untitled-1         │  │ │   Desktop    │   │
│  │ │ ▫ Untitled-2         │  │ └──────────────┘   │
│  │ └────────────────────────┘↕ ┌──────────────┐   │
│  │                            │ │  New   🗀    │   │
│  │ Save File As:              │ └──────────────┘   │
│  │ ┌────────────────────────┐   ┌──────────────┐   │
│  │ │ FineLine             │   │ │   Cancel     │   │
│  │ └────────────────────────┘   └──────────────┘   │
│  │                              ┌──────────────┐   │
│  │                              │    Save      │   │
│  │                              └──────────────┘   │
└──────────────────────────────────────────────────┘
```
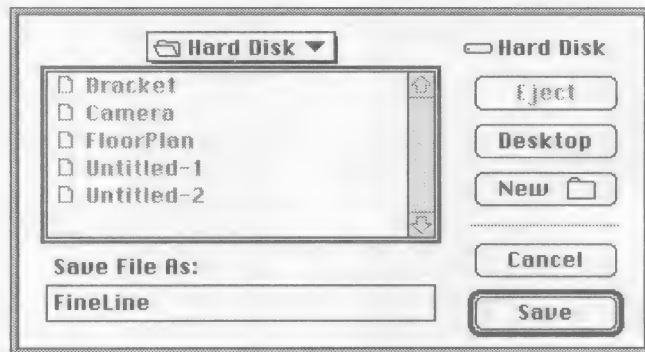
Save As Dialog box

You could use Save As in a couple of different ways. For example, you can make a backup copy of a current work file, or keep both the original version of the file along with a more recent version. In making different versions, you save the original version under one name, and then use Save As again to save the new document under a different name.

If you want to save a file in a different folder, double click the folder name in the list box to open the new folder.   You can also change which drive the new file is saved to, by clicking on the drive name shown in the upper right-hand corner of the Save As Dialog.

Import

The Import option is a pop-up menu that allows you access to the different file formats that are supported within **KeyCAD Complete**. The formats that can be imported are PICT, DXF (AutoCAD), IGES, and XYZ Coordinates.

Import ▶	PICT...
	DXF...
	IGES...
	XYZ...
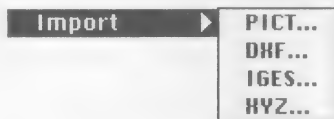
PICT

Choose PICT to display files that have been saved in PICT or PICT2 formats. The PICT format allows you to export your **KeyCAD Complete** documents to almost any Macintosh program that supports the PICT format. Remember that the PICT format is an integer based format and does not maintain a floating point database. (Integer is defined as a whole number or zero, no numeric digits to the right of the decimal point.)

DXF

Choose DXF to display or open files that have been saved in the DXF format. The DXF format is the most popular among **AutoCAD** users, this format is used when transferring **AutoCAD** files from one computer program to another.

IGES

The IGES format is used in transporting **AutoCAD** files or other **CAD** programs within the industry. IGES stands for *Initial Graphics Exchange Standard*. This format is very common among analysis programs.

XYZ Coordinates

This format is used when you want to import XYZ coordinate points. When using this format, the program only places data points in the proper coordinate position. The program does not draw lines or curves between these points.

Export

The Export option is a pop-up menu that allows you access to the different file formats that are supported within **KeyCAD Complete**. These formats can be exported to any program that supports the PICT, DXF, IGES, HPGL, EPS, and XYZ Coordinates. When you choose one of the formats within the **Export** menu, a Dialog box appears prompting you to name the file.

The formats are briefly defined under the *Import* section of this chapter. **Export** menu supports two more formats than the **Import** menu, these formats are HPGL and EPS.

```
┌─────────────────────┐ ┌───────────────┐
│ Export            ▶ │ │ PICT...       │
└─────────────────────┘ │ DXF...        │
                        │ IGES...       │
                        │ HPGL...       │
                        │ EPS...        │
                        │ XYZ...        │
                        └───────────────┘
```
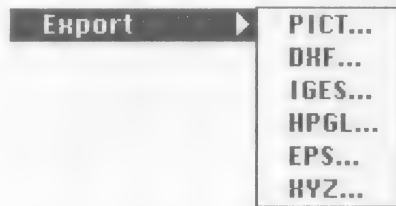
HPGL

This format is exported when you want to create an HPGL file that can be used with plotter servers. A file can be plotted without having to have the **KeyCAD Complete** program when plotting. Think of it as a stand alone format.

EPS

The EPS format stands for *Encapsulated PostScript*, which translates a file to the PostScript page-command language. This format is very popular among page layout and illustration programs.

Open Symbol...

Symbols are treated like individual files that can be placed within your current design. Symbols are predrawn images that you can use in saving time when creating your design.

Remember that a Symbol file format is different from the regular file format that your designs are saved in when you select the Save or Save As command.

To open a symbol, pull down the **File** menu and select the Open Symbol command. A Dialog box appears asking you to choose the symbol name of your choice. Once you find the symbol name of your choice, click on the name one time and then click on the Open button. You can also double click on the symbol name to instantly open the file.

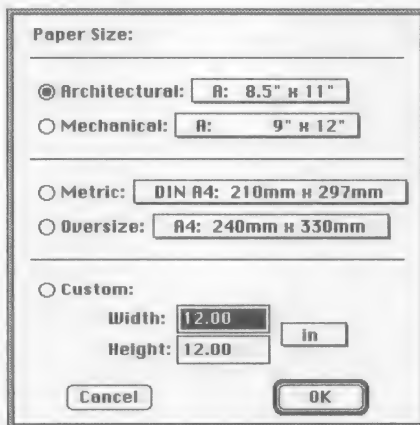# Save Symbol...

When you have created an object to be saved as a Symbol, you must first select the object that you wish to save, before choosing the Save Symbol command. Once you select the Save Symbol command from the **File** menu, a Dialog box appears prompting you to name the symbol you are saving. Once you have saved the symbol, you can then open that symbol from the Open Symbol command.

Paper Size...

When you select the Paper Size command from the **File** menu, a Dialog box appears asking you to choose the paper size for your new document. You have several industry standards to choose from, or the option to create a custom paper size. The program also supports most of the metric standard sizes of paper. The pull-down menus have the letter or numeric name along with the paper's actual dimension size. When the program is first started, it defaults to the Mechanical "A" size (8.5"x11") piece of paper. You can change Paper Size at anytime while creating your design.

Once you choose a paper size, the program represents the paper with a white background. If you scroll to the edge of the paper, you can notice where the paper ends and the background color of your monitor begins. Click the OK button once you have selected the proper paper size.

Below is an example of the Paper Size Dialog box, and the following pages display the pull-down menu options.

```
┌─────────────────────────────────────────┐
│  Paper Size:                             │
│  ───────────────────────────────────     │
│  ● Architectural: [  A:   8.5" x 11" ]   │
│  ○ Mechanical:  [ A:       9" x 12" ]    │
│  ───────────────────────────────────     │
│  ○ Metric:  [ DIN A4:  210mm x 297mm ]   │
│  ○ Oversize:  [ A4:  240mm x 330mm ]     │
│  ───────────────────────────────────     │
│  ○ Custom:                               │
│       Width: [12.00]                     │
│                         [  in  ]         │
│      Height: [12.00]                     │
│  ( Cancel )          (  OK  )            │
└─────────────────────────────────────────┘
```

Paper Size Dialog box

Paper Size Chart

Architectural:	A	9" x 12"
	B	12" x 18"
	C	18" x 24"
	D	24" x 36"
	E	36" x 48"
	F	28" x 40"
	30/42	30" x 42"

Mechanical:	A	8.5" x 11"
	B	11" x 17"
	C	17" x 22"
	D	22" x 34"
	E	34" x 44"

Metric: DIN A4 210mm x 297mm
DIN A3 297mm x 420mm
DIN A2 420mm x 594mm
DIN A1 594mm x 841mm
DIN A0 841mm x 1189mm
DIN B1 707mm x 1000mm

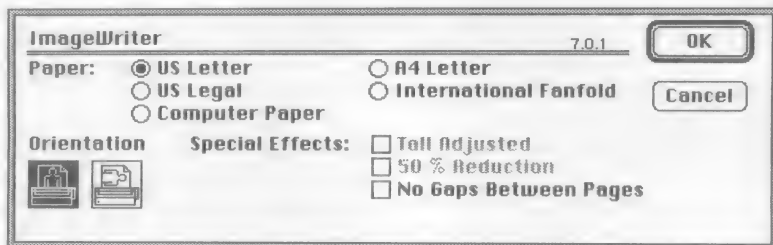| Metric Oversize: | A4 | 240mm x 330mm |
	A3	330mm x 450mm
	A2	450mm x 625mm
	A1	625mm x 880mm
	AO	880mm x 1230mm

Custom Size... Can choose from **in.**, **mm** or **cm** and
have custom horizontal and vertical
paper widths.

Page Setup...

The Page Setup command specifies the page size, orientation, and pagination of your current file when you choose to print the active file. You find the Page Setup command under the **File** menu. After you choose the Page Setup command, the Page Setup Dialog box appears on screen.

NOTE: The information which is displayed in the Page Setup Dialog depends on the system software and printer drivers' that you may use with your Macintosh.

The following example displays and discusses the page setup for the ImageWriter. If you are using an Apple LaserWriter, a plotter, or another printing device, the settings and choices within the Dialog box are different.

ImageWriter   7.0.1   [OK]
Paper: ⦿ US Letter   ○ A4 Letter
          ○ US Legal   ○ International Fanfold   [Cancel]
          ○ Computer Paper
Orientation   Special Effects: ☐ Tall Adjusted
                                    ☐ 50 % Reduction
                                    ☐ No Gaps Between Pages

Page Setup Dialog box for ImageWriter

If you choose to change the page size or the orientation, you must click on the appropriate button. Once you have made your settings, you can then select Print from the **File** menu.
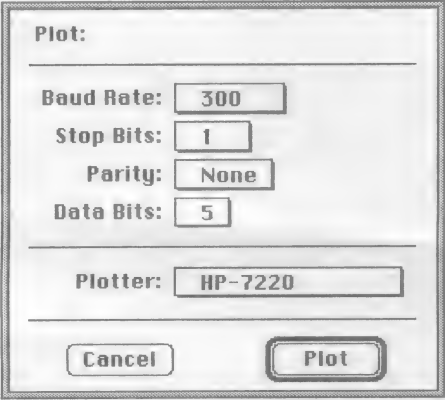
Plot

The Plot command allows you to plot your designs to any HPGL (Hewlett Packard) compatible plotter. The Plot Dialog box allows you to setup the program's parameters to your plotters specification. For plotter specifications refer to your Plotters Manual.

You have the option to set the Baud Rate, Stop Bits, Parity, Data Bits, and you can choose from several different HP plotter models. Each option is a pull-down menu, so click and hold down the mouse button to access the pull-down menus.

Before clicking on the Plot button, be sure that the Dialog box settings are set for your plotter.

Your plotter must be plugged into the printer port on the back of your Macintosh.

The paper size that you plot to, is determined by the Paper Size Dialog box found under the **File** menu.

```
┌────────────────────────────────────────────┐
│  Plot:                                       │
│  ──────────────────────────────────────────  │
│                                              │
│    Baud Rate:  │  300  │                     │
│     Stop Bits: │  1                          │
│       Parity:  │  None  │                    │
│     Data Bits: │  5                          │
│  ──────────────────────────────────────────  │
│                                              │
│       Plotter:  │  HP-7220      │            │
│  ──────────────────────────────────────────  │
│                                              │
│    ( Cancel )        (( Plot ))              │
│                                              │
└────────────────────────────────────────────┘
```

Plot Dialog box

Plot dialog pull-down menus are listed below:

Baud Rate:

✓300
600
1200
1800
2400
3600
4800
7200
9600
19200
57600

Parity:

✓1
1.5
2

Data Bits:

✓None
Odd
Even

Stop Bits:

✓5
6
7
8

Plotter:

✓HP-7220
HP-7440
HP-7470A
HP-7475A
HP-7475B
HP-7550A
HP-7550B
HP-7570A
HP-7570D
HP-7580B
HP-7580D
HP-7585E
HP-Draft Master

Print

You can choose the Print command from the **File** menu or you can press the Command-P keys. Once you choose the Print command, the program prints only the active view on the screen. Only the active window is printed. Any other documents or files in the background that were opened when you chose the print command are not printed.

NOTE: The information which is displayed in the Print Dialog depends on the system software and printer drivers that you use with your Macintosh.

The following example displays and discusses the Print Dialog box for the ImageWriter. If you are using an Apple LaserWriter, a plotter, or another printing device, the settings and choices within the Dialog box are different. You should refer to the Printer or Plotter Manual for more details concerning your printing device.
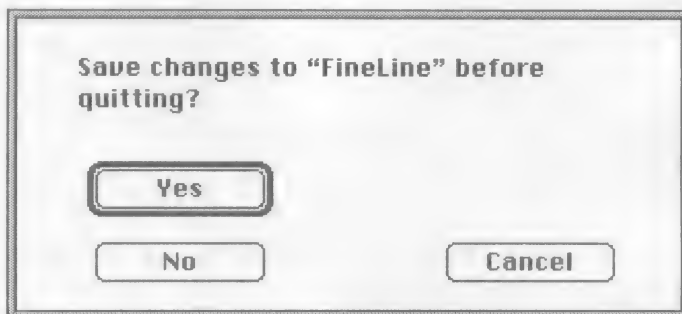
ImageWriter			7.0.1	Print
Quality:	● Best	○ Faster	○ Draft	
Page Range:	● All	○ From: ___ To: ___		Cancel
Copies:	[1]			
Paper Feed:	● Automatic	○ Hand Feed		
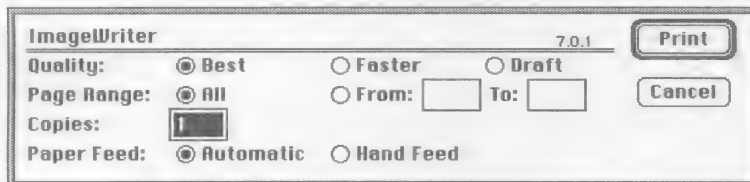
ImageWriter Print Dialog box

You can choose from Best, Faster, or Draft quality printing. Select either *All* or *From* what page *To* what page you want to print, as well as the number of copies to be printed. Once you have made your selection, click the Print button or press the Return key.

Quit

The Quit command allows you to exit the **KeyCAD Complete** program, when you finish working on a file and you wish to leave the program. You have the option of choosing the Quit command from the **File** menu or pressing the Command-Q keys.

If at anytime you have changed the currently opened file, the warning *"Save changes before quitting?"* appears. If you want to save the changes then click Yes. If you had several windows opened on the screen, **KeyCAD Complete** asks you to save each one individually. The warning *"Save changes to...?"* appears, naming each open file that you have changed. This allows you to decide to save the changes or not. If any of the opened files are untitled, the Save Dialog box appears to let you name the file before saving it.
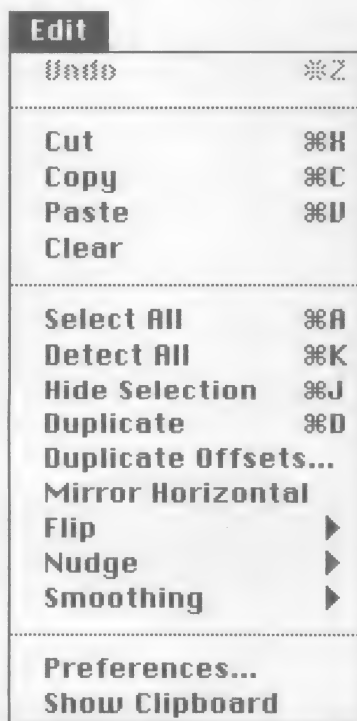
```
Save changes to "FineLine" before
quitting?


        ┌─────────────┐
        │     Yes     │
        └─────────────┘


   ┌─────────────┐              ┌─────────────┐
   │     No      │              │   Cancel    │
   └─────────────┘              └─────────────┘
```

Quit Dialog box

Edit Menu

The **Edit** menu is designed to offer you the commands for changing, editing or modifying any objects and text within your design. For example some of the commands found within the **Edit** menu are Undo, Cut, Copy, Paste, Clear, Select All, Detect All, etc. Many of these commands have menu equivalents for quicker access.

The Preferences dialog box is accessed under the **Edit** menu. This is were you can change the preference of certain defaults found within the program. Some of the Menu Bar commands, are also found under the **Edit** menu.

```
┌─────────────────────────┐
│ Edit                    │
├─────────────────────────┤
│ Undo              ⌘Z    │
│                         │
│ Cut               ⌘H    │
│ Copy              ⌘C    │
│ Paste             ⌘V    │
│ Clear                   │
│                         │
│ Select All        ⌘A    │
│ Detect All        ⌘K    │
│ Hide Selection    ⌘J    │
│ Duplicate         ⌘D    │
│ Duplicate Offsets...    │
│ Mirror Horizontal       │
│ Flip                  ▶ │
│ Nudge                 ▶ │
│ Smoothing             ▶ │
│                         │
│ Preferences...          │
│ Show Clipboard          │
└─────────────────────────┘
```

Edit Menu

Undo

The Undo command allows you to cancel the last action that changed the file you are working on. For example, if you create a door, then resize the door and decide that the original size is preferable, then choose the Undo command from the **Edit** menu.

