easy·Draw

EASY-TOOLS™

Contents

Introduction

Migraph Inc. is pleased to present you with Easy-Tools™, a GEM drawing accessory that makes it even easier to create more professional-looking drawings, technical illustrations, layouts, and plans with Easy-Draw®.

Easy-Tools is easy-to-use and allows you to manipulate figures in ways that were previously impossible. Figures can be rotated by any degree, sized and located using numeric data, turned into polylines for further editing, and more. Easy-Tools gives you the control and flexibility you need to produce high quality materials.

Copies of Easy-Tools

Please make one copy of Easy-Tools on a floppy or hard disk as stated in the license agreement. See your Atari ST owner's manual for directions on copying floppy disks.

Installation

Easy-Tools can be installed on a floppy disk or hard drive.

To install Easy-Tools on a floppy system follow these directions:

[1] Place the file EZD_ACC1.ACC on the root directory of your Easy-Draw boot disk (A:\).

[2] Copy the folder EZ_TOOLS onto the floppy disk which will be in A: when you run Easy-Draw. This installs the polytext font.

Note: Always use C: if you have a disk called C: even if you boot from drive A:.

[3] Reboot your system.

To install Easy-Tools on a hard drive follow these directions:

[1] Place the file EZD_ACC1.ACC on C:\

[2] Copy the folder EZ_TOOLS onto the top level of C:. This installs the polytext font.

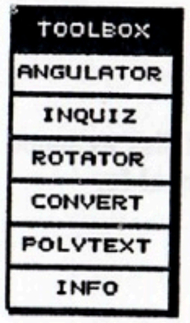
[3] Reboot your system.

This GEM accessory needs no resource file. While it takes up one slot in the Desk dropdown menu, it is inactive until you run Easy-Draw.

Easy-Tools works with all versions of Easy-Draw numbered 2.26 or higher. If you have an earlier version, contact Migraph for an upgrade.

Running Easy-Tools

Once you have installed Easy-Tools, run Easy-Draw as usual by double clicking on EASYDRAW.PRG. The Easy-Tools icon will appear on the desktop and looks like this:



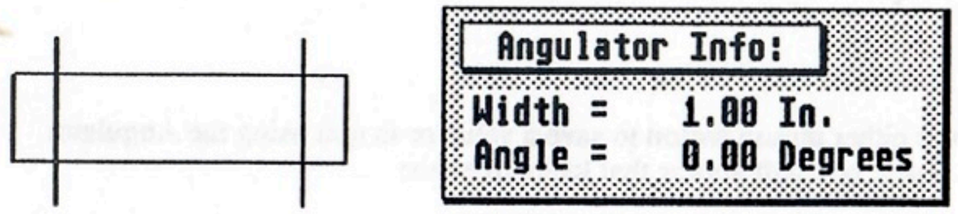
To move the icon, click on the title bar at the top of the icon, then drag the icon. If the icon becomes obscured by a window when you are using Easy-Draw, either move the window or go up under the Desk menu and select Easy-Tools. The icon will be brought to the top and then moved to the bottom after a tool is selected.

Before using tools that either modify a figure or supply information, select the figures you want to work on, then click on the tool you wish to activate.

Note: Learning to use Easy-Tools to its fullest requires experimentation. To avoid costly mistakes, we strongly recommend using a copy of the figure rather than the original.

The Angulator

The Angulator is a small ruler that appears on screen to help measure the length and angles of figures rather than having to guess what they are. When you click on the Angulator, the following will appear on your screen:



The Angulator is used to measure while the dialog box displays the current width and angle of the Angulator. The following keys on the keypad (not the keyboard) are used to change the size and angle of the Angulator:

/ moves the right marker in .1 unit (inches or centimeters)

* moves the right marker out .1 unit " "

+ moves the right marker out by .01 unit " "

- moves the right marker in by .01 unit " "

Up and down arrow keys rotate the Angulator by ten degrees

Right and left arrow keys rotate the Angulator by one degree

Shift plus up/down arrow key changes the angle by 1/100 degree

Shift plus left/right arrow key changes the angle by 1/10 degree

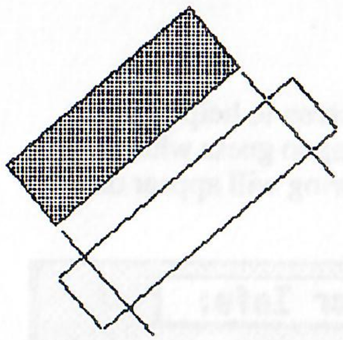
Home key increases the length of the Angulator.

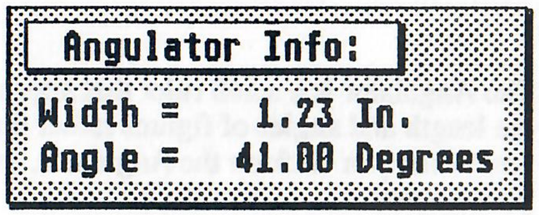
Insert key decreases the length of the Angulator. Note that when the ruler is smaller it moves about the screen more quickly and easily.

Spacebar makes the markers flush with the edge of the Angulator. Press Spacebar again to extend the markers out.

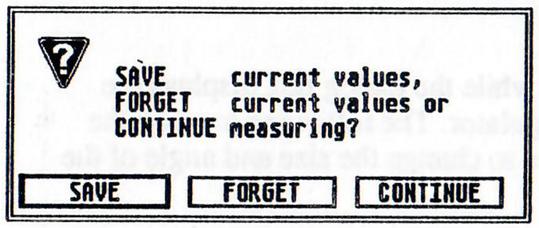
By using the different keys, you can change the size and angle of the ruler so that you get an exact measurement. The Angulator is a visual tool and as such is limited by the resolution of the screen. Measurements are more accurate at zoom levels greater than Full Page, so we recommend using zoom Normal or greater.

Here is an example of the Angulator being used.





Press either mouse button to save a value or to quit using the Angulator. A dialog box will appear that looks like this:



It offers you these options:

Continue Continue using the Angulator without losing the current values.

Forget Restore the Angulator values to the values when you last activated the Angulator and return to the mode (drawing, pointing, etc) that you were in before activating the Angulator.

Save Save the current values so that the next time you activate the Angulator, it will have the current values. The angle is also available to the Rotator the next time you use that tool.

Note: The Angulator will save only one set of values at a time. After selecting Save, you return to the mode (pointing, drawing, etc) that you were in before activating the Angulator.

The Inquisitor (Inquiz)

The Inquisitor is a dialog box that allows you to enter a figure's coordinates and dimensions in numerical form rather than using the mouse to stretch, shrink, and position the figure. Depending on the object type, other attributes can also be changed from within the Inquisitor.

This section is divided into three parts: the first is a tutorial on sizing and locating a figure using numeric data; the second describes the dialog box buttons and how they vary among object types; the last section deals with an extra feature of the Inquisitor that allows you to make precise grids quickly and easily.

The Inquisitor can deal with more than one selected figure at a time. The figures are highlighted with a dashed line in the order they were created. When you finish with one figure, you can proceed to the next. Save any changes made to a figure with the Set button. The changes do not appear on the screen, however, until after you exit the Inquisitor.

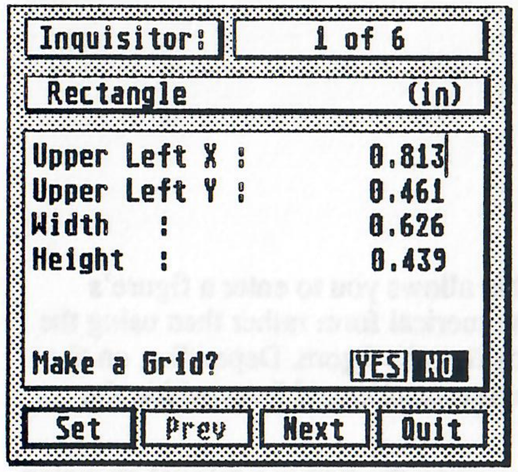
Because there are several different object types in Easy-Draw (rectangles, circles, lines, etc), the dialog box for the Inquisitor will vary somewhat with each object type. A detailed description of the various types follows this section.

To numerically change the size and location of an object, follow these directions:

[1] Create a rectangle of any size in the upper left portion of the page.

[2] Click on Inquisitor.

A dialog box will appear that looks like this:



If the dialog box obscures the selected object, click on the title box to move it to the opposite side of the screen.

[3] Using the arrow keys or mouse, move the cursor to the upper left x edit field, and change the number to 2.0.

[4] Move the cursor, and change the upper left y coordinate to 1.5.

[5] Modify the width and height numbers to 1.000 inches.

[6] Click on Set to save the changes.

[7] Click on Quit to exit the Inquisitor.

Your box should now have the size and location you specified.

When you are modifying a figure's extents, it isn't necessary to type in the whole number. The number parser stops at the first unrecognized character. For example, 1. is the same as 1 or 1.0 or 1xa or 1____ etc.

While you can enter numbers with accuracy greater than 0.001, they won't be valid because Easy-Draw is currently accurate to only about 1/1000 of an inch or 1/300 of a centimeter.

Note: A quick way to delete a number in any dialog box is to move the cursor to the field you wish to edit, then press the Escape key.

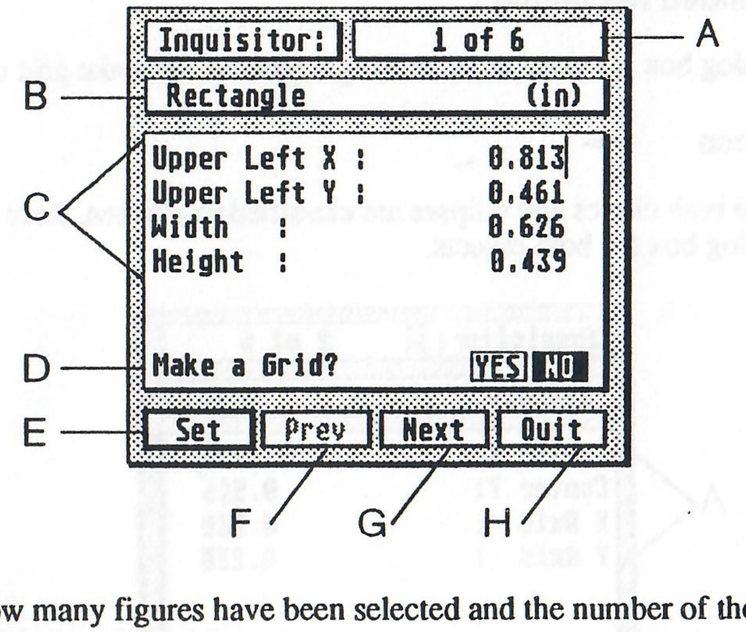
Inquisitor Dialog Boxes

The Inquisitor has several different dialog boxes for the various object types found in Easy-Draw. Each dialog box is displayed below with a

description of the settings in the box that make it different. Once a button or setting has been described, it will not be repeated if another box has an identical one.

Note: The numbers and settings shown in dialog boxes are for illustrative purposes only.

Rectangle



A. How many figures have been selected and the number of the currently selected figure.

B. The figure type and measurement unit, either inches (in) or metric (cm). Note that some figures are classified as the same type. For instance, both circles and ellipses are classified as ellipses while polylines and sketches are both classified as polylines.

C. Dimensions and coordinates of the rectangle. The values can be changed by using the arrow keys to move the cursor, and then typing in the desired value.

D. The Make a Grid option is for rectangles. See the following section for detailed instructions on using this option.

E. Click on the Set key or press return to save any setting changes you have made. The changes will be displayed after you have quit the Inquisitor. After pressing Set, the next selected item will be highlighted. If it is the last item, you will return to the mode you were in before activating the Inquisitor.