```
┌──────────┐
│  Edit    │
├──────────────────────────┐
│  Undo            ⌘Z      │
└──────────────────────────┘
```

Undo is found under the Edit Menu

The Undo command permits cancellation of the last action on an object, such as cutting or pasting, duplicating, resizing, reshaping or changing position and location.

NOTE: Undo works only on the last action performed. Once another action changes the file, the preceding action cannot be undone.

Scrolling, selecting a drawing, changing of a Dialog box, or the resizing of a window, are actions that cannot be undone and effectively do not change a file.

Two choices are presented in activating the Undo command. One is to pull down the **Edit** menu and drag the mouse over the word Undo, then release the mouse button. The second, is to press the Command-Z keys.

Cut

The Cut command removes any selected objects or text from your design and automatically places them on the Clipboard. Remember that when you use the Cut command, you replace anything currently on the Clipboard with the new selection that you have Cut.

You can choose the Cut command from the **Edit** menu or press the Command-X keys.

```
 Edit
   Undo            ⌘Z
   ....................................
   Cut             ⌘H
```

Cut is found under the Edit Menu

Use Cut to delete objects, text, or to move them to a new location on your design. To use the Cut command you must first select the object or text and then choose the Cut command, so it cuts the selected objects to the Clipboard. Move or scroll the document to a new location and choose the Paste command to place the Clipboard contents at the center of your new location. The Paste command is also found under the **Edit** menu.

Cut can be used to move objects from one **KeyCAD Complete** document to another. Cut the object from the first document, then open the second document and choose the Paste command. If you have multiple windows opened, you can Cut from the active window then click on the window you wish to activate, then choose the Paste command.

Copy

Choose the Copy command to copy selected objects or text to the Clipboard. The copied object replaces anything on the Clipboard with a newly selected object. Use the Copy command to duplicate objects or text within the current document or different files.

You can choose the Copy command from the **Edit** menu, or press the Command-C keys.

```
┌──────────┐
│ Edit     │
├──────────────────────┐
│  Undo          ⌘Z    │
├──────────────────────┤
│  Cut           ⌘X    │
│  Copy          ⌘C    │
└─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─┘
```

Copy is found under the Edit Menu

You **must select** the objects or text prior to selecting the Copy command. After selecting the Copy command, the objects or text remain selected. Deselection is done by clicking anywhere on the drawing area.

Once a selection is copied to the Clipboard, the object or text can be pasted to another section of the document or even to the file of another application that supports the paste command.

The Copy command is used for copying and pasting objects or text into the Scrapbook. The Scrapbook is found under the **Apple** menu. For more information concerning the Scrapbook, please refer to the Macintosh Owner Manual.

Paste

The Paste command places a current copy of the Clipboard contents into the active layer of the current window. Pasting an object from the Clipboard does not clear the Clipboard contents. Because the contents of the Clipboard remain on the Clipboard, you can use the Paste command repeatedly to make multiple copies of text or objects within the same or different files. For a description on other methods of duplicating objects, please refer to *Duplicate* and *Duplicate offsets* under the ***Edit*** *Menu* section of this manual.

You can choose Paste from the **Edit** menu, or press the Command-V keys to activate the Paste command.

```
 Edit
  Undo              ⌘Z

  Cut               ⌘H
  Copy              ⌘C
  Paste             ⌘U
```

Paste is found under the Edit Menu

Pasting an Object

KeyCAD Complete pastes an object by placing it in front of all other objects within the current file.

☐ If you have just opened the current file and choose the Paste command, the copy is placed in the center of the screen.

☐ If you have scrolled the file in the window, the copy is placed in the center of the screen.

❑   Since **KeyCAD Complete** supports multiple layers within
    one file, you can also use the Cut, Copy, and Paste
    commands when moving objects between layers.

❑   Be sure to activate the layer first before choosing the Copy
    command, then activate the layer you wish to Paste the
    object into.

Transferring Pasted Objects

An option exists for the transferring of complete drawings, individual
objects, and text created in other applications. The aforementioned
designed in MacDraw, Canvas, FreeHand, Illustrator, can be transferred
to the Clipboard or the Scrapbook, and then pasted into your **KeyCAD
Complete** documents.   The entire contents of the Clipboard or
Scrapbook, are pasted into the **KeyCAD Complete** document as one
object and not separately. Once the objects have been pasted within
the document, resizing of the object can be done.

NOTE: To paste a drawing, object or text from any kind of *Paint*
product such as MacPaint, SuperPaint or PhotoShop remember the
applications draw the images on pixel basis dot by dot (bitmapped).
You will be unable to edit the objects that appear within the
boundaries of the pasted object. You can neither Ungroup nor Unjoin
these objects. Files created in a Paint application are called *Raster*
files.

If you use Cut, Copy, and Paste to transfer objects from applications
that support vector objects such as MacDraw, Canvas, ClarisCAD,
and **KeyCAD Complete**, you will be able to edit, ungroup, or unjoin
these objects. Files created in a draw application such as the ones
listed in this paragraph are called *Vector* files.

Clear

The Clear command removes (clears) selected objects or text from your design. The Clear command does not place the cleared object on the Clipboard. Clear is used when you want to delete or permanently remove any selected object or text. This is useful to clear an object from the design, while maintaining the contents of the Clipboard.

You can select any object or text and press the Delete key, which removes (clears) the selected object. The Delete key does not affect the contents of the Clipboard.

NOTE: Remember to use the Undo command to cancel the most recently cleared object.

How to Clear an Object

❏   First, select the object or text that you wish to clear.
❏   Second, pull down the **Edit** menu and select Clear. You may choose to press the Delete key.
❏   The object selected is then permanently removed from your design. If necessary you can choose Undo to retrieve the object.

Select All

The Select All command allows quick access for selection of objects within your design. This includes text and geometric shapes. The vertex points of each object are highlighted as an indicator that the objects are all selected.

Upon choosing the objects within your design, it is easy to move them to a different location.

Moving objects with Select All

☐ First, pull down the **Edit** menu, then choose the Select All command. You should notice that all vertex points are highlighted.

☐ Now, select the Selection tool (Arrow tool), which is the first tool in the Edit toolbox.

☐ Place the cursor on top of one of the selected objects, then hold down the mouse button while dragging the objects to a new position. You can watch the readouts at the bottom of your screen for a precise location.

Another way of making the Select All command work for you, is to select all objects before you choose a command that affects the entire file. For example, you can lock all the objects within your design to a specific grid point, or you can even group all of the objects together. If you want to clear everything on your design, choose the Select All command, and then press the Delete key, or select Clear from the **Edit** menu. This is much faster than selecting each individual object.

Using Select All to Move Objects

With the Select All command subsequent mouse repositioning moves all the objects together. Individual objects cannot be repositioned but you can change the place of the entire design by dragging the objects to a new setting. If your entire design is bigger than your monitor, you may want to choose Fit to Window to help you in design adjustment.

Resizing with Select All

Once the Select All command is chosen, you cannot resize each individual object. If you drag a handle, it proportionally and simultaneously resizes all of the selected objects. For example, if you drag a handle to reduce the size of one object, all selected objects are reduced by the corresponding amount that you drag the mouse. However, the distance between all objects does not change. The distance from the center of one object to the center of the next object remains the same. Only the object size changes either by enlargment or reduction. Objects can be reduced by pushing the mouse towards the center of an object and enlarged by dragging it away.

An entire design can be reduced or enlarged yet maintaining proportional spacing between objects. First, select the Select All command from the **Edit** menu, and then choose the Group command found under the **Options** menu. Then select the Resize tool and grab a selected handle, and begin reducing or enlarging. An example for this option is if you want to reduce the entire size of a design,, fit on a particular size of paper.

Detect All

The Detect All command should not be confused with the Select All command.   These two commands have completely different end results. You can access the Detect All command under the **Edit** menu, or you can press the Command - K keys.

Detect All is designed to undo the Hide Selection command also found under the **Edit** menu. The Hide Selection command hides any selected objects from being selected again. To select an object which is currently hidden use the Detect All command.

Example

☐   First, select one or more objects, and then select the Hide Selection command from the **Edit** menu.

☐   After choosing Hide Selection, the chosen objects cannot be selected.

☐   To deactivate the Hide Selection pull down the **Edit** menu and choose Detect All. The hidden objects become reselectable.

This feature is useful when working in very detailed design areas; encountering problems selecting a particular point due to the close proximity of several points. To remedy this, select the points not to be altered and use the Hide Selection command, permitting work on the point of your choice.   To release the Hide Selection upon completion of work, pull down the **Edit** menu and select the Detect All command.

Hide Selection

The Hide Selection command allows you to select any object or groups of objects such as lines, rectangles, circles, polygons, and hide them to prevent selection with any of the tools.

Example

☐ First, select the objects to be hidden using the Selection tool from the Edit toolbox.

☐ Now, pull down the **Edit** menu or press the Command - J keys to activate the Hide Selection command.

☐ Now, you cannot select any of the objects that were previously selected.

☐ To release the Hide Selection command, pull down the **Edit** menu and select Detect All. This allows selection of any object that was previously hidden from selection.

This feature is useful when you are working in very tight design areas; encountering problems selecting a particular point due to the close proximity of several points. To remedy this, select the points which are not to be altered and use the Hide Selection command. To release the Hide Selection upon completion of work, pull down the **Edit** menu and select the Detect All command.

Duplicate

The Duplicate command immediately copies any and all selected objects, including text blocks. Subsequently, it places the duplicate object in the current window. This command does not place a copy of the selected objects onto the Clipboard, therefore the Paste command is not necessary. Duplicate is an option that allows copies of any selected object in one easy step.

The Duplicate command is found under the **Edit** menu, or you can press the Command - D keys.

The Duplicate Offsets affect the location of the newly duplicated objects. Please, refer to the upcoming section called *Duplicate Offsets*, for more information.

Using Duplicate

When using the Duplicate command, first select the object(s) that you wish to duplicate. Then, pull down the **Edit** menu and select the Duplicate option, or press the Command - D keys. The copy that appears is slightly offset from the original. Once the object is selected, you can immediately edit, reduplicate or relocate it.

If you select and duplicate objects that appear on different layers, the duplicates appear on the same layers as the original objects. If you wish to duplicate an object(s) and place them on a different layer, use the Cut, Copy and Paste commands. This copies the object and places it on the Clipboard. Pasted objects appear in the active layer.

Example

The example below shows you a duplication of a bush for a landscape layout.

1. First, select the bush as shown below. Notice the highlighted points around the object.

Porch

Sidewalk

Highlighted Points
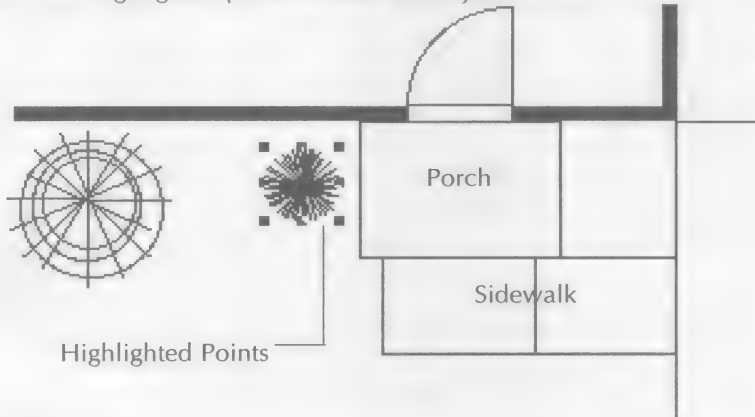
2. Now pull down the **Edit** menu and select Duplicate, or press the Command - D keys. After selecting Duplicate, notice the new object is highlighted. Use the Selection tool to drag the duplicate to a new location.

Porch

Sidewalk
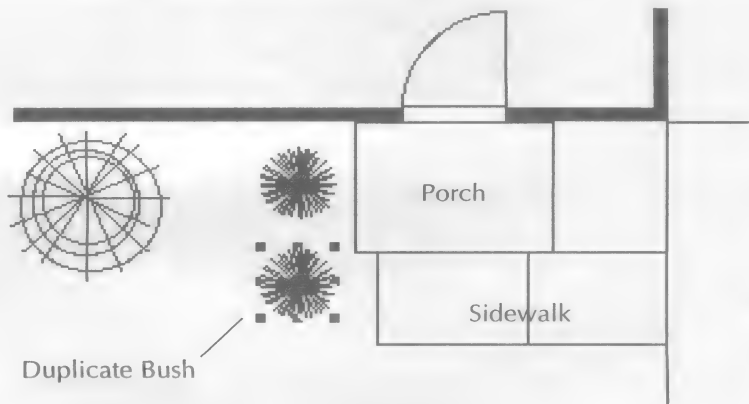
Duplicate Bush

3. After moving the second duplicate bush, select the
   Duplicate command and make a third bush. Reposition
   the third bush to its proper location.

Porch

Sidewalk

— Third Bush
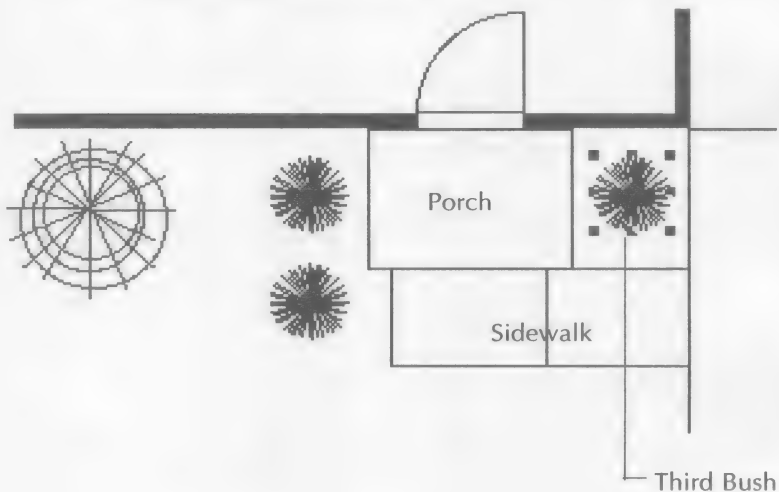
4. When moving the objects after duplication monitor the
   readouts at the bottom of the screen to assist in relocating
   the selected object to a precise coordinate.

NOTE: The Duplicate Offsets Dialog box determines the offset
distance the duplicate object(s) is to be placed after duplication. The
Duplicate Offsets Dialog can be accessed from the **Edit** menu.

Duplicate Offsets...

The Duplicate Offsets Dialog box is useful for laying out charts and other design elements such as evenly spaced bolt patterns or multiple shrubs in a landscape design. The Duplicate Offsets Dialog function duplicates a selected object requiring a number of evenly spaced copies.

The Duplicate Offsets Dialog can be accessed by pulling down the **Edit** menu. Once you type in the Horizontal and Vertical offsets together with the number of Repeats, click the OK button or press the Return key to close the Dialog.
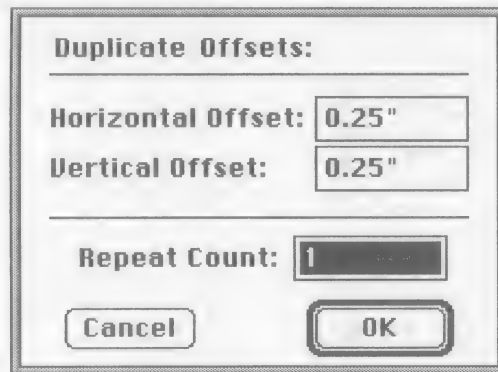
The Horizontal or Vertical offsets are changed within the Duplicate Offsets Dialog. The Duplicate command duplicates the number of objects and their offsets in correlation to the settings within the Duplicate Offsets Dialog.

All Duplicate Offset objects are measured from the origin of the preceding object. Once you choose the Duplicate Offsets and Repeat Count of a selected object, the position of the first copy is measured from the origin of the original object. The position of the second copy is measured from the origin of the first duplicate copy. This process is repeated as many times as the Repeat Count entry displays.

Copies of objects created via the Duplicate Offsets or Duplicate command are placed in front of the original. This applies to each duplicated object regardless of the Repeat Count number.

NOTE: The Duplicate Offsets and Duplicate command do not affect the contents of the Clipboard.

The example below shows the actual Duplicate Offsets Dialog box settings found within the program.

Duplicate Offsets:

Horizontal Offset: | 0.25" |

Vertical Offset: | 0.25" |

Repeat Count: | 1 |

(Cancel)   (OK)

Duplicate Offsets Dialog box

How to use the Duplicate Offsets

☐ First, select the object you wish to duplicate by using the Duplicate Offsets Dialog box. Use the Selection tool for selecting objects
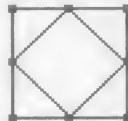
Selected object

☐ Once you have selected the object pull down the **Edit** menu and select Duplicate Offsets. After the Dialog box appears type in a Horizontal Offset of 1.00" and a Vertical Offset of 0", and a Repeat Count of 2. Now click the OK button or press the Return key. Your design should repeat as shown below.

Object after Duplicate Offset command

◀║▶ Mirror Horizontal

The Mirror Horizontal command allows you to flip any selected object or group of objects in a diametrically different direction. Select an object and perform the Mirror command to make a duplicate of the object flipped horizontally and placed by a certain offset.

The Mirror Horizontal command is found under the **Edit** menu. For quick access to the Mirror Horizontal command, activate the Menu Bar and click the Mirror button.

Mirror Button

The Menu Bar can be turned on or off by pressing the Command - M keys or by pulling down the **Layout** Menu.

How to use Mirror Horizontal

The following example shows you how to use the Mirror command to create a frontal view of a tree. Creation of the first half of the tree is devised using the Open Polygon tool.

❏   First select the object or groups of objects that you wish to mirror. Use the Selection tool for selecting objects.

❒ Once the object is selected, you need to pull down the
Edit menu and select Mirror Horizontal, or press the
Mirror button on the Menu Bar.

❒ Notice that after you select the Mirror command, the
newly duplicated copy is selected and slightly offset in the
Horizontal axis. This is so you can move or edit that
object if necessary.

❒ Now that the second half of the tree is created, use the
Selection tool to drag the mirrored copy in alignment with
the original half of the tree. The example below shows
the end result after alignment of the mirrored objects.

❒ Once the mirrored objects are aligned, take the Line tool
and make accent lines within the trees boundary lines.
This adds a more realistic appearance.

Final Example

Flip

The Flip command lets you flip any selected object or group of objects horizontally or vertically. When flipping objects, the program uses the center of the selected objects for a reference point.

The Flip command is found under the **Edit** menu. The Flip options are found within a pop-up menu. To access the pop-up menu, drag the mouse cursor on top of the word Flip while holding down the mouse button.

Hold down mouse button to access pop-up Menu

For quick access to the Flip Horizontal and Vertical commands use the Menu Bar buttons. To turn the Menu Bar on or off, pull down the **Layout** menu or press the Command - M keys.

Flip Vertical   Flip Horizontal
Buttons   Buttons
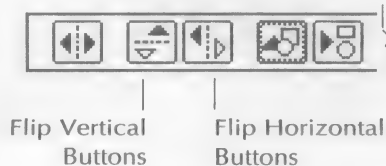
Example

The Flip Horizontal command is useful for creating objects that should be symmetrical along a vertical axis. An example of this, is if you draw a free-formed shape, copy the shape, and then reposition and flip the copy to produce two free-formed shapes with symmetrical curves and lines. The Vertical Flip command works in the same manner, except the objects flip on the Vertical axis.

Flip Horizontal flips the object along the Horizontal axis. Think of it as flipping the object to the right of the original object.

Vertical Axis Line
Up or Down

Horizontal Axis
Left to Right
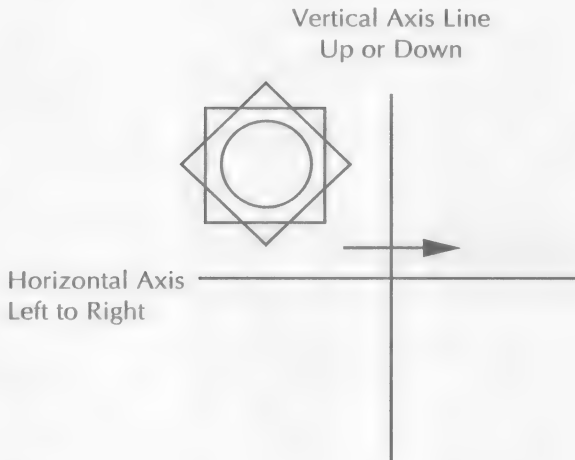
Flip Vertical flips the object along the Vertical axis. Think of it as flipping the object down from the original object.

Vertical Axis Line
Up or Down

Horizontal Axis
Left to Right
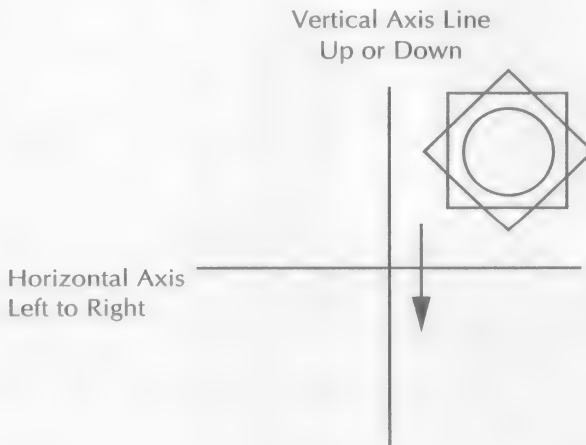
Nudge

The Nudge commands are very useful when you want to move selected objects in small or large increments without using the Selection tool (Arrow tool). When moving objects, it sometimes becomes difficult to move selected objects using the Selection tool (Arrow tool). With this in mind, **KeyCAD Complete** has designed several convenient ways of Nudging (moving) selected objects. You can set the distance an object is to be nudged, by accessing the Nudge Rate Dialog box.

To access the Nudge command pull down the **Edit** menu, highlight Nudge and a pop-up menu appears, from which you can select either Nudge UP, DOWN, LEFT, or RIGHT. You can also access the Nudge Rate Dialog box.

Nudge ▶	Up
	Down
	Left
	Right
	Nudge Rate...
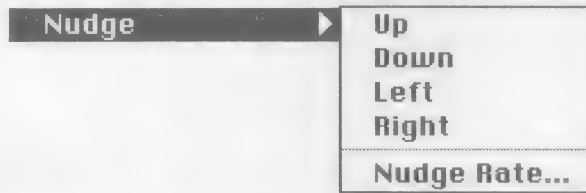
Nudge Pop-up Menu

The Nudge Buttons

KeyCAD Complete has placed Nudge buttons on the Readout display window. The display buttons support two types of Nudge, i.e., Incremental Nudge and Absolute Nudge. The following examples display two types of Nudge.

Nudge Absolute   Nudge Incremental
Buttons   Buttons

◀▶ X: 0.58   ◀▶ W: 0.19
♦ Y: −0.83   ♦ H: 0.14

Nudge Absolute

The Nudge buttons allow you to nudge any selected object(s), and individual vertex points from the Absolute reference point (Origin Point). The Absolute (Origin) Point is where the axis lines meet. The program defaults to the lower left of the screen.

For example, select an object then click on one of the Nudge buttons, either to the left or to the right and up or down. The selected object moves in that direction according to the distance set within the Nudge Rate Dialog box. The program defaults the Nudge Rate to one pixel or 1/72".

NOTE: Remember the reference point from which the Nudge is calculated, is the Absolute (Origin) point of your design.

Absolute Nudge Buttons
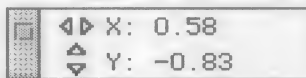
◀▶ X: 0.58
⬆⬇ Y: −0.83

☐ **Nudge X (Left or Right)**, when clicking on these buttons the object moves along the X-Axis.

◀▶ X: 0.58

Nudge Left or Right

☐ **Nudge Y (Up or Down)**, when clicking on these buttons the object moves along the Y-Axis.

⬆⬇ Y: −0.83

Nudge Up or Down

☐ Click the Nudge buttons as many times as necessary.

Nudge Incremental

These nudge buttons allow you to nudge any selected object(s) and individual vertex points in Incremental coordinates. Incremental means that the selected object moves in reference to the original position of the object or points. For example, if you select a rectangle and then click on the ◀▶ **W** Nudge buttons, the rectangle changes in width, which changes the size of the selected object. The nudge distance is set in the Nudge Rate Dialog box.

If you select an object then click on one of the Incremental Nudge buttons, either (**W**) left or right and (**H**) up or down, the selected objects change in Width or Height according to the distance set within the Nudge Rate Dialog box. The program defaults the Nudge Rate to one pixel or 1/72".

When using the **W** or **H** nudge buttons on selected objects, the width and height are referenced from the center of the selected object.

Incremental Nudge Buttons