F. Click on Prev to go back to the previous figure.

G. Click on Next to go to the next selected figure. Be sure to save any changes you have made by clicking on the Set key, otherwise the values will be reset to the previous ones.

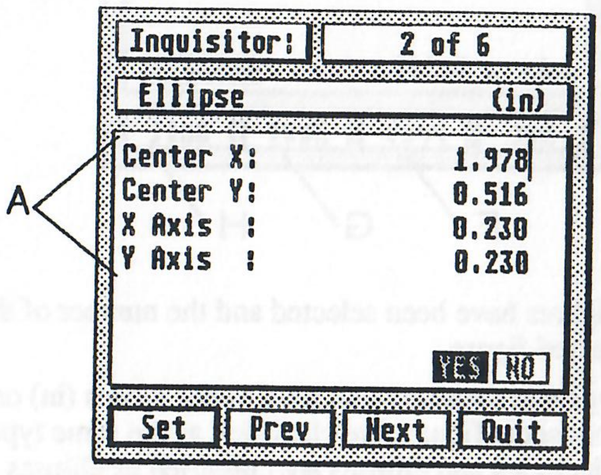
H. Quit will exit from the Inquisitor and return to the mode (drawing, pointing, etc.) you were in before selecting the Inquisitor.

Rounded Rectangle

The dialog box is the same as Rectangle without the make grid option.

Ellipse

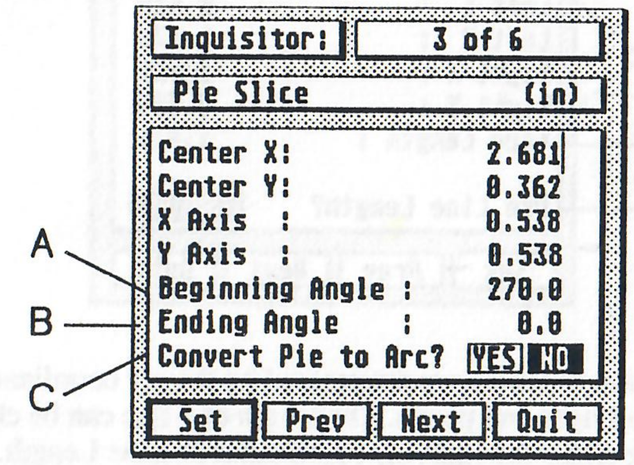
Because both circles and ellipses are classified as ellipses, there is only one dialog box for both objects.



A. The center x and y coordinates determine the location of the ellipse, while the x and y axis determine the size and shape of the ellipse. Be sure to use the Set key to save any changes.

Pie Slice

Just as circles and ellipses are classified the same, so too are circular and elliptical pie slices and arcs.



A. The Beginning Angle can be edited to change the shape of the wedge.

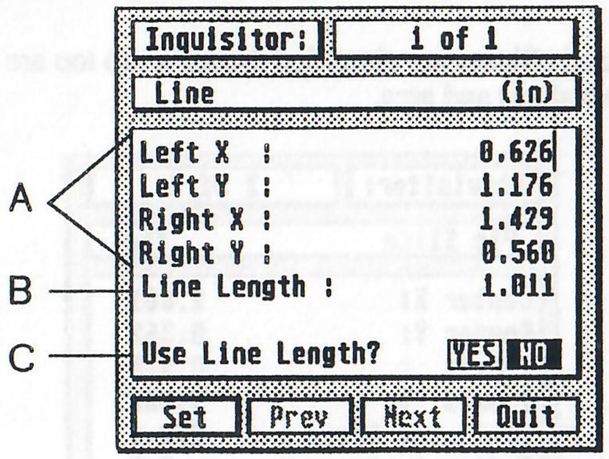
B. The Ending Angle can be edited to change the shape of the wedge.

C. Convert Pie to Arc offers converts the wedge to an arc. If you want to convert the wedge, click on Yes, then click on Set to save your choice.

Arc

This dialog box deals with circular and elliptical arcs and is the same as the dialog box for pie slices without convert the arc to a pie slice. Again, if you select Yes, click on Set to save your choice.

Line



A. The location of the line is determined by the x,y coordinates for the left and right end points. The length of a line can be changed by editing *either* the right x,y coordinates *or* Line Length.

B. Click on Yes after "Use Line Length?" to edit line length with this setting. Note that the right x.y values will not reflect the new setting while you are in the Inquisitor. Exit and re-enter to see the new coordinates.

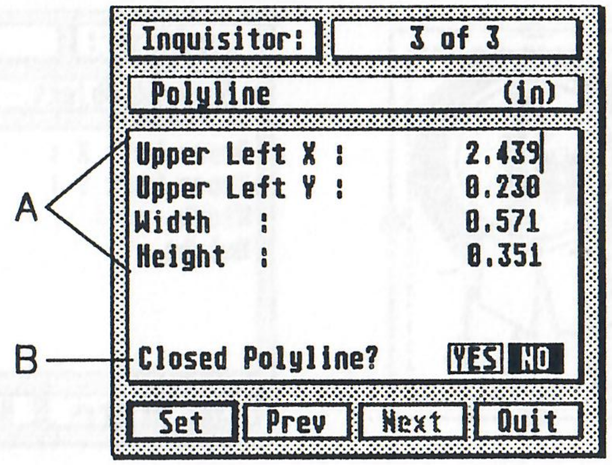
C. When you choose No (it is the default), then Line Length can only be edited by altering the right x,y coordinates. Even if you enter a new number for the Line Length setting, the setting will be ignored.

Choose Yes when you wish to change a line's length using the Line Length setting. When you chose Yes, even if the right x,y settings are altered, they will be ignored.

Note: A line is not considered a polyline. If you wish to convert a line to a polyline you must use the Convert tool.

Polyline

Both polylines and freehand sketches are classified as polylines. You can change the size and location of the polyline by altering the different settings.



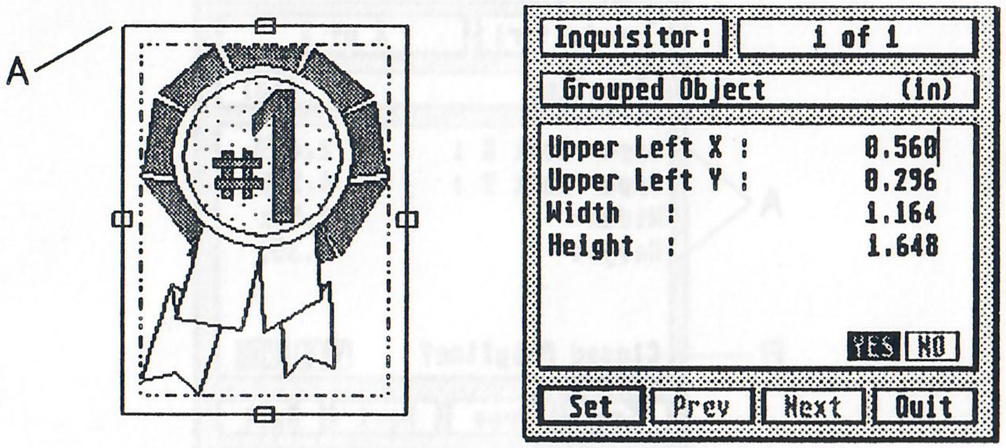
A. When dealing with polyline figures, the size and location are determined by the object box that appears when the figure is selected. The x,y coordinate of the upper left corner of the object box is used to locate the group.

The size of the figure is determined by the size of the object box. The width and height settings reflect the box's size.

B. Close the polyline if it is open, or open it if it is closed. Click on Yes to use the option, then click on Set to save your choice.

Grouped Object

This dialog box is similar to Rounded Rectangle and appears when several objects have been grouped together to form a figure.



A. When dealing with grouped objects, the size and location are determined by the object box that appears when the item is selected. The x,y coordinate of the upper left corner of the object box is used to locate the group.

The size of the group is determined by the size of the object box and it is the box's size that is reflected in the width and height settings.

Using the Make Grid Option

The Inquisitor allows you to make grids quickly and easily for use in charts, graphs, forms, and more. To make a grid, follow these directions:

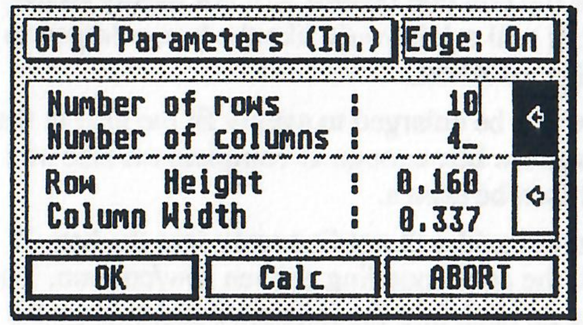
[1] Draw a rectangle 2 x 3 inches (for this exercise).

[2] Click on the Inquisitor.

[3] Click on Yes after the Make a Grid option.

[4] Click on Set.

A dialog box will appear that looks like this:



[5] Change the number of rows to 10.

[6] Change the number of columns to 4.

[7] Click on Calc. The actual size of the rows and columns will now be displayed in the bottom part of the dialog box.

[8] Click on OK.

The box will now be filled with a grid that has 4 columns and 10 rows. It is grouped as one object but you can break it apart or ungroup it into its separate elements to edit the grid.

The exercise above illustrates one way to create a grid by specifying the number of rows and columns you need. This is the easiest to use because the program calculates the row/column size so that the grid fits evenly into the box.

Through the second method, you can specify the exact size of the rows and columns. To create a grid using this method follow these directions:

[1] Draw a rectangle for the grid.

[2] Click on Inquisitor.

[3] Click on Yes after Make a Grid, and click on Set.

[4] Click on the bottom arrow button to activate the bottom field.

[5] Enter the size you desire for the rows and columns.

[6] Click on Calc to display the number of rows/columns that will fit in the proposed grid.

At this point you have several choices. If the number of rows/columns is not what you desire, you can abort, edit the size of the box in the Inquisitor, and return to the make grid option.

If you select OK to create the grid, it is a strong possibility that the rows/columns may not fit evenly into the box. In this case, two dialog boxes will appear that state the box you created will not evenly fit the row/column size specified. It will ask if you'd like the box enlarged to fit. You may choose Yes, No, or Abort.

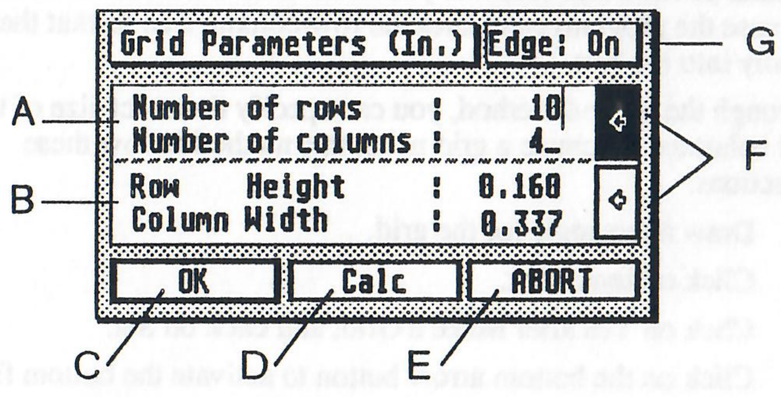
If you answer Yes, the box will be enlarged to evenly fit the grid in that direction. It will only enlarge the box enough to complete the size of 1 row/column. The grid will then be drawn.

If you choose No, the resulting grid will not fit evenly into the box. It will then be displayed with the corresponding uneven row/column. You may also choose Abort and go back into the Inquisitor and enlarge the box yourself. In this case, choose Make Grid again to complete the grid.

Note that when you are in the Inquisitor, any changes you make to settings will be reflected when you choose the Make Grid option. In other words, you can set a new size and location for the box before you set the grid options. When the grid is actually drawn on the screen, it will include the new size and location you set.