```
◀▶ W: 0.19
 ▲
 ▼ H: 0.14
```
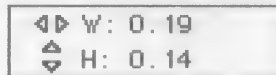
☐ **Nudge W**, when clicking on these buttons the object changes along the X-Axis.

◀▶ W: 0.19

Nudge Width (Left or Right)

☐ **Nudge H**, when clicking on these buttons the object changes along the Y-Axis.

▲
▼ H: 0.14

Nudge Height (Up or Down)

Setting the Nudge Rate

When using the Nudge commands, you can set the distance an object moves each time you use the Nudge command. To access the Nudge Rate Dialog box, pull down the **Edit** menu and drag the cursor on top of the word Nudge. A pop-up menu, displays. Now select the Nudge Rate... Once the dialog box appears you can then type in the nudge rate. Click, OK once you have typed in the correct rate. Click on the Cancel button if you wish to cancel and return to the previous setting.

The Nudge Rate Dialog affects the all of the Nudge commands.

NOTE: The Nudge Rate is always tied to the current scale of your design.

Nudge Rate...

```
1.00
```

[Cancel]   [OK]
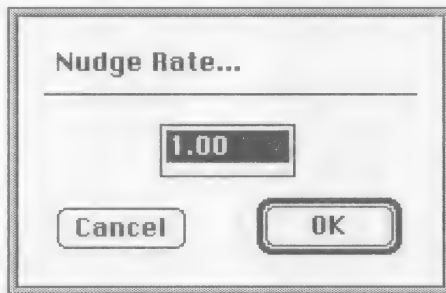
Nudge Rate Dialog box

Smoothing

This command is designed to round the angles of polygons, splines and unsmoothed freehand shapes. This command can also work conversely by changing the rounded angles back into sharper angles.

You can access the Smoothing commands under the **Edit** menu, hold down the mouse button on top of the word *Smoothing* and a pop-up menu appears. From the pop-up menu you can access Smooth, Unsmooth, and Tension Dialog box.

Smoothing ▶	Smooth
	Unsmooth
	Tension...

Smoothing Pop-up Menu

❐ **Smooth**
Spline Smooth changes any selected polygons to smoothed splines. Smooth rounds the corners of polygons and unsmoothed free-formed shapes.

❐ **Unsmooth**
The Unsmooth command changes splines, smoothed polygons and any smoothed free-formed shapes into polygons with sharp angles.

❐ **Tension...**
This command allows you to access the Tension Dialog box and change the tension value from which the Smooth command is tied. You can loosen or tighten the smoothness of selected objects.

Using the Smooth command

The following example shows the effects of the Smooth command when applied to a polygon.

❏   First, create a simple open polygon, then select the polygon by using the Selection (Arrow) tool, so that all of the points within the polygon are highlighted.

Highlighted points ─────────────

Unsmoothed Polygon

❏   Now, select the Smooth command from the Smoothing pop-up menu. After selecting Smooth, the polygon automatically smooths the angled corners of the polygon.
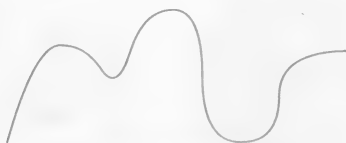
Smoothed Polygon

Unsmooth

❏   After you have smoothed the polygon, you can select the smoothed polygon and choose Unsmooth. The polygon returns to its original angular shape.

Tension Dialog Box

When you access the Tension Dialog box you are setting the amount of smoothness that is to be applied when you use the Smooth command.

You can select the Tension Dialog box from the Smoothing pop-up menu, which is found under the **Edit** menu.

When entering the tension value, the smaller the number the tighter the curves are going to appear. If you go with too small a number, the corner points become angular.   This has a similar effect to the Unsmooth command.

If you increase the tension value, the curve smoothness becomes looser, taking on a larger curve effect. If the value is to high, you can make objects with no straightness.

Spline Tension:

Tension: 5

Cancel   OK
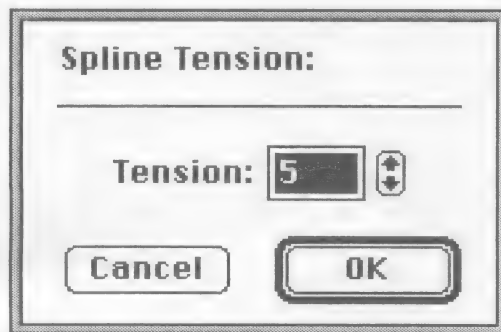
Tension Dialog box

Preferences...

This Dialog box allows you to personalize **KeyCAD Complete**. You can change the way the program defaults certain tools and commands. The Preferences options are useful when you want to adjust the **KeyCAD Complete** environment to fit your working habits.

You can access the Preferences Dialog box under the **Edit** menu. The dialog permits a choice of several options.

Multigon Sides

The number in this box represents how many even sides you have when using the Multigon tool found in the Draw toolbox.

Curve Smoothness

KeyCAD Complete uses splines when creating any curves within the program. This setting allows you to determine how many points are placed on each curve segment. The higher the number, the smoother the curves appear. The lower the number, the rougher the look to the curves

Snap To Tool Sensitivity

This setting lets you determine how close you have to be to the object outline. The number represents how many pixels away from the object you can be. A pixel is equal to one dot on your screen.

Snap To Tool Percentage

The percentage value you type into this box determines the point on the line the Snap To tool snaps to. You can set it from 0 to 100%. Refer to the *Percentage Snap To Tool* for more information.

Auto Reset Tools

You can turn this option on or off. An **X** in the box indicates that it is on. This option when turned on, resets the tool you have selected back to the Arrow tool (Selection tool), after you have used the selected tool one time. If you leave this option turned off, then the tool you select stays selected until you choose another tool.

Preference Dialog

Multigon Sides: `5`

Curve Smoothness: `10`

Snap Tool Sensitivity: `5`

Snap Tool Percentage: `25` %

☐ Auto Reset Tools

Cancel   OK
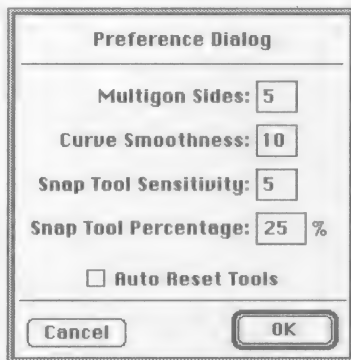
Preferences Dialog box

Show Clipboard

The Show Clipboard command opens the Clipboard. The Clipboard window shows the objects or text that you most recently cut or copied to the Clipboard. The Clipboard is used when you want to copy (duplicate), or move selected objects from any part of your design to another part, or even to a different file. You can also move objects to other applications that support the Clipboard Cut, Copy, and Paste commands.

You access the Show Clipboard window under the **Edit** menu.

When you choose Show Clipboard from the **Edit** menu, a window appears which displays the most recently copied object or text to the Clipboard. To close the window click on the Close button of the window.

Layout Menu

When using the **Layout** menu, think of the commands as items that customize design requirements. The **Layout** menu allows you to access commands such as turning the Menu Bar on or off, Drawing Scale, Fit to Window, Axis Lines on or off, Grid specifications, and many other commands used for creating, viewing, and measuring objects.

Several commands have keyboard equivalents for fast access, when combining the Command key with certain letters as shown in the menu below.