Make Grid Dialog Box

Below is a more detailed description of the Make Grid dialog box.



A. Up to 9999 rows/columns. While this amount is possible, practicality and the memory in your computer means you should use fewer.

B. Size of each row/column. Spacing is entered in inches/centimeters depending on the spacing displayed in the title bar.

C. OK either exits the dialog box and creates the grid or displays additional dialog boxes with further choices.

D. The Calc button operates in two modes. If you have enter the number of rows/columns, Calc will calculate the size of each row/column. If you have specified the size of the rows/columns, Calc will determine the number of rows/columns that will fit into the box you created.

E. Exits from the Make Grid option and returns to the Inquisitor.

F. Click on the arrow button to activate the portion of the box you wish to edit. Black indicates the active portion.

G. Edge On/Off is a toggle that lets you choose to have the outer edge of the grid visible or invisible.

The Rotator

The Rotator allows you to rotate any Easy-Draw object *except* text and bit-images. Previously, you could rotate figures only in 90 degree increments. Now, you can rotate them by any degree about a user-defined point. The Rotator is a powerful tool for creating hundreds of new figures and designs.

Before you can rotate a figure, you must convert it to polylines. You can do this in the Rotator itself or by using the Convert tool. Once you have converted a figure, it will always be a polyline. Therefore, unless you are especially brave or confident, we strongly recommend using a copy rather than the original when rotating figures.

The only exception to this rule is line objects. You can rotate lines without converting them. If you want to convert a line to polylines, you must use the Convert tool.

Because some round-off error in calculations is unavoidable because of Easy-Draw's resolution, we recommend that you rotate a figure as few times as possible. The more times you rotate a figure, the more distorted it may appear. Rotating a figure and then rotating it back will probably not restore the appearance of the original figure (another reason for using a copy).

Note: Distortion of a figure does not occur when using Circular Copy because all copies are copies of the original.

It is also preferable to rotate a large figure rather than a small one. First rotate the large figure, then size it to the correct proportions using Easy-Draw or the Inquisitor.

Using the Rotator

This section contains three short tutorials: how to rotate a figure about its center, how to rotate a figure about a user-defined point, and how to make a circular copy of a figure. These tutorials are basic examples. For more detailed ideas on how to use the Rotator, see the Tips and Hints section. For a detailed description of the buttons in the Rotator box, see the section following this one.

Rotating a Figure About Its Center

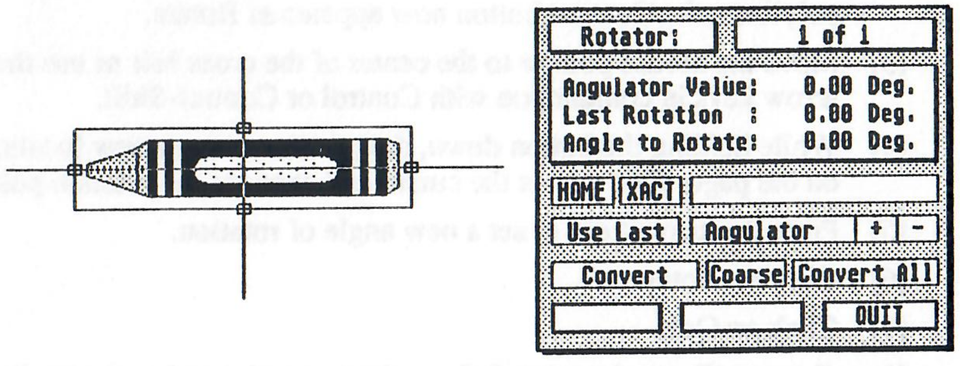
To rotate a figure about its own center, follow these directions:

[1] Load CRAYON.GEM onto your Easy-Draw page.

[2] Select the object.

[3] Click on Rotator in the Easy-Tools icon.

Your figure will be highlighted with a dashed line. A full screen cross hair will appear at the center of the figure. This indicates the point about which the figure will rotate. A dialog box appears that looks like this:



If the box obscures the figure, move it to the other side of the screen by clicking on the title bar.

[4] Click on Convert to convert the object to polylines.

[5] Press the arrow keys to rotate the object to any angle.

[6] Click on Rotate.

[7] Click on Quit.

Your figure will be rotated to the angle you selected. When you use the arrow keys to rotate the object, the highlighted outline moves to reflect the new angle. The figure is not really rotated until you click on Rotate, and it is not actually shown on the screen until you exit the tool.

When you have several figures selected, the Rotator will highlight them one at a time in the order they were created. You can rotate each figure to your specifications and move to the next figure by clicking on the Next button. Remember, the final rotations are not displayed until you quit the Rotation tool.

Note: The rotator will not rotate text or bit images. If these are grouped with figures you wish to rotate, you must ungroup the figure, deselect the bit images or text, and then rotate the figure. You can then regroup if you want to.

Note: When a figure is rotated, positive angles rotate the object in a counterclockwise direction. Negative angles rotate the figure clockwise.

Rotating a Figure About a User–Defined Point

To rotate a figure about a user-defined point, follow these directions:

[1] Select the figure you previously rotated.

[2] Click on Rotator. Since the figure has already been converted to polylines, the Convert button now appears as Rotate.

[3] Move the mouse pointer to the center of the cross hair or use the arrow keys in conjunction with Control or Control-Shift.

[4] While holding the button down, drag the mouse to a new location on the page. This moves the cursor and changes the rotation point.

[5] Press the arrow keys to set a new angle of rotation.

[6] Click on Rotate.

[7] Click on Quit.

Your figure will now be rotated about the new point and to the angle you specified.

Making a Circular Copy

Circular Copy is a tool within the Rotator that allows you to create many different figures/designs through the use of various settings. This

example shows multiple copies of a figure being equally rotated about a user-defined point. This example assumes that you have already converted the figure to polylines.

To make a circular copy of a figure, follow these directions:

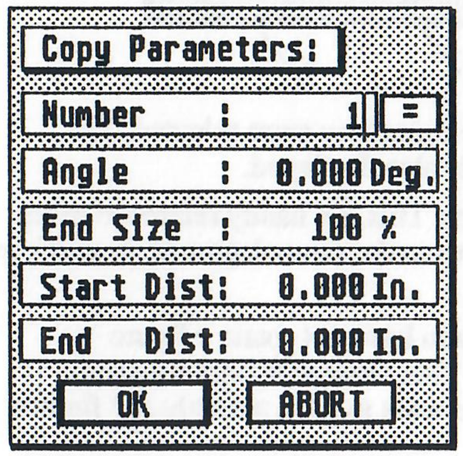
[1] Select the figure.

[2] Click on Rotator.

[3] Move the cross hair to a new point slightly away from the figure.

[4] Click on Circular Copy.

A dialog box will appear that looks like this:



[4] Change the number of copies to 6.

[5] Click on =.

[6] Click on OK.

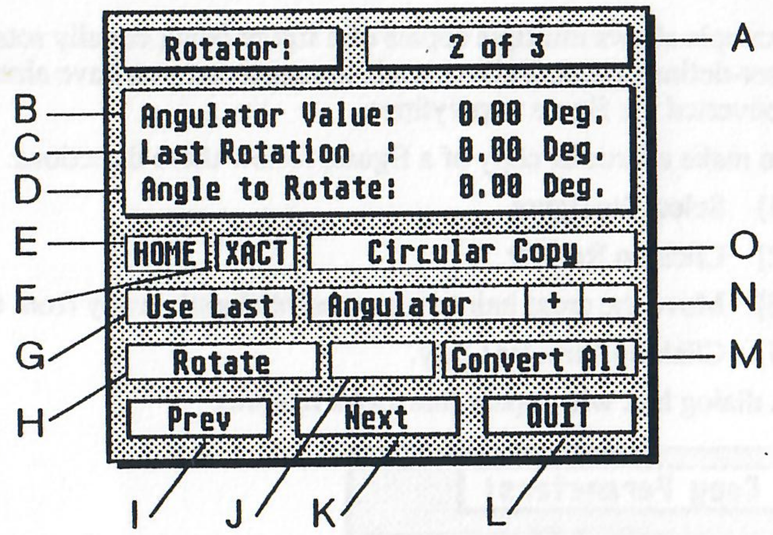
[7] Click on Quit in the Rotation dialog box.

Your copies will now be evenly spaced apart and rotated about the point you specified.

Note: Remember to set the rotation point before selecting Circular Copy because you cannot change it once you are in that function.

Rotator Dialog Boxes

This section provides a detailed description of the Rotator and Circular Copy dialog boxes.



A. Figures are highlighted in the order they were selected. The number of the current figure is also displayed.

B. Current value of the Angulator. This is a handy reference when you wish to rotate other figures to the same degree or in multiples of that angle.

C. Angle of the last rotation. If you have not rotate a figure previously, the angle is zero. This number is primarily for reference or for use when you want to have a number of figures rotated by the same degree.

D. Angle by which to rotate the figure. Press the arrow keys to select the rotation angle. The keys work in this way:

Up and Down arrow keys change the angle by 10 degrees

Right and Left arrow keys change the angle by 1 degree

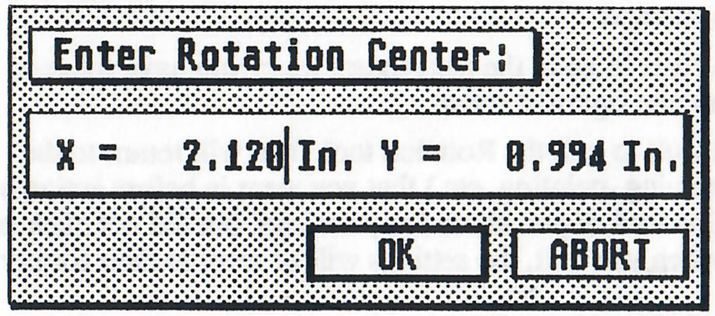
Shift plus Left/Right changes the angle by 1/10 degree

Shift plus Up/Down changes the angle by 1/100 degree

As you change the angle of rotation, the highlighted figure will appear to rotate as well. This provides visual feedback on the rotation angle. Note, however, that the figure is not actually rotated on screen until you select rotation angles for all the figures and exit the rotation tool.

E. Clicking on HOME or pressing the home key places the cross hair cursor at the center of the currently selected figure and sets the rotation point to that value.

F. By selecting the XACT key, you can enter exact coordinates for the point about which to rotate the object instead of using the cursor. When you select XACT, a dialog box will appear that looks like this:



You can set the X and Y coordinates or cancel out of the operation.

G. Sets the rotation angle to the angle used in the last rotation. This allows rotating a number of figures by the same angle with a minimum of work.

H. Click on Rotate to rotate a figure after you have entered values for the different settings. If the current figure has not already been converted to polylines, then Convert appears instead of Rotate. Once you have converted a figure, the Convert button changes to Rotate. Note that previous values will be used if you do not set new ones.

Note: Once a figure has been converted, you cannot change it back into individual objects, so we recommend that you work with a copy instead of the original.

I. Click on Prev to go back to the previous figure when you have selected more than one figure to rotate.

J. The Coarse/Fine button is active when the Convert button is active. It determines the number of segments used to create the polyline. The number of segments is also set by the type of object. For instance, a full circle requires 128 end points in fine mode and 64 end points in coarse mode. All other objects use some fraction of these numbers.

The default is Coarse. To change from Coarse to Fine, click on the button. Note that whatever is the currently displayed choice is the one that will be used when converting figures to polylines.

In most cases, the Coarse mode works well. If you have a particularly large figure and want it to have smoother lines, or if you have a high resolution printer, then you might want to use Fine when converting figures. Note that once a figure has been converted using coarse or fine, it cannot be converted again using the other method.