```
┌─────────────────────────┐
│ Layout                  │
├─────────────────────────┤
│ ✓Menu Bar          ⌘M   │
│                         │
│ Drawing Scale...        │
│ Fit to Window      ⌘1   │
│                         │
│ ✓Axis Lines             │
│ Page Breaks             │
│ Grid               ▶    │
│ Align to Grid      ⌘R   │
│                         │
│ Dimensioning       ▶    │
│                         │
│ Draw Parallel      ⌘Y   │
│ Parallel...             │
│ Draw from Center        │
│                         │
│ Colors...          ⌘F   │
│ Readouts           ▶    │
│ Lines              ▶    │
└─────────────────────────┘
```
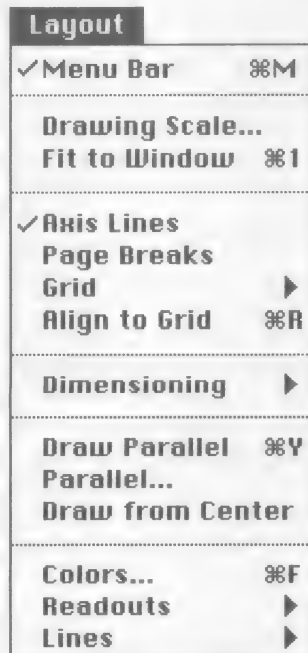
The Layout Menu

Menu Bar

The Menu Bar is designed to let you work efficiently and quickly within your design. The Menu Bar can be turned on or off as necessary. To turn the Menu Bar on or off, first pull down the **Layout** menu and then select the Menu Bar command. You may also hold down the Command-M keys to turn the Menu Bar on or off.
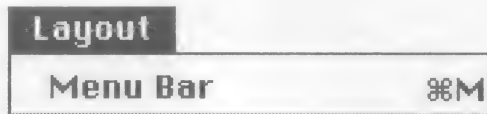
```
┌──────────────┐
│ Layout       │
├──────────────────────────┐
│ Menu Bar            ⌘M   │
└──────────────────────────┘
```

The commands, tools, and options found within the Menu Bar can be accessed within the various menus found at the top of your screen.

The buttons and pull-down menus have been designed with minimal size. They follow along the edge of the title bar to minimize space utilization and should not interfere with design work.

If you are using a monitor that is smaller than the width of the Menu Bar, the program cuts off the options furthest to the right. It cuts off one option at a time, until the width of the Menu Bar fits within your screen size.

A brief definition of each option found within the Menu Bar is provided on the following pages. Further information on these options is available by referring to the menu that contains the required option. The Menus have more detailed examples on how to use these options in the creation of your design. Refer to theTable of Contents at the begining of this Manual for a List of Commands contained within each menu.

Menu Bar Layout with Names

Fit to Window

Actual Size

Tools:

Toolbox
Pull-Down Menu

Axis Line
On or Off

Snap to
Grid

Grid Lines
On or Off

Color

Current Color

Eyedropper

Flip Vertical   Group

Lock

Join

Mirror

Flip
Horizontal   Ungroup

Unlock

Unjoin
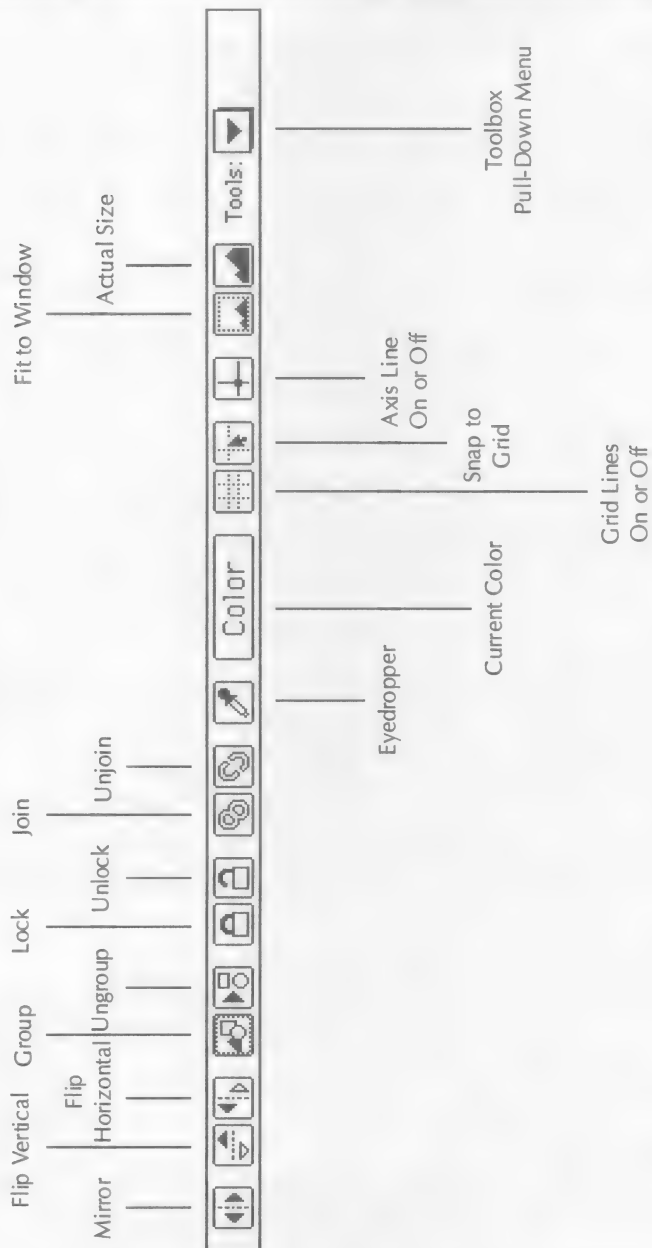
Mirror

This button allows you to duplicate and flip a selected object. The mirrored object is slightly offset from the original. To use the Mirror command, first select the object then click on the Mirror button within the Menu Bar. You can Mirror individual objects or groups of objects.

Flip Vertical

This button allows you to Flip selected objects along the vertical axis, comparable to flipping the selected object upside down. You can Flip individual objects or groups of objects.

Flip Horizontal

This button allows you to Flip selected objects along the horizontal axis, comparable to flipping the selected object to the right. You can Flip individual objects or groups of objects.

Group

This button allows you to consolidate a set of selected objects as one grouped object. A grouped set of objects is treated as a single object, rather than several individual objects.

Ungroup

The Ungroup button automatically divides a grouped object into individual objects.

Lock

This button allows you to Lock the characteristics and location of any selected object or groups of objects, so that it cannot be changed.

Unlock

The Unlock button Unlocks selected objects that have been previously locked.

Join
This button allows you to connect (Join) all selected lines or arcs that share overlapping (connected) end-points.

Unjoin
The Unjoin button disconnects all selected lines or arcs that have been previously Joined.

Eyedropper
The Eyedropper tool allows you to select the current color from any color within your design. Once you click the Eyedropper tool on a color within your design that color then becomes the current color. The color you have clicked on is then displayed in the Color button.

Current Color
This button displays the current color within the program. It allows you to select the color picker when you click once on the button.

Grid Lines On or Off
The Grid button turns the Grid Lines on or off, depending on the current status of the Grid Lines when you click the button. You can set the Grid spacing under the Grid pop-up menu found under the **Layout** menu.

Snap To Grid
This button allows you to quickly turn the Snap To Grid option on or off.

Axis Lines On or Off
Clicking this button toggles the Axis Lines on or off.

NOTE: The Axis Lines represent the Origin point, a reference site for all Absolute coordinates and Readouts.

Fit to Window
This button automatically makes the entire design fit within your current window size. This is useful for the overall layout of a design.

Actual Size
This button displays your design at its actual size. This is very useful when you have Zoomed In or Out and wish to return to Actual Size without using the Zoom tool or Menu command. To access the keyboard equivalent for Actual Size, press the Command - E keys. The Menu command is found under the **Options** menu.

Tools: ▼   **Toolbox Pull-Down Menu**
This pull-down menu turns on or off any of the toolboxes found within the program.

Tools: ▼

✓**Edit**
✓**Draw**
  Snap
  Dimension

✓**Position Info**
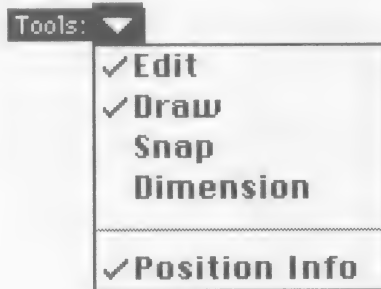
Toolbox Pull-Down Menu

Drawing Scale...

The Drawing Scale Dialog box is used for setting the scale that you work in when creating your design. You can specify what an inch or centimeter measurement stands for in actual size. **KeyCAD Complete** supports all of the scales used in today's engineering fields.

Scale factors are very useful when working on precise designs that are larger than the paper needed to print the design. Working with scaled drawings, is knowing how a design proportionally fits with respect to the real world coordinates.

Access the Drawing Scale Dialog from the **Layout** menu.

```
 Layout
✓Menu Bar      ⌘M
 Drawing Scale...
```
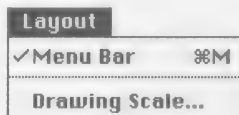
The program defaults to 1" (in.) equals 1" (in.). Once you change the scale it stays to the new setting until you change it again. Below are some example scales that are commonly used.

> 1/16 in. = 1 ft.
> 1/8 in. = 1 ft.
> 1/4 in. = 1 ft.
> 1/2 in. = 1 ft.

These scales are more commonly used in Architectural designs. Since most Architectural designs are very large in real life, a small scale factor is needed to permit the design to fit on a reasonable size of paper.

KeyCAD Complete Drawing Scale Dialog supports both English and Metric scales and they are interchangeable.

Example

Below is a simple room presented in two different scales to assist in the comprehension of how scales can benefit your design.

☐ Create the room **1" = 1" scale factor**. Notice that the size of the room is very small in comparison to the real world size of the same room.
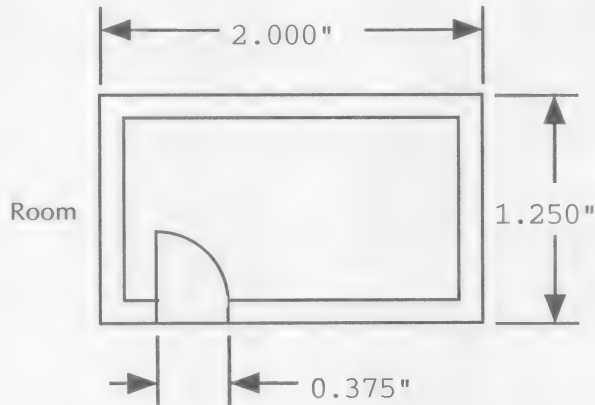
☐ Now create the same room but use **1/8" = 1' scale factor**, to show the real life measurements.
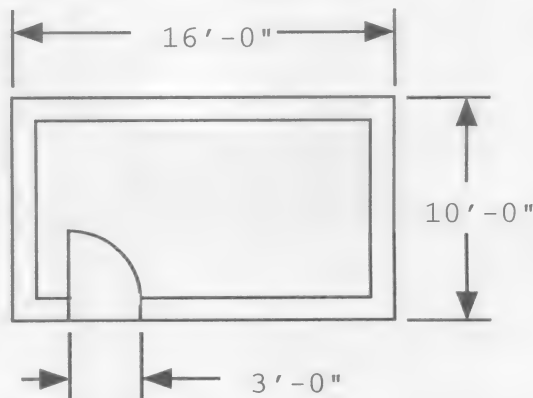
Setting the Drawing Scale

Set the Drawing Scale at the begining of your design, when you first open a new file.

When setting the scale factor you must consider setting the Display options to display the proper units of measurement.

The first step in setting the Drawing Scale is opening the Drawing Scale Dialog box. Pull-down the **Layout** menu and select Drawing Scale, A Dialog box appears asking you to set the scale of your choice. You can set the units to inches, feet, yards, millimeters, centimeters, decimeters, meters.

You can select the Rescale Objects box to automatically update any previously drawn objects. If you do not select the Rescale Objects, then only the objects you draw from this point take on the new scale factor. This allows you to have multiple scale factors within one document.
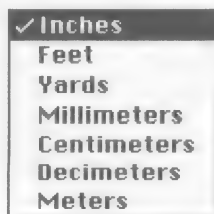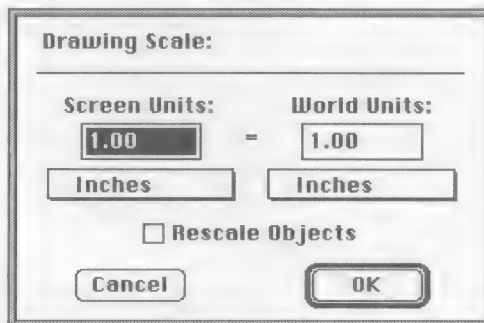
| Unit Options | Drawing Scale Dialog box |

Once you change the scale, your readouts at the bottom of your screen change accordingly.

Fit to Window

This command quickly lets you see an overview of the entire document by fitting it to the current window size. This command is useful for designs that cover several pages. You can change the view to see how the whole design looks, and ensure a proper fit on the selected paper size. **KeyCAD Complete** reduces or enlarges the size of a design to permit viewing of it in its entirety within your current window size.

You can choose the Fit to Window command under the **Layout** menu or you can press the Command - 1 keys.

```
┌─────────────────────────────┐
│ Layout                      │
├─────────────────────────────┤
│ ✓Menu Bar            ⌘M     │
│ ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄ │
│    Drawing Scale...         │
│    Fit to Window    ⌘1     │
└─────────────────────────────┘
```
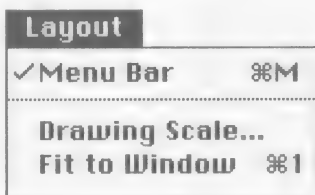
Fit to Window Menu command

KeyCAD Complete also gives you the option to use the Fit to Window button on the Menu Bar. To activate the Menu Bar, either pull-down the **Layout** Menu or press the Command - M keys.

⊞ Axis Lines

The Axis Lines command turns on or off the Axis lines on your screen. The axis lines represent where the X & Y axis lines meet. This is considered the Absolute reference point of your design. When the program is first started the axis lines appear in the lower left-hand corner of the screen. The axis lines can be moved by selecting the Move Origin under the **Options** Menu.

X-Axis runs horizontal or (left to right).

Y-Axis runs vertical or (up and down).

To access the Axis Lines command pull down the **Layout** Menu. You can tell in the menu if the axis lines are on or off. A check mark beside the name indicates that they are on.

```
┌─────────────────────────┐
│ Layout                  │
├─────────────────────────┤
│ ✓Menu Bar        ⌘M    │
│ ·······················  │
│   Drawing Scale...      │
│   Fit to Window   ⌘1   │
│ ·······················  │
│ ✓Axis Lines            │
└─────────────────────────┘
```
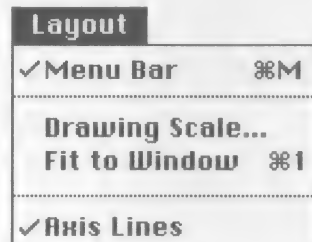
KeyCAD Complete offers the option of using the Axis Lines button found on the Menu Bar. You can activate the Menu Bar command under the **Layout** Menu, or press the Command - M keys. Click on the button, to turn the lines on or off, like a toggle switch.

Page Breaks

This command permits viewing of how a drawing divides into pages
for printing purposes. It shows the page breaks of any file (document).
A page break appears as dashed lines on your screen. Your design may
extend over the page break lines. The dashed lines DO NOT print;
they represent where **KeyCAD Complete** divides the drawing into
printed pages. The page break lines are in accordance with the page
size and orientation selected in the Page Setup Dialog box.

Page break lines cannot be moved or adjusted on the page where they
appear on your design. **KeyCAD Complete** automatically sets the
page break positions based upon the settings chosen in the Paper Size
and Page Setup Dialog boxes.

  ☐   To display Page Breaks choose the Page Break
      command from the **Layout** Menu.

Layout	
✓Menu Bar	⌘M
Drawing Scale...	
Fit to Window	⌘1
✓**Axis Lines**	
Page Breaks	
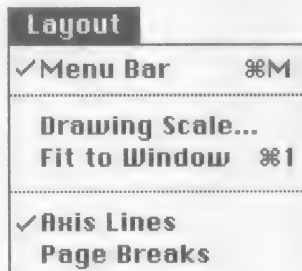
  ☐   To hide the page breaks, choose the Page Breaks
      command again and the lines disappear. The
      Page Breaks command works as a toggle switch.

Grid

The Grid options are accessed through the Grid pop-up menu, which is found under the **Layout** menu. Drag the mouse cursor on top of the word Grid and a pop-up menu appears as shown below. Within this menu you can choose to turn the Grid lines on or off, Snap To Grid, and set the Grid Spacing.

Grid ▶	✓**Grid Lines**
	✓**Snap to Grid**
	Grid Spacing...
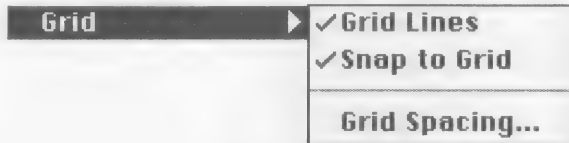
Grid Pop-up Menu

Grid Lines

Grid lines are evenly spaced on the screen and can be used for reference points when creating your design. These lines help you accurately position and adjust the size of objects. The space between each grid line can be set to a specific distance. To change the grid spacing, select the Grid Spacing command; a Dialog box appears allowing you to set the grid spacing.

The Grid Lines option works like a toggle switch, and the check mark ✓ beside the option means that the grid lines are on. Select the Grid Lines option to turn them off and the check mark disappears.

To turn the grid on or off simply click on the grid button found on the Menu Bar. The Menu bar appears under the title bar of your window. You can turn the Menu Bar on or off from the **Layout** menu or by pressing the Command - M keys.

Snap To Grid

If you want to ensure that objects drawn conform exactly to the Grid, turn on the Snap to Grid option. When you turn on the Snap to Grid option, **KeyCAD Complete** restricts the sizing, placement, and drawing of objects to the spacing of the grid.

Objects change size in increments of the grid spacing only when the Snap to Grid option is activated. Objects cannot move to positions between the grid points. Move them so that the boundary lines of the object align only with the grid lines.

Turning on the Snap to Grid

To turn on the Snap to Grid option select it from the Grid pop-up menu found under the **Layout** menu. The option works like a toggle switch, and when the Snap to Grid is on, a check mark ✓   appears beside the name.

Alternatively turn the Snap to Grid on or off by clicking on the Snap to Grid button found on the Menu Bar. Turn the Menu Bar on or off by selecting the command under the **Layout** menu or by pressing the Command - M keys. For more details concerning the Menu Bar refer to the *Menu Bar* section of this chapter.
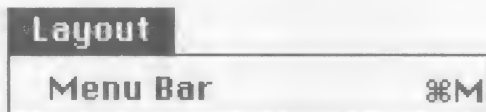
The Menu Bar Command

Grid Spacing...

The spacing between the horizontal and vertical grid lines can be set by accessing the Grid Spacing Dialog box. The grid spacing can be set for both the Horizontal and Vertical lines.

Access the Grid Spacing Dialog box by selecting the Grid Spacing option found in the Grid pop-up menu, which is found under the **Layout** menu.

Grid ▶	✓ Grid Lines
	✓ Snap to Grid
	Grid Spacing...
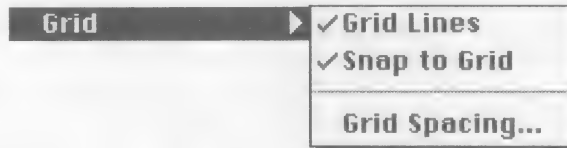
With the appearance of the Dialog box, type in the horizontal and vertical distance required. The horizontal and vertical distances do not have to be the same. Once you have typed in the desired settings click on the OK button and the Grid lines are automatically updated to reflect the new settings. You can cancel the Dialog by clicking on the Cancel button, and the program returns to the previous settings.

Grid Spacing:

Horizontal: `0.00`

Vertical: `0.00`

[Cancel]   [OK]
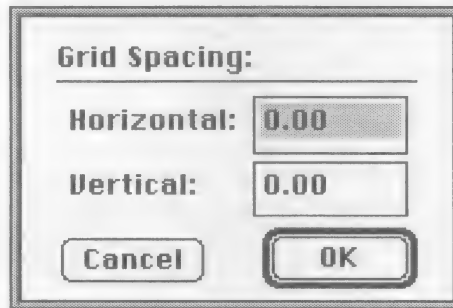
Grid Spacing Dialog box

Align to Grid

The Align to Grid command automatically aligns individual or groups of objects to the current grid spacing.

Using the Align to Grid

☐   First, select the object you wish to align to, by using the Selection tool.

☐   Second, turn on the Align to Grid command by selecting it from the **Layout** menu.

☐   Now, select the End-Point Snap To tool and click on the vertex point within the object you wish to align to the grid. Clicking on the point with the Snap To tool tells the program which point you wish to snap to the grid.

☐   Once you have snapped to the desired point while holding down the mouse button drag the object to the closest grid point and release the mouse button. The object is automatically aligned to the grid point.

NOTE: You must use the Snap To tools when aligning objects to the grid. This is so the program can understand which point of the object you want aligned to the grid. You can use any of the Snap To tools when using the Align to Grid command.

Dimensioning

The Dimensioning pop-up menu allows you to access several options
for the dimension tools. Most options work like a toggle switch, and
have check marks ✓ beside them to indicate that they are on. These
options include Arrows In, Arrows Out, Center Text, Text Frame,
Single, Double, Limiting Tolerances.

Tolerance Values Dialog box can be accessed from the Dimensioning
pop-up menu. This Dialog is for setting the upper and lower tolerance
values for the Limiting Tolerance option.

The Arrowheads pop-up menu is where you select the type of
arrowhead for the dimension lines.

Using these options enhances the custom look appearance of the
document and helps in using industry standard methods of drafting.

Dimensioning ▶	Arrows In
	✓ Arrows Out
	Arrowheads ▶
	✓ Center Text
	✓ Text Frame
	Single Tolerance
	✓ Double Tolerance
	Limiting Tolerance
	Tolerance Values...
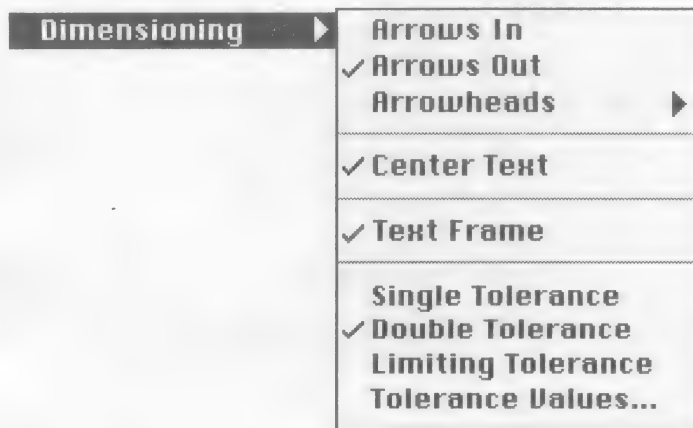
Dimensioning Pop-up Menu

Dimensioning Options

Arrows In

This option makes the Arrows appear on the inside of the witness lines. The example below displays how the arrows look when using the Arrows In option.
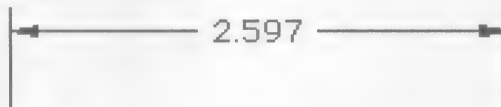
Arrows Out

This option makes the Arrows appear on the outside of the witness lines. The following example displays how the arrows look when using the Arrows Out option.
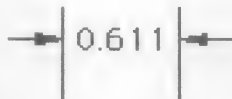
Arrowheads

The Arrowheads pop-up menu provides the Arrowhead types available for selection with dimensions. The following example displays the available options.
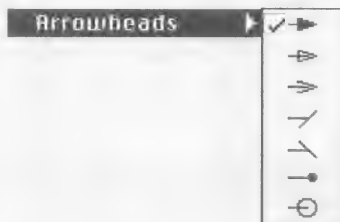
Center Text

When selecting this option the text that appears with your dimension is automatically centered between the witness lines. This is useful if you alter the size of an object that is already dimensioned. The text remains in its original position until you select the dimension and choose Center Text.

Text Frame

After selecting the Text Frame option, the dimension text automatically has a box drawn around the text. The example below displays how the Text Frame appears.

Single Tolerance

This option displays a tolerance value with the dimension text. The Tolerance option can be combined with the Text Frame option as shown in the examples below. To set this tolerance value, choose Tolerance Values from the pop-up menu and set the upper tolerance to your specifications.
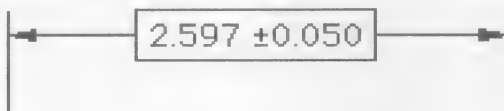
Single Tolerance with Text Frame
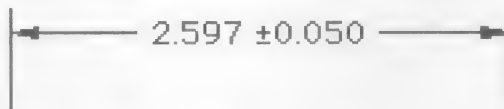
Single Tolerance without Text Frame

Double Tolerance

This option displays your dimensions with a double tolerance value, i.e. an upper and lower tolerance value. To set these upper and lower values, access the Tolerance Values Dialog box. The Double Tolerance option can be displayed with or without a text frame. The following examples show how the options appear with a dimension.

Examples of Double Tolerance options

$$2.597 \begin{array}{l} +0.050 \\ -0.025 \end{array}$$

Double Tolerance with Text Frame

$$2.597 \begin{array}{l} +0.050 \\ -0.000 \end{array}$$
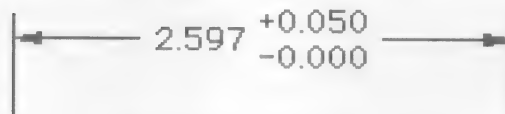
Double Tolerance without Text Frame

Limiting Tolerance

When choosing this option your dimensions appear with a double dimension value that has added the upper and lower tolerance values to the actual dimension. The examples below illustrate this option. The upper tolerance value is set to 0.050 and the lower tolerance value to 0.025.   These values are automatically added to the original dimension.   You set the values in the Tolerance Values Dialog box found within the Dimensioning pop-up menu.

2.597

Original dimension

2.647
2.597
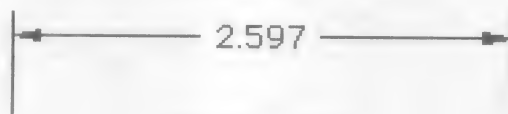
Dimension after selecting the Limiting Tolerance option

2.647
2.597
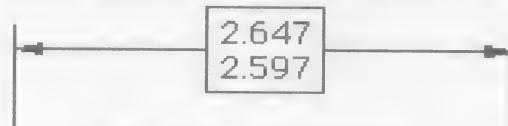
Limiting Tolerance with Text Frame

Tolerance Values

The Tolerance Values Dialog is where you set the upper and lower tolerance values that are applied to the Single, Double and Limiting Tolerance options. The following example illustrates the Tolerance Values Dialog.

Tolerance Values:

Upper Tolerance: `0.00`

Lower Tolerance: `0.00`

[Cancel]   [OK]
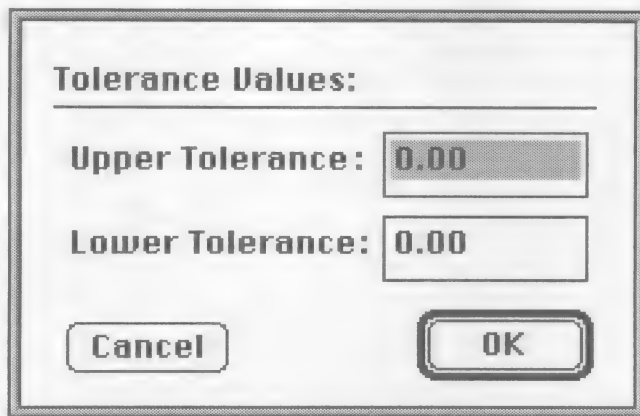
Tolerance Values Dialog box

Draw Parallel

This command draws all objects with a parallel of the object you are drawing. Select the Draw Parallel command before you start drawing the object. The parallel options can be set within the parallel Dialog box, which is also found under the **Layout** menu.

Draw Parallel examples

Parallel...

The Parallel Dialog box is where you set the parallel options for drawing parallel objects. You can choose from drawing the parallel to the Inside, Outside, or Center of the original object. You can also set the distance that the parallel is to be offset from the original.

Parallel Options:

○ Inside ↔

◉ Outside ↔

○ Center ↔

Width: 0.25

(Cancel)   (OK)
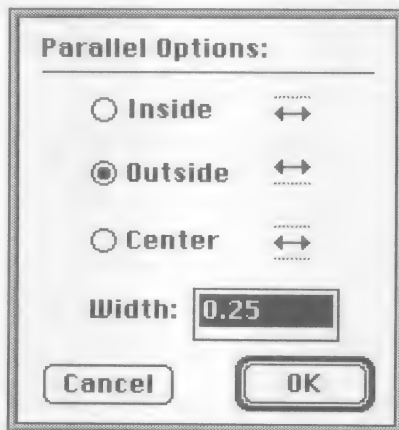
Parallel Options Dialog box

Draw from Center

This command sets the Draw tools to always draw from the objects center. When using this command the readouts display half of the objects width and height, due to the fact that it is drawing the object from the center. If you want to draw a circle with a specific radius, select Draw from Center and the width and height readouts display the radius.

| Color | ## Colors...

The Colors command gives access to the color picker within the program. The color picker allows you to choose any color or grayscale that is available to your hardware.

You can access the Colors command under the **Layout** menu, or press the Command - F keys. You can also bring up the color picker by clicking on the Color button on the Menu Bar. You can turn the Menu Bar on or off from the **Layout** menu, or press the Command - M keys.

The Color button displays the currently selected color.

KeyCAD Complete provides an easy method to select a color that you may have previously chosen. Use the Eyedropper tool to conveniently change the current color in the color picker.

Using the Eyedropper tool

❑ Click on the Eyedropper tool, which is found on the Menu Bar.
❑ Now, place the tip of the Eyedropper on top of the color you wish to select, and then click the mouse button.
❑ Notice that the color button changes to the color you have clicked on. This new color stays active until you change it again.

Readouts

The Readouts pop-up menu gives access to the options available for the Readouts window. From the pop-up menu you can set the readouts to display certain levels of precision. You can also set the readouts to display feet and inches. A check mark (✓), indicates which option is active.

Readouts ▶	**0**
	0.0
	✓ **0.00**
	0.000
	0.0000
	0 "
	0' – 0 "
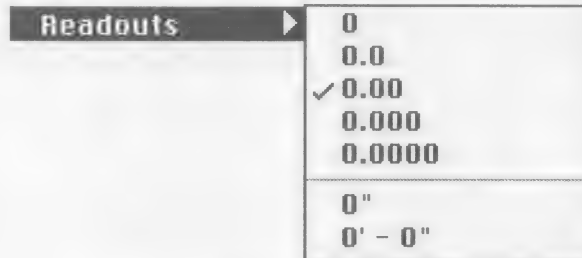
Readouts Pop-up Menu

The following example is the Readouts window, which appears at the bottom of the screen. These readouts can be turned on or off, and can be moved to any location on the screen.

| ◀▷ X: 0.58 | ◀▷ W: 0.19 | 100% | RAD.: 0.29 | ⊿ –350° 59" |
| ⬍ Y: –0.83 | ⬍ H: 0.14 | 100% | DIA.: 0.57 | |

Readouts Window

Lines

The Lines pop-up menu allows you to choose from the different types and sizes of lines.   The choice of lines consist of plain lines, centerlines, and different types of dashed lines. The line size applies to all line types. You can also access the Line Size Dialog box.
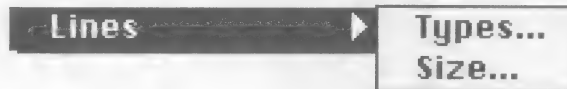
Lines Pop-up Menu
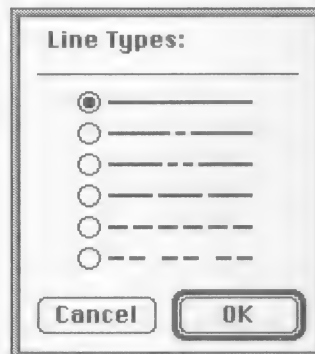
Line Types Dialog box

Changing Line types

If you have already created an object and you wish to change the line type of that object, proceed as follows:

☐   First, select the object then pull down the **Layout** menu and access the pop-up menu, to select the line type of your choice.

☐   Only the selected objects change to the new line type.

Line Size

This Dialog box is used to select the line thickness that appears when using the Draw tools. The lines are determined by point size. The Dialog box displays the line width after you type in the point size. Use whole numbers such as 1, 2, 3, etc. You can choose from 1 to 20 on the line size.

Line Size:

Points: 1

Cancel   OK
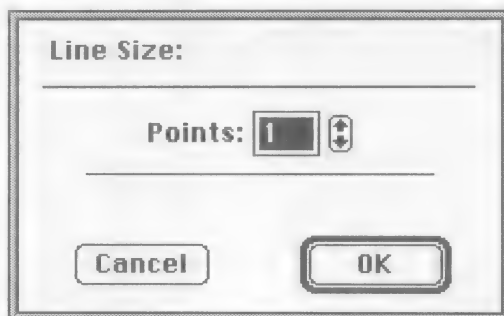
Line Size Dialog

The following examples illustrate what the different lines sizes look as printed.

1 point line

2 point line

4 point line

6 point line

8 point line
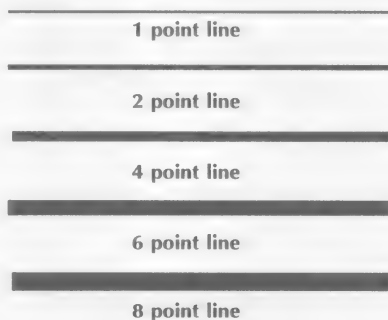
Options Menu

The **Options** menu is where you select various options available to the program. The commands consist of filling objects with Fill Patterns, Lock or Unlock objects, Join or Unjoin objects, Group or Ungroup, Move Origin, and Actual Size.

Several of the **Options** menu commands can also be accessed from the Menu Bar (refer to *Menu Bar* section). The commands that have Menu Bar equivalents are Lock, Unlock, Join, Unjoin, Group, Ungroup.

Menu Bar Buttons   Menu Commands

Lock

Unlock

Join

Unjoin

Group

Ungroup

Options

Fill Patterns   ▶

Lock
Unlock
Join
Unjoin

Bring to Front   ⌘F
Send to Back   ⌘B

Group   ⌘G
Ungroup

Move Origin...   ⌘/

Actual Size   ⌘E
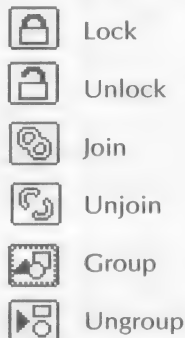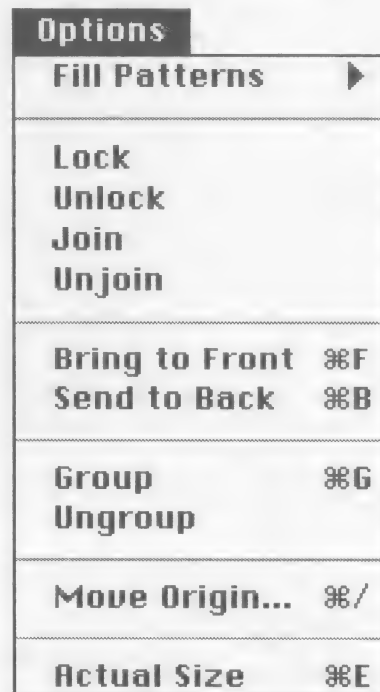
Fill Patterns

The Fill Patterns pop-up menu gives access to the various fill patterns for filling objects. You can apply a fill to any object such as polygons, circles, rectangles, squares or multigons. If an object is made up of lines and arcs, you must first join the different elements of the object together prior to filling it.

To select a fill pattern pull down the **Options** menu and drag the mouse on top of Fill Patterns. A pop-up menu appears, then drag the mouse cursor on top of the fill of your choice and release the mouse button.
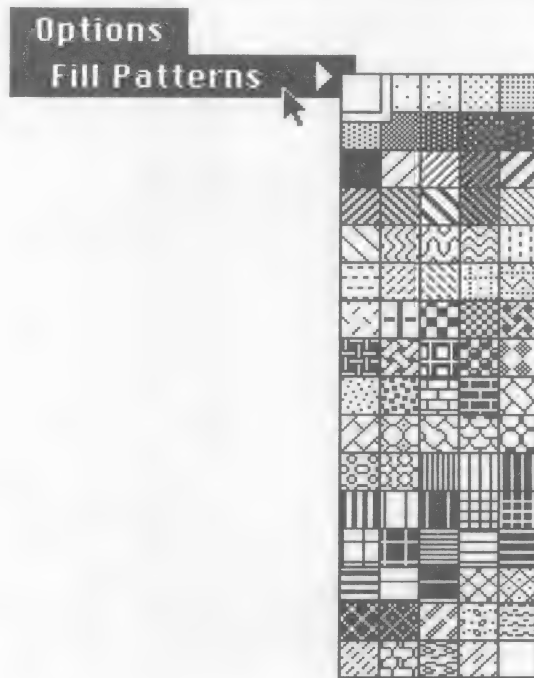
Fill Pattern Pop-up Menu & Tear off Menu

Select a fill pattern; when you return to the Fill Pattern pop-up menu, the selected fill is identified by a white frame. This indicates that a fill is currently selected.

Applying a Fill Pattern to an object

☐ First, select the object you wish to fill. More than one object can be selected by holding down the Shift key while clicking on additional objects.

☐ Now, select the fill of your choice from the Fill Pattern pop-up menu.
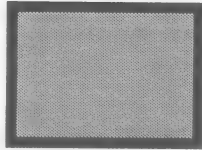
Filled objects

When an object is already filled and you decide to do further edits to the size or shape of the object, the fill pattern is automatically updated to reflect the changes.

Lock and Unlock

Objects within your document can be locked to prevent them from being accidentally moved, edited or deleted. When you lock an object you cannot cut, delete, move, rotate, mirror or flip it. Neither can you change its' appearance, stacking order (layer) size, alignment to the grid, smooth, unsmooth, or reshape the object that is locked. However, you can select copy and duplicate a locked object.

If you include a locked object among objects selected for grouping and then choose the Group command, **KeyCAD Complete** keeps that object locked even though it is grouped with other objects.

The Lock command is found under the **Options** menu; or use the Lock and Unlock buttons found on the Menu Bar. The Menu Bar is turned on or off from under the **Layout** Menu.

NOTE: You can protect an entire document by selecting all of the objects in the document and locking them. When locked, none of the objects can be changed.

Locking an Object

- [ ] First, select the object by clicking on it with the Selection tool.
- [ ] Second, choose the Lock command from the **Options** menu or click on the Lock button found on the Menu Bar.

Unlocking an Object

- [ ] First, click on the object(s) you wish to Unlock, making sure the boundary points are highlighted.
- [ ] Second, choose the Unlock command from the **Options** menu, or click on the Unlock button found on the Menu Bar.

Join and Unjoin

When you select Join from the **Options** menu or the Menu Bar, the program automatically connects all line segments with overlapping end-points. Overlapping means that the end-points are connected by snapping them to each other, (using the Snap To tools). The Join command combines individual line segments, arcs, polygons, and free-formed splines into one polygon.

Overlapping end-points

The Join command turns individual line segments and arcs into polygons. Perform any of the procedures or choose any of the commands that you want to use with open or closed polygons. You can resize, reshape, smooth or fill joined objects.

You can choose Join from the **Options** menu or click on the Join button found on the Menu Bar. Select objects prior to selecting the Join command.

How to Join objects

❐ First, select the objects you wish to join, by using the Selection tool and Shift clicking on the individual objects. (Be sure that the end-points are overlapping, connected).

❐ Now, select the Join command from the **Options** menu or click on the Join button found on the Menu Bar.

Unjoin

When you select Unjoin from the **Options** menu, any selected objects are automatically disconnected from each other. Unjoin separates the segments that have been combined into one joined polygon, therefore making them individual line segments. Unjoin divides rectangles, rounded rectangles, polygons or circles into individual line segments.

You can choose the Unjoin command from the **Option**s menu or click on the Unjoin button found on the Menu Bar.

How to Unjoin objects

☐ First, select the object, by using the Selection tool from the Edit toolbox.

☐ Then, select the Unjoin command from the **Options** menu, or click on the Unjoin button on the Menu Bar.

Bring to Front

The Bring to Front command from the **Options** menu, moves any
selected object all the way to the front of the stacking order. This
command is useful in moving an object from behind another object,
allowing an edit to the object. After editing the object move the object
to the back of the stacking order. If several objects are selected and
then Bring to Front is chosen, all selected objects move together in
front of the unselected objects. The transposed objects remain in the
same stacking order they were prior to the command. Choose the
Bring to Front command from the **Options** menu, or press the
Command - F keys.

Send to Back

The Send to Back command moves any selected object to the last
position of the stacking order. An object moved to the back can be
partially or totally obscured from your view by other objects placed
in front. Although obscured, the object remains selected and you can
move it to the front if necessary. You can choose the Send to Back
command from the **Options** menu, or press the Command - B keys.

To move an object Front or Back

☐   First, select the object(s). This command also works with
     grouped objects.
☐   Then, select the command of your choice and the selected
     object move to the Front or Back depending on which
     command is selected.

Group and Ungroup

Designs can be made of many different individual objects. A design may need to consolidate, or group, several objects into one object, to make work with a design easier. Once objects are grouped; it enables them to work as one single object.

Ungrouped objects selected

Same objects grouped and selected as a group

Notice in the example above that the objects have individual boundary points when not grouped. After grouping the objects, they share the same boundary points, making them act as one object.

Clicking on a set of grouped objects select the entire group simultaneously. It is possible when working with grouped objects, to resize, delete or duplicate them. Once a set of objects are grouped, you cannot change the individual objects that make up the group, (unless the objects are first ungrouped).

Objects can only be grouped on the same layer. When you select objects for grouping, they appear at different positions in the object stacking order. Once you group these objects, they take on the stacking order of the foremost grouped object.

Grouping Objects

☐ First, select the objects you wish to group, by clicking on individual objects, use the Selection tool and hold down the Shift key. You can drag a selection rectangle around the objects you wish to group.

☐ Choose Group from the **Options** menu, or click on the Group button found on the Menu Bar, or press the Command - G keys.

☐ Once the objects are grouped, a display of boundary points are exhibited around the grouped objects.

Ungrouping Objects

☐ First, ungroup any grouped objects, if you want to make any changes to the individual objects within the group. Ungrouping objects breaks those objects into individual objects again. You cannot ungroup locked objects. You must first unlock the objects, using the Unlock command.

☐ Select the grouped objects by clicking on them with the Selection tool.

☐ Choose Ungroup from the **Options** menu, or click on the Ungroup button found on the Menu Bar.

Once grouped objects are Ungrouped, you can make changes to each individual object. **KeyCAD Complete** automatically highlights the selected objects.

Move Origin

The Move Origin command allows you to move the Absolute point of the design. The Absolute point is where all absolute coordinates are calculated from. The Absolute coordinates are considered the X and Y coordinates or the horizontal and vertical distance from the zero point. The Origin point is where the horizontal and vertical axis lines intersect.

You can move the Origin point to any location on the current document. Moving the Origin point affects all layers.

You can access the Move Origin command from the **Options** menu.

Actual Size

Use the Actual Size command to return the current document back to the 100% view. Actual Size means the measurement on the screen is the size the document is to be printed at.

Actual Size is useful to quickly remove any zoom in or out commands you may have performed. The design returns to 100% viewing.

Access the Actual Size command from the **Options** menu, or press the Command - E keys.

Windows Menu

The **Windows** menu gives you access to various options that affect the characteristics of the windows setup. The options are: Scrolling Speed, Background Color, Title Options, Toolboxes.

The following example shows how the menu appears within the program.