K. Click on Next to go to the next figure when you have selected more than one figure to rotate.

L. Click on Quit to quit the Rotation tool. You will return to the mode (drawing, pointing, etc.) that you were in before activating the rotation tool. If you altered any settings, but did not click on Rotate, when you quit, the settings will be reset to their former values.

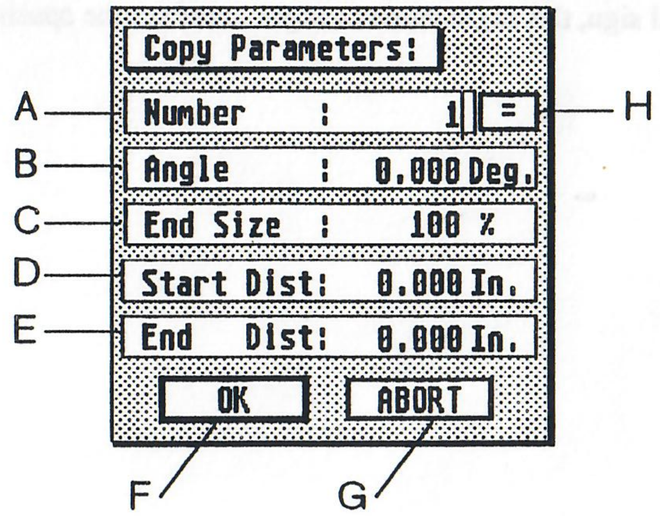
M. The Convert All button converts all selected figures to polylines and then return to the currently selected figure.

N. The Angulator + and - buttons rotate the figure by multiples of the Angulator value.

O. Circular Copy makes copies of a figure about a user-defined point. You can specify different settings for the size and location of the figure copies to produce different effects.

Circular Copy Dialog Box

This dialog box appears when you are in the Rotator Tool and select Circular Copy.



A. Number of copies of the figure you wish to make and rotate. If you do not alter the number, the current setting will be used.

B. Sets the angle by which to rotate the figure and each of its copies. If you have already selected the equal button, you do not need to set the angle.

C. Alters the size of the figure copies. Your original will remain the same size, but the copies will become either progressively larger or smaller, depending on the size you choose for the last or end copy.

D. Distance from the first figure to the rotation point. To change this distance, you must leave Circular Copy and go back to the Rotation dialog box. Move the cross hair to the location you desire, then select Circular Copy again.

E. Distance from the last figure located to the rotation point. If the value is the same as for Start Distance, the figures will be the same distance from the rotation point. When you enter a greater or smaller value, the figures will go in either an outwards or inwards spiral.

F. Saves the values you have set and returns you to the Rotator. Once you quit the Rotator, the circular copy will be displayed on the screen.

G. Returns you to the Rotation tool and resets any values you may have changed to their former setting.

H. Spaces the figures equally apart. Notice that when you click on the equal sign, the angle value changes to reflect the spacing.

Convert

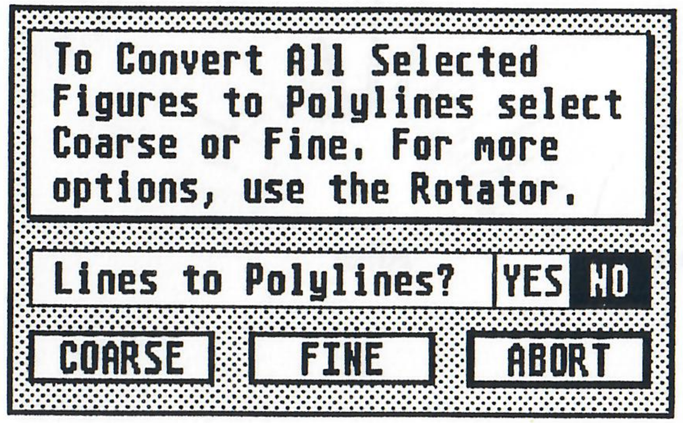
The Convert tool allows you to convert all selected objects to polylines at one time. Once an object has been converted, you have much greater control over it because you can add, delete, and move individual points on the object.

To use Convert follow these directions:

[1] Select the objects you wish to convert.

[2] Click on Convert.

A dialog box will appear that looks like this:



[3] Choose Coarse or Fine method of conversion.

The program converts the figures and returns you to the mode you were in before selecting the Convert tool.

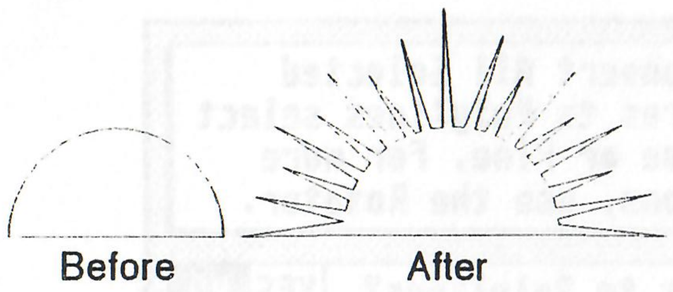
If you decide not to convert the figures, click on Abort before choosing Coarse or Fine to return to your previous mode.

The Coarse and Fine buttons determine the number of segments used to create the polyline. The number of segments is also set by the type of object. For instance, a full circle requires 128 end points in fine mode and 64 end points in coarse mode. All other objects use some fraction of these numbers.

Lines will not be converted to polylines unless you click on Yes. The reason for this is to save space in Easy-Draw because polylines use twice as much figure space as other figures. You can rotate lines without converting them. Unless you need to move or alter individual points on a line, we recommend that you do not convert lines to polylines.

For most purposes you will use the Coarse setting. While it converts the figure into fewer segments than Fine, the figure is easy to work with and takes up less space than a figure converted with Fine. Use the Fine setting when you have a large arc or circle that you want to print smoother or when you have an object with a particularly sharp corner or tight curve.