```
┌─────────────────────────┐
│ Windows                 │
├─────────────────────────┤
│ Scrolling Speed...      │
│ Background Color...     │
├─────────────────────────┤
│ Title Options        ▶  │
├─────────────────────────┤
│ Toolboxes            ▶  │
└─────────────────────────┘
```
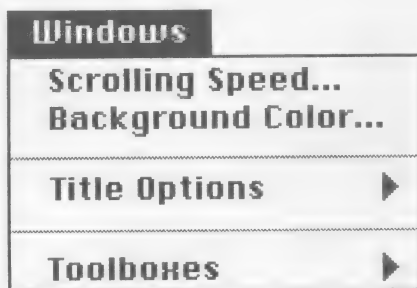
The Windows Menu

Scrolling Speed

The Scrolling Speed Dialog box allows you to change the speed at which your document scrolls when clicking on the Scroll Arrows.

The Scrolling Speed is determined by the number of pixels at which your document moves before it redraws the screen.

The Dialog can be changed in two different ways; either click on the small arrows next to the numeric display, or highlight the numeric value and type in a value. The program defaults to 50 pixels. The higher the number the faster the document scrolls.

```
┌─────────────────────────────────────┐
│  Scrolling Speed:                    │
│  ─────────────────────────────────   │
│                                      │
│        Pixels:  [50]  ◆              │
│                                      │
│    ( Cancel )    (( OK ))            │
└─────────────────────────────────────┘
```
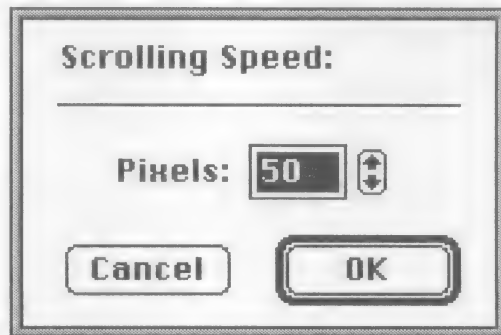
Scrolling Speed Dialog box

Once you have typed in the desired speed, click on the OK button and the new settings become effective. You can click on the Cancel button to return the Dialog to the previous settings.

Background Color

The Background Color option allows you to change the background color of your document. If you have any objects that have no fill to them, the background color appears through the objects. The background color covers the entire size of your current document page size.

When you choose the Background Color from the **Windows** menu, a color picker Dialog box appears. You can choose from any color available to your current video hardware. **KeyCAD Complete** supports up to 16.8 million colors.
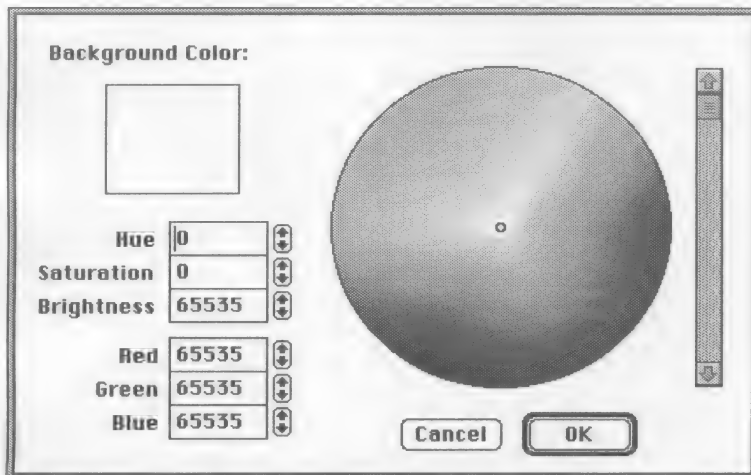
Background Color Dialog box

You can type in the R G B values of any color, as well as the Hue, Saturation, or Brightness of any color. The selected color appears in the color box located in the upper left-hand corner of the Dialog. Once you have selected the color , click on the OK button, or click on the Cancel button to return to the previous background color.

Title Options

KeyCAD Complete offers several different options for titling your documents. These options consist of the Drawing Name, Drawing Name / Axis, Axis and Layer Name.

Title ▶	Drawing Name
	Drawing Name / Axis
	Axis
	Layer Name
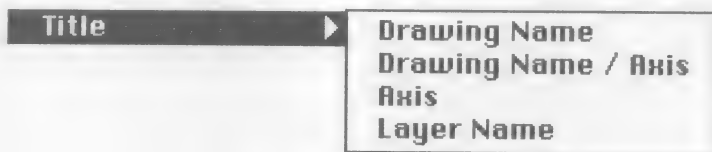
Title Options Pop-out Menu

Select the Title options by accessing the Title pop-up menu under the **Options** menu. The document title can be changed at anytime during the design process.

The selected title appears in the middle of the Title Bar at the top of your screen.

If you choose the Layer Name option, only the active layer name appears.

Toolboxes

The toolbox pop-up menu turns on or off any of the toolboxes, as well as the Readout display at the bottom of your screen. You have access to the Edit toolbox, Draw toolbox, Snap To toolbox, Dimension toolbox, Position Info (readouts). A check mark ✓ beside the name indicates that the toolbox is active.

Toolboxes ▶ | ✓**Edit**
✓**Draw**
Snap
Dimension
✓**Position Info**
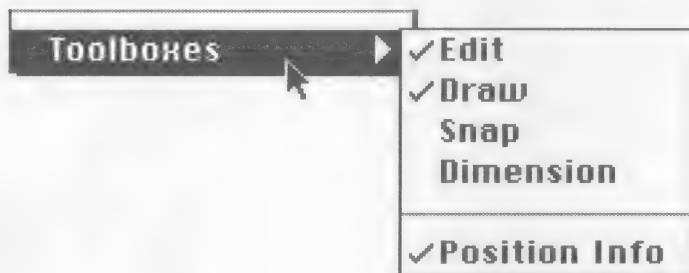
The Toolbox Pop-up Menu

The toolboxes can also be accessed from the Menu Bar. This pull-down menu is designed to quickly turn on and off the tools. You can turn the Menu Bar on by pressing the Command - M keys or by pulling down the **Layout** menu.

Tools: ▼
✓**Edit**
✓**Draw**
Snap
Dimension
✓**Position Info**
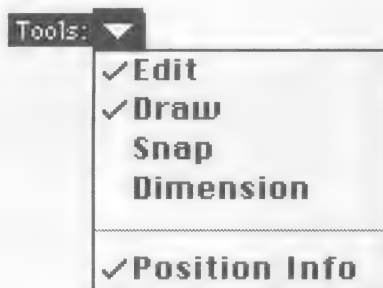
The Tools Pull-down Menu

Layers Menu

Introduction

The **Layers** menu is where you control the various layers that you create.   **KeyCAD Complete** allows you to add information to a document in separate overlay, called layers, which act as transparent overlays.   Layers are used to hold or display various aspects of a design.   A single layer can contain and display different aspects of a design,   **KeyCAD Complete** supports up to 256 layers.

For example draw a floorplan on one layer, adding the windows and doors of the floorplan to a different layer, and the dimensions of the floorplan to another layer.   Each layer can be separately named for easy access.
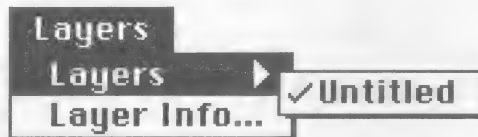
Layers Menu and Layer Names Pop-up Menu
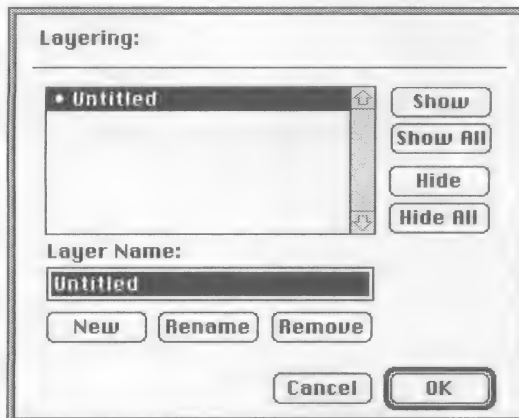
Layers Information Dialog box

Example

The example below explains how you can have different information on separate layers. Notice that the separate layers information still pertains to one design and not separate designs.

Layer 1:   Contains the original design created.

Layer 2:   Contains the dimensions of the design on Layer 1, while Layer 1 remains hidden.

Layer 1 and 2: The example below shows both Layers 1 and 2.
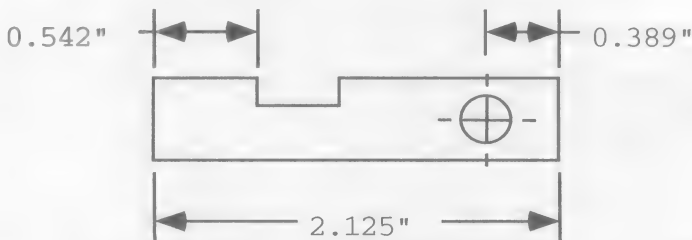
Layer Names Pop-up Menu

Under the **Layers** menu you can access the Layer Names pop-up menu. This menu displays the names of any layers that you have created. The program defaults to one untitled layer. A check mark ✓ beside the layer name indicates that the layer is active.

Layers Name Pop-up Menu

Layers Dialog box

Working with the layers provides the option of naming the layer, showing individual layers, showing all layers, hiding layers, hiding all layers, adding new layers, renaming layers, or removing layers. The Dialog lists the names of the layers to help you choose the layer you wish to assign any attributes to. A dot beside the layer name indicates that the layer is visible.
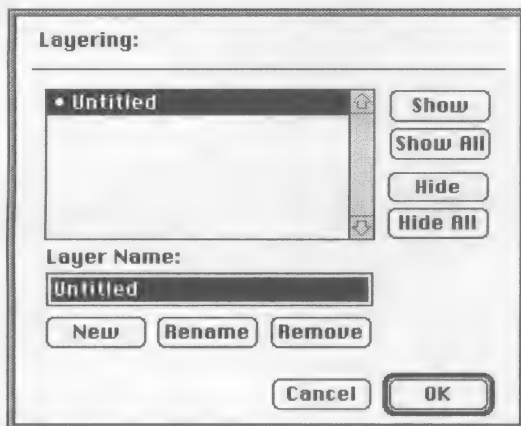
Layers Dialog box

Text Menu

The **Text** Menu allows you to edit words, sentences, and paragraphs that are created using the Text tool (found in the Edit toolbox). **KeyCad Complete** gives you the ability to label charts, to display measurements and to give titles to objects and designs. This chapter teaches you how to change the font, the style, the size or the alignment of a text block in order to place text anywhere in a design.

Dashed-lined boxes represent the borders of a text block. When a text block first appears on the screen, the default size is about 1.5 inches by 1.5 inches. The size of the text block can be altered by using the Selection tool.

Like the appearance of objects is governed by the palette icons in the toolbox, text appearance is governed by the selections in the **Text** Menu. Changing the appearance is very easy to do. First, select the text to be changed using the Text tool, then select one of the **Text** Menu options.   Only the selected or highlighted text is affected by the change.

The initial font style that **KeyCad Complete** is set to is Geneva 12 point. The font style is easily changed using the Text tool and the **Text** menu.

```
┌─────────────────────┐
│ Text                │
├─────────────────────┤
│  Font            ▶  │
│  Size            ▶  │
│  Style           ▶  │
├─────────────────────┤
│ ✓Align Left         │
│  Align Right        │
│  Align Center       │
└─────────────────────┘
```

Text Menu

Font

Fonts are different types of lettering styles that are installed within your System Folder.   For adding and removing fonts, refer to your Macintosh User Manual.

How to change Fonts

- ☐ Highlight the text to be changed with the Text tool by clicking the mouse button and dragging the highlight bar across to the end of the desired text . (To highlight individual words, double click on them.) The highlighted area is blackened.
- ☐ Pull down the **Text** Menu at the top of the screen and choose the font submenu. Drag the mouse across and up or down to the desired font. A check mark ✓ denotes the chosen font.

Unlike most programs of this nature, **KeyCad Complete** remembers the last selected font. This means that after you have changed any font, all subsequent text is written with or uses the same font style until you change it again. For example, if you change some text to Courier with the Text tool and then create an object, when you reuse the Text tool, the Courier font will still be chosen.

The Font pop-up menu displays a list of all fonts available in the Macintosh Current System Folder. To add and remove fonts from your System refer to your Macintosh User Manual. **KeyCAD Complete** supports PostScript and TrueType fonts.
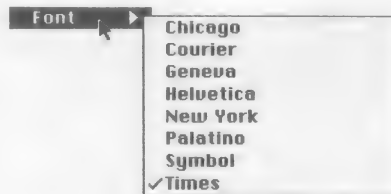
Fonts Pop-up Menu

Size

The size of text is regulated by the Size function under the **Text** menu. The initial or default point size of text is **12**. The size can be raised or lowered depending on your needs.

How to change Font Size

☐ Highlight the desired text by clicking the mouse and dragging it across the words to be changed. (Individual words can be highlighted by double clicking on them.) The highlighted text is blackened.

☐ Pull-down the **Text** menu at the top of the screen, choose the Size function, then select the desired size. After you have selected the desired size, a check mark ✓ denotes the chosen point size.

Under the **Size** pop-up menu only certain point sizes are shown. The numbers shown are the recommended sizes to receive the best quality text. **KeyCad Complete** supports other point sizes, however, the text quality may be inferior. Font sizes are determined for each individual font, when you install the actual font within your System Folder.
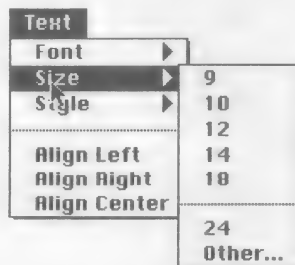
Size Pop-up Menu

KeyCad Complete allows point sizes that are larger than 18 points. Use the Other option under the Size submenu. When the Other option is chosen, a Dialog box appears. Type in a whole number for the point size and press Return or click on the OK button.

Style

Font styles are useful for adding a special touch to your text within any document you have created. **KeyCAD Complete** supports several styles such as Plain, Bold, Italic, Underline, Outline, Shadow, Condensed, and Extended. You can combine any one of these styles with any Font or Font Size. **KeyCAD Complete** default Style is Plain text. The style can be changed at any time.

KeyCAD Complete supports keyboard equivalents for some of the Font Styles as shown in the pop-up menu below.

How to change Font Style

☐ Highlight the text with the Text tool by clicking the mouse and dragging it across the desired text. (Double clicking on words highlights them.) When highlighted, the selected text is blackened.

☐ Pull down the **Text** menu at the top of the screen, select the Style pop-up menu and the desired style. After selecting the Style, the highlighted text changes to the new style. You can have multiple styles within the same text block.

Plain Text	⌘P
Bold	⌘B
Italic	⌘I
<u>Underline</u>	⌘U
Outline	
Shadow	
Condensed	
Extended	
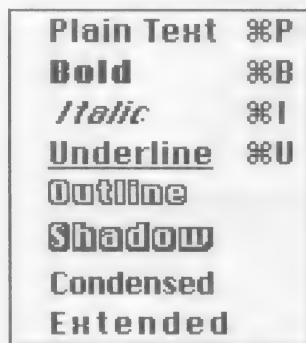
Style Pop-up Menu

Align

The last three options under the **Text** menu are Align Left, Align Right, and Align Center. These three options are used to justify the text inside the text block. This option makes it easier to place text on designs. The default mode is Align Left. The mode can be changed in order to create right or center aligned text, as in headlines or titles.

How to Change Text Alignment

☐ Highlight the text using the Text tool by clicking at the beginning of the block and dragging across to the end of the text. (Individual words are highlighted by double clicking on them.) Highlighted text is blackened.

☐ Pull down the **Text** menu at the top of the screen and choose the appropriate **Align** options.
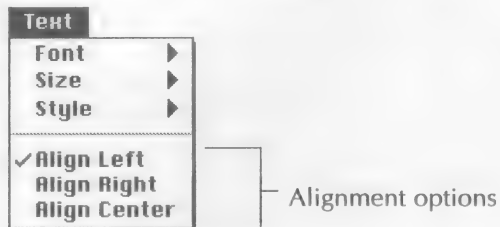
The Text Menu

Below are some examples of the alignments and how they appear within a text block.

Text Aligned Left

Text Aligned Right

Text Aligned Center
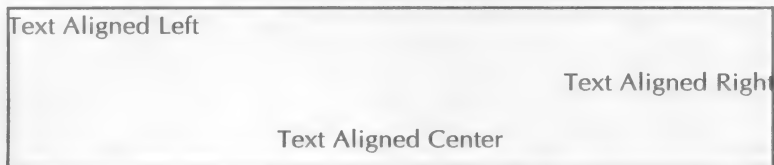
Do not forget that font sizes, styles, and align modes can be changed *prior to typing* the text. Simply make the desired choices from the **Text** menu at the top of the screen before typing the titles, paragraphs, or captions in your designs.

KeyCAD Tutorial

☐ **Introduction**

☐ **System Requirements**

☐ **Opening PICT symbols** (symbols that come with the program)

☐ **Exercise 1**

☐ **Exercise 2**

☐ **Exercise 3**

☐ **Exercise 4**

☐ **Exercise 5**

☐ **Exercise 6**

☐ **Decimal Equivalents Inch / Fraction**

☐ **Metric Equivalents**

Introduction

While you continue to improve your various drawing techniques with this tutorial, you will find that new information is introduced in a gradual manner. This will assure you of a precise learning process that can be adjusted to your specific needs without having to acquire unnecessary information before practising the basic design techniques.

The following tutorial has been created to further assist you in your understanding of the basic features found within **KeyCAD Complete**, which leads you to the many powerful design techniques available within the program.   It does this by providing a general design foundation from which you can work within.

After completing the tutorial, you will be able to use the Draw Tools, Snap To Tools, Edit Tools and Dimension Tools which are available within the program. Finally, you will have an appreciation of how **KeyCAD Complete** allows you to develop professionally detailed drawings with the least amount of time and money invested.

To help in keeping this tutorial fast and user friendly, many of the **KeyCAD Complete** features and combinations of tools were not included in this tutorial.   For more detailed and comprehensive coverage of how to use all features, refer to the **KeyCAD Complete** User Manual.

System Requirements

☐ **KeyCAD Complete** requires a minimum of 2MB of RAM
and a hard disk. System 7 users should use 4MB of RAM.

☐ **KeyCAD Complete** operates on a Macintosh Plus or
greater.

☐ **KeyCAD Complete** works on black and white,
monochrome and color Macintosh computer sytems.

Recommended Hardware

☐ Math Coprocessor (*KeyCAD Complete is fully functional
without a math coprocessor, however the Math
coprocessor increases the speed of the program.)*

Opening PICT Symbols

The program comes with free PICT symbols that you can use in creating your designs. These symbols are saved as MacDraw PICT files. This allows you to use these symbols with any graphics program that can accept PICT formats.

To open a PICT symbol in **KeyCAD Complete** use the Import options found in the **File** menu.

The Import Pop-up Menu

Step 1
   Pull down the **File** menu and drag the cursor on top of the Import options, and then select the PICT format.
Step 2
   Once the File Dialog box appears, select the desired PICT symbol and double click on the file name. This places the symbol in the middle of your current screen size. You can move the symbol to any location by using the Selection tool.
Step 3
   Once you have placed the PICT symbol you can save it as a **KeyCAD Complete** symbol. If you save it as a **KeyCAD Complete** symbol, only **KeyCAD Complete** can import the newly saved symbol. To open a symbol that has been saved as a **KeyCAD Complete** symbol, you must use the Open Symbol… command found in the **File** menu.

Exercise 1

Create a 2.0 in. diameter circle with its center at the end-point of a
horizontal line.
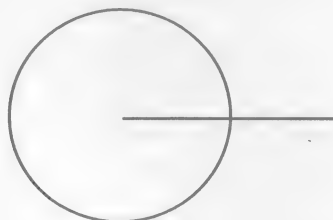
Example Design

Answer 1

Step 1

First, select the Circle tool from the Draw toolbox, and draw a
2.0 in. circle. To draw a circle, select the tool then place the
cursor at the desired start point, then click and drag the mouse
while holding down the Shift key. Watch the readouts at the
bottom of your screen to obtain the correct size of circle.

Circle Tool

| X: 1.32 | W: 0.88 | 100% | RAD: 1.00 | ∠ 82.24 |
| Y: 9.68 | H: -0.49 | 100% | DIA: 2.00 | |

Readouts

Diameter

Step 2

After you have created a 2.0 in. diameter circle, select the Line tool from the Draw tools.

Line Tool

Step 3

Select the Center point Snap To tool. (Remember that the Snap To tools are designed to work in conjunction with the Draw tools.)

Center Point Snap To Tool

Step 4

After you have selected the Line tool and Snap To tool, place the cursor near the boundary line of the circle and click and drag the mouse to the desired line length. Notice that when you first click the mouse, the start point of the line automatically snaps to the center point of the circle.
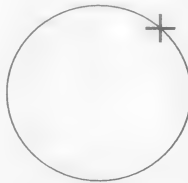
Place cursor near boundary line

Step 5

Release the mouse button once you have reached the desired line length. (*You can select a different Snap To tool for the end-point of the line by pressing the Tab key during the drawing of the line.*)

Exercise 2

In this exercise, create a line perpendicular to a circle.
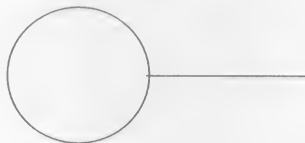
Example design

Answer 2

Step 1

You must first create a circle, the circle can be any size. To draw a circle, select the Circle tool from the Draw toolbox and place the cursor at the desired start point.,Then, click and drag the mouse while holding down the Shift key. The Shift key allows you to create perfect circles, if you release the Shift key the tool will draw ovals.

Circle Tool

Step 2

After you have drawn a circle, select the Line tool from the Draw toolbox.

Line Tool

Step 3

Then, select the Perpendicular Snap To tool from the Snap To toolbox. (Remember that the Snap To tools are designed to work in conjunction with the Draw tools.)

Perpendicular Tool

Step 4

Place the cursor near the boundary lines of the circle, then click and drag the mouse to any desired line length. Notice that the line you are creating automatically snaps to a perpendicular position in relation to the circle. The perpendicular angle is determined by the position of the start point of the line. In this example, the start point of the line is fixed at a horizontal position in relation to the circle.

Place cursor near the boundary line
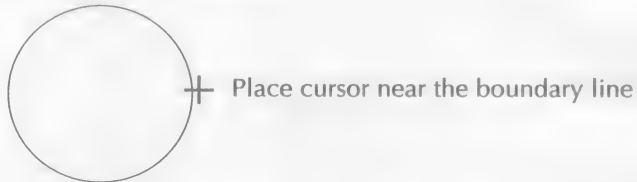
Step 5

Once you have reached the desired line length, release the mouse button. This method of creating a perpendicular line by combining Draw tools with the Perpendicular Snap To tool, works with any of the objects in the Draw toolbox.

Exercise 3

In the following exercise, draw a circle with its' start point at the
intersection point of two lines. This exercise is designed to demonstrate
how you can start any object from the intersection point of any two
objects.

Example design

Answer 3

Step 1

First, create two lines that intersect as shown in the example
above. Use the Line tool from the Draw toolbox.

Line Tool

Step 2

Now, select the Circle tool from the Draw toolbox.

Circle Tool

Step 3

Select the Intersection Snap To tool from the Snap To toolbox.

Intersection Snap To Tool

Step 4

Place the cursor near the intersection point of the two lines. Then, click and drag the mouse to create a circle, hold down the Shift key to draw perfect circles. Notice that the start point of the circle snaps to the intersection point of the two lines.

Place cursor near intersection point

Step 5

Drag the mouse button to the desired size, and then release the mouse button. You can watch the Readouts to obtain a certain diameter. This method of creating objects with their start points at the intersection point of any two objects works with any intersection point, by combining Draw tools with the Intersection Snap To tool. (*You can select a different Snap To tool for the end-point of the circle by pressing the Tab key during the drawing of the circle.*)

Exercise 4

The following exercise demonstrates how to use the Linear Dimension tool, when dimensioning a rectangle. This example uses a simple object such as a rectangle, but you can use the same steps when dimensioning between any two points.
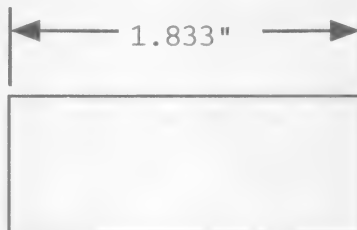
Example Design

Answer 4

Step 1

First, create a rectangle similar to the one in the example above. Use the Rectangle tool when drawing your rectangle.

Rectangle Tool

Step 2

Select the Linear Dimension tool from the Dimension toolbox.

Linear Dimension Tool

Step 3

Select the End-Point Snap To tool from the Snap To toolbox.

End-Point Snap To Tool

Step 4

Then, place the Dimension tool cursor near the first point of the rectangle. Click and hold down the mouse button while dragging the cursor to the second point of the rectangle. Release the mouse button at the second point. Since you selected the End-Point Snap To tool, the dimension lines automatically snap to the points of the rectangle.

Click near first point   Drag to second point
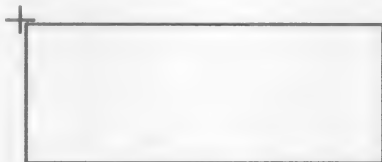
Step 5

After you release the mouse button at the second point of the dimension, notice how the dimension lines follow the cursor movement. Once you reach the desired distance from the rectangle, click one time to anchor the dimension. After you click the mouse button to anchor the text, the dimension automatically appears between the arrowheads. (*You can select a different Snap To tool for the start or end-point of the dimension you are creating by pressing the Tab key during the drawing of the dimension.*)

Exercise 5

This exercise demonstrates how to use the Angular dimension tool.
The following example illustrates a closed polygon with a 90 degree
v-shape in the middle of the polygon.
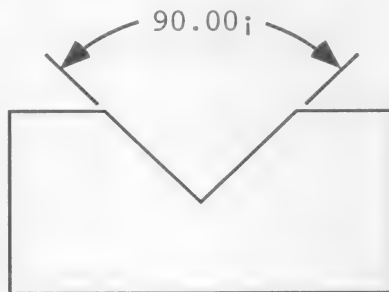
Example Design

Answer 5

Step 1

Create a polygon similar to the one in the example shown
above. Use the Closed Polygon tool found in the Draw
toolbox.

Polygon Tool

Step 2

After you have created the closed polygon, select the Angular
Dimension tool from the Dimension toolbox.

Angular Dimension Tool

Step 3

Select the End-Point Snap To tool from the Snap To toolbox. Be
sure to double click on the End-Point tool so that the tool is
locked.

End-Point Snap To Tool

Step 4

Place the cursor near the angular point of reference as shown
below. Then, click and hold down the mouse button,while
dragging the cursor to the second point of the angled line. Once
you are near the second point of reference, release the mouse
button.This operation indicates to the program from which line
you want to obtain an angular dimension.

Second point of reference

Click near angular
point of reference

Step 5

After you release the mouse button at the second point, notice
how the program has built an angular dimension line which
follows the mouse movements. Now, drag the cursor to the
third reference point as shown below, and click the mouse
once. This is telling the program the size of the angle you are
dimensioning. Drag the mouse away from the object and click
one time to anchor the dimension.

Third point of reference
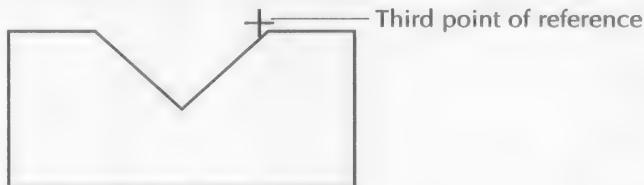
Exercise 6

In the following exercise create a closet that would be used in a typical floorplan. For the purpose of this exercise create the design using a scale factor of 1/8" = 1'.
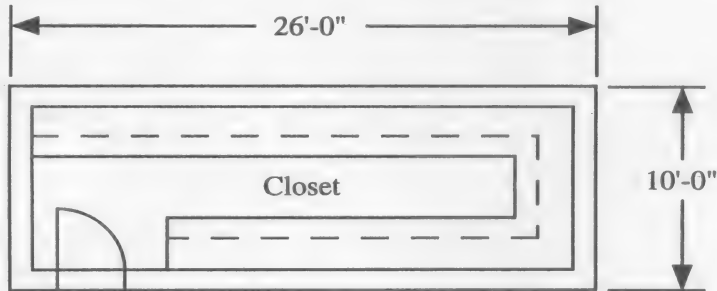
Example Design

Answer 6

Step 1

The first step in creating the closet as shown above, is to set the scale factor of the design. Select Drawing Scale from the **Layout** menu. Set the Screen Units to .125 inches and the World Units to 1.0 feet as shown below. Then, click on the OK button, your document has a scale factor of 1/8" equals 1' foot.
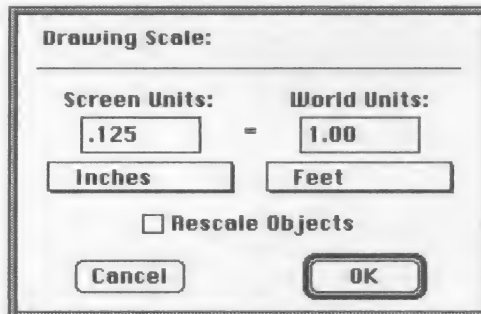
Drawing Scale Dialog box

Step 2

Select the Parallel Dialog box from the **Layout** menu. Select the Inside option button and set the width to .125, then click on the OK button.
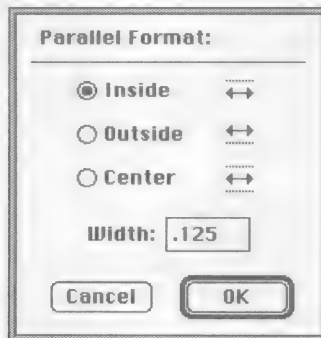
The Parallel Format Dialog box

Step 3

Now that the parallel options are set, select the Rectangle tool from the Draw toolbox. Then, select the Draw Parallel option from the **Layout** menu, a check mark (✓), beside the option indicates that it is active. Now draw a (3-1/4") 26'-0" wide by (1-1/4") 10'-0" high rectangle. This represents the outer walls of the closet.
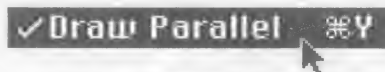
Draw Parallel option

26'-0" or (3-1/4") wide
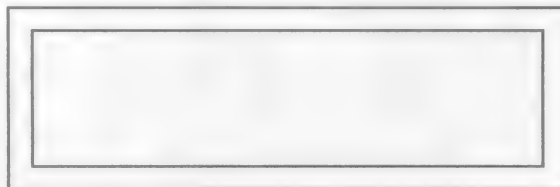
10'-0" or (1-1/4") high

Step 4

Create a 3'-0" door for the closet. Select the Rectangle tool and draw a 3/8" (3'-0") wide x 1/8" (1'-0") high rectangle.

3/8" (3'-0") wide x 1/8" (1'-0") high rectangle

Step 5

Draw a 3'-0" (3/8") vertical line extending up from the upper left-hand corner of the rectangle created in Step 4. The example below shows how the line and rectangle should look.

3'-0" (3/8") vertical line ——

Step 6

Now select the Arc tool from the Draw toolbox and draw a circular arc from the upper right-hand corner of the rectangle to the end-point of the vertical line.

End-point of arc ———

—— Start point of arc

Step 7

After creating the door, select all objects that make up the door by dragging a selection rectangle around the entire door assembly, using the Selection tool. Then, select the Group command, group the entire door assembly. This helps in relocating the door to its proper position. You can group objects by selecting the Group command from the **Options** menu or by clicking on the Group button found on the Menu Bar.

Group ⌘G

Menu Command   **Group Button**

Step 8

Place the door in the proper location as shown below. The
door is 1' from the left interior wall.

Place door 1' from left wall
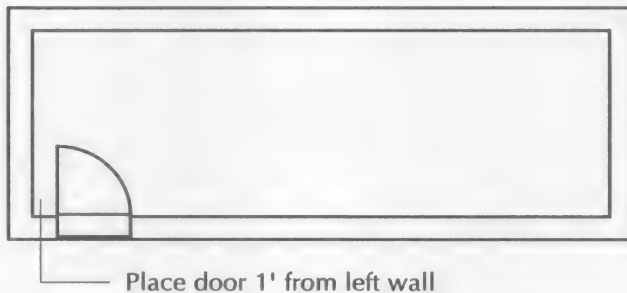
Step 9

Use the Polygon tool to create the shelf in the closet. The shelf
is 2'-4" wide. Then place a dashed-line set back 1'-0" from the
edge of the shelf, this represents the clothes rod for hanging
clothes on. Use the Polygon tool to create the dashed-lines.
You can change the line type from the **Layout** menu.

26'-0"

Closet

10'-0"
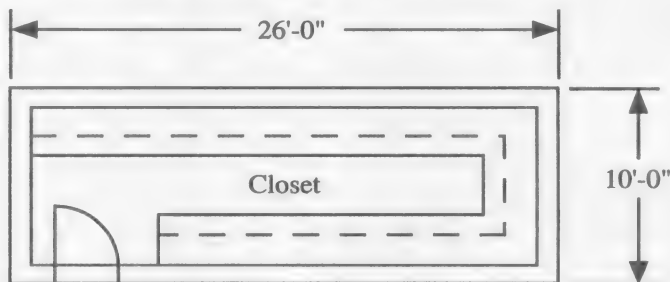
Step 10

Now select the Linear Dimension tool and dimension the closet
as shown above. Be sure to use the End-Point Snap To tool
when dimensioning the closet.

End-Point Snap To Tool

Decimal Equivalents Inch / Fraction

Frac.	Equiv.	Frac.	Equiv.	Frac.	Equiv.	Frac.	Equiv.
1/64	0.015625	17/64	0.265625	33/64	0.515625	49/64	0.765625
1/32	0.03125	9/32	0.28125	17/32	0.53125	25/32	0.78125
3/64	0.046875	19/64	0.296875	35/64	0.546875	51/64	0.796875
1/16	0.0625	5/16	0.3125	9/16	0.5625	13/16	0.8125
5/64	0.078125	21/64	0.328125	37/64	0.578125	53/64	0.828125
3/32	0.09375	11/32	0.34375	19/32	0.59375	27/32	0.84375
7/64	0.109375	23/64	0.359375	39/64	0.609375	55/64	0.859375
1/8	0.1250	3/8	0.3750	5/8	0.6250	7/8	0.8750
9/64	0.140625	25/64	0.390625	41/64	0.640625	57/64	0.890625
5/32	0.15625	13/32	0.40625	21/32	0.65625	29/32	0.90625
11/64	0.171875	27/64	0.421875	43/64	0.671875	59/64	0.921875
3/16	0.1875	7/16	0.4375	11/16	0.6875	15/16	0.9375
13/64	0.203125	29/64	0.453125	45/64	0.703125	61/64	0.953125
7/32	0.21875	5/32	0.46875	23/32	0.71875	31/3	20.96875
15/64	0.234375	31/64	0.484375	47/64	0.734375	63/64	0.984375
1/4	0.2500	1/2	0.5000	3/4	0.7500	1	1.0000

Metric Equivalents

MM		In.	MM		In.	In.		MM	In.		MM
1	=	0.0394	17	=	0.6693	1/32	=	0.794	17/32	=	13.493
2	=	0.0787	18	=	0.7087	1/16	=	1.587	9/16	=	14.287
3	=	0.1181	19	=	0.7480	1/32	=	2.381	19/32	=	15.081
4	=	0.1575	20	=	0.7874	1/8	=	3.175	5/8	=	15.875
5	=	0.1969	21	=	0.8268	5/32	=	3.968	21/32	=	16.66
6	=	0.2362	22	=	0.8662	3/16	=	4.762	11/62	=	17.462
7	=	0.2756	23	=	0.9055	7/32	=	5.556	23/32	=	18.256
8	=	0.3150	24	=	0.9449	1/4	=	6.349	3/4	=	19.050
9	=	0.3543	25	=	0.9843	9/32	=	7.144	25/32	=	19.843
10	=	0.3937	26	=	1.0236	5/16	=	7.937	13/16	=	20.637
11	=	0.4331	27	=	1.0630	11/32	=	8.731	27/32	=	21.431
12	=	0.4724	28	=	1.1024	3/8	=	9.525	7/8	=	22.225
13	=	0.5118	29	=	1.1418	13/32	=	10.319	29/32	=	23.018
14	=	0.5512	30	=	1.1811	7/16	=	11.112	15/16	=	23.812
15	=	0.5906	31	=	1.2205	15/32	=	11.906	31/32	=	24.606
16	=	0.6299	32	=	1.2599	1/2	=	12.699	1	=	25.400

Glossary

Angular Dimensioning: A tool found in the Dimension toolbox, which allows dimensioning of angular objects or lines.

ANSI Standard: The ANSI Standard is the most universal standard used in the USA. ANSI stands for American National Standards Institute.

Application: A program that has been created to perform a specific task such as word processing, database information, spreadsheets, etc. **KeyCAD Complete** is an example of a graphics or draw application.

Arrowheads: Arrows which appear at the end of the dimension lines indicating the points being dimensioned.

Associative Dimensioning: This means if one area of the dimensioned object is adjusted, all parts of the dimension area are adjusted accordingly. Any change to a single object or dimension causes all components of that dimension to be automatically updated to reflect the new changes.

Axis Lines: The lines that are positioned horizontally and vertically within a document window. Axis lines help in providing guidelines for creating objects horizontally and vertically.

Background Color: The color that **KeyCAD Complete** uses to fill any area that is not filled with an object fill pattern or color.

Block: A Block (Text Block) is the rectangular area enclosing any text that you have typed in your document.

CAD: Computer Aided Design - this is using a computer to assist you in the creation of blueprints or precision graphics.

Chamfer Tool: An Edit tool which allows corners of joined objects to be chamfered. Chamfering is the process of *clipping* off a corner of an object, thus giving the object an angular corner.

Chooser: An option under the Apple Menu where printers and other preferences are placed for selection.

Clipboard: The clipboard allows text, graphics, and objects to be moved within the same document, or to move objects to and from other applications.

Dimension Line: Shows the direction of any dimension. This line also shows the relationship of a dimension to the referenced object.

Duplication Options: Assigns duplication coordinates and repetitions to any selected object.

Edit Tools: Tools which appear in the Edit toolbox permitting the edit or alteration of points and objects. These tools include selection, point selection, resize, skew, rotate, chamfer, fillet, etc.

Elliptical Arc: A tool found within the Draw toolbox which is used to create curved lines.

Equilateral Triangle: A triangle with three equal sides.

Extension Lines: These lines occur when the dimension is established outside of an object's boundary lines. These lines are designed to *tie* the dimension line and the numerical value of the objects being dimensioned.

Fillet Tool: An Edit tool which allows corners of objects to be rounded off to a specific radius.

Finder: The *desktop* of the Macintosh. The finder screen is where organization and management of files and folders take place.

Floating Point Accuracy: The format used for precise mathematical computations. This format uses extended precision storage to avoid excessive round-off errors in all objects created.

Ghost Lines: These are dashed-lines which run parallel to the selected points you are moving or editing within your document. These lines move as you reposition the mouse.

Grow Buttons: The small boxes found in the upper right-hand corner of your window title bar. These buttons are activated by clicking them once with the mouse cursor. These buttons are used to enlarge or decrease the window size.

Horizontal Dimensioning: An option in linear dimensioning for finding the horizontal distance between any two points.

Isosceles Triangle: A triangle with two equal length sides.

Layer: A level in your document used to help in the organization of objects. **KeyCAD Complete** allows designs to be created in separate *transparent* sheets and stacked on top of one another. Layers can be temporarily hidden to view your document in different ways.

Linear Dimensioning: A special tool found within the Dimension toolbox, which allows the linear dimensioning of any two points.

Line Tool: A tool found within the Draw toolbox, which is used to construct individual horizontal or vertical lines of any length or angle.

Math Coprocessor: Computer processing chip which aids in the mathematical calculations of creating objects.

Numerical Value: The number which is displayed when two points have been dimensioned.

Origin: The location which is represented as Zero for all Draw and Edit tools. The Origin is also referred to as the Absolute Point of the document.

Precision Readouts: The numeric values displayed at the bottom of the document. This information window contains the Absolute, Incremental, Percentage, and Angular information about objects and their position.

Radial Duplication: This is where objects are rotated and duplicated simultaneously around a specific point.

Relative Point: The Relative Point represents a point in space against which angles are measured. The Relative Point automatically has a circle drawn around it.

Relocate: To move objects to a new location or coordinate.

Resize: The Edit function, that changes an object size.

Rotate: An Edit function which allows objects to be moved around a fixed point.

Scaling: The process of assigning different scale factors to objects. Scaling can be performed in English or Metric measurements.

Scrapbook: This is where users store text blocks, graphics, etc., which can then be pasted into other documents.

Scroll Bars: The *gray bar* area at the right-hand side and bottom of each document window. Press the arrows at the end of the scroll bars to move across the drawing area within a window.

Selection Points: The small circles and squares which appear at vertex points within objects.

Skew: An Edit function which allows objects to be slanted or sheared in a specific direction.

Symbols: An object or groups of objects which are saved in individual files, with the capability of being recalled for future use.

Text Tool: A tool found within the Edit toolbox which allows words, sentences, and paragraphs to be created in blocks and placed anywhere within your document

Toolbox: A palette of tools which appear within the program window.

Vertical Dimension: An option found within the Dimension toolbox for finding the vertical dimensions of any two points.

X-Axis: The horizontal plane in a document.

Y-Axis: The vertical plane in a document.

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