After a figure has been converted to polylines you can use the Edit Polyline feature of Easy-Draw to add, delete, or move any point of the figure. Figures that formerly took two or more objects to create can often be made in less time with fewer objects. Below is an example of object that has been edited with Edit Polyline. If you use Easy-Draw for any kind of illustration, you'll quickly see the advantages of this powerful tool.



Polytext

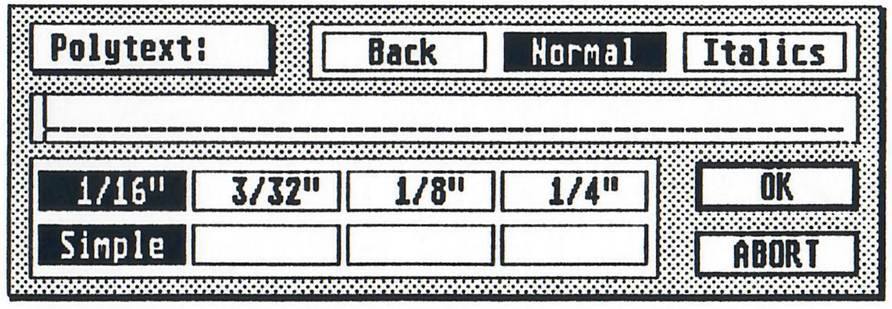
The Polytext tool allows the creation of lines of polyline text that can be rotated, sized, stretched, etc. Each polytext line can be up to 45 characters in length, either normal, backslant, or italic style, and in one of four sizes. The tool comes with one polyline font, but if you have a C compiler you can create and install your own font styles. If you'd like more information on creating your own polyline fonts, see the Tips and Hints section.

Using Polytext

It is very easy to use Polytext. To create a polytext line follow these directions:

[1] Click on the Polytext tool.

A dialog box will appear that looks like this:



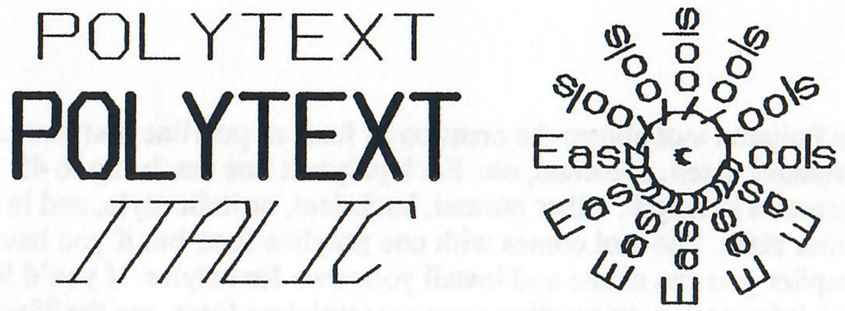
[2] Type in a sample text line.

[3] Select a text style and size by clicking on those boxes.

[4] Click OK.

The polytext will be placed on the clipboard if it is empty. If not, it will be placed in the upper left corner of the page. To see the text, remove it from the clipboard.

Once you place polytext on the page, you can rotate, size, stretch, copy, group, and alter it like other objects. Experiment by changing the size of the polytext label by stretching the object box. Change the line style by selecting new choices from the line menu, and use the Rotator to change the angle of the text. You can see that by using these choices you can be very creative with polytext labels.



Tips and Hints

Note for 1Mb ST Owners with a Laser Printer or the Deskjet

If you have Supercharged Easy-Draw and are using multiple fonts, you will not have any problem using Easy-Tools (assuming that you have no other accessories loaded). However, when you want to print your drawings at 300 DPI, you will have to disable Easy-Tools to allow enough room to load all the printer fonts. (You do not need to disable Easy-Tools when printing at 150 DPI or if you only use one font at 300 DPI).

You can disable Easy-Tools at the desktop level by renaming it EZ_TOOLS.AC, for example. Then reboot your system and run OUTPRINT.PRG as usual. When you wish to use Easy-Tools again, simply rename it, and reboot your system.

Clearing a Field

Easy-Tools usually saves the previous value settings. When you wish to edit or change a field in any of the dialog boxes, a quick way to clear the field is to move the cursor to the field and press the Escape key. This will clear only that field, not the whole dialog box.

Number of Figures per Drawing

Easy-Draw sets limits on the number of figures allowed per drawing. When you convert an object to a polyline, a square for instance, it uses up three figures instead of one. You will quickly run out of space if you use many polyline figures or sketches, or if you create designs with Circular Copy that use hundreds of figures.

To see how many figures you have used and how many you have left, check the Info Box under the Desk menu. Be sure to click on DT (dump trash) while in the Info box.

Hints for Using the Angulator

If you save a ruler size and then zoom in on an area smaller than the ruler size, the ruler will shrink to fit. To keep the old ruler size for use at the previous zoom, click on Forget instead of Save when you exit the Angulator.

Press Spacebar to extend and contract the ruler ticks.

If you hold down the adjustment keys too long and the keyboard buffer has more key presses stored than you want, hold down the Alt and Shift keys at the same time while the buffer empties. No changes are made while these are both down.

The angle shown in the Angulator info box depends on the direction the ruler was rotated. Counterclockwise gives you a positive number, while clockwise produces a negative number. (350 degrees = -10 degrees but the former got there by counter clockwise rotation).

Hints on Using the Inquisitor

When you're going to work with the Inquisitor, we recommend having only a few figures selected at a time. When many are selected, it's easy to lose track of which figure is the one you're working on.

The Inquisitor allows arc and pie angles to be entered directly up to .0001 degrees, however GEM only allows the specification of degrees to .1 degrees. Any digits after tenths of a degree are rounded to the nearest tenth.

Locations and widths are only accurate to three decimal points. Entering more than three digits is a waste of time. If in doubt about how many digits are significant, see how many the Inquisitor displays when it first comes up.

When adjusting a line and using Line Length, the right most point of the line is the one that changes.

When you have created a grid, remember it is made of groups within groups, so if you need to move or delete a line, ungroup the grid first. Once you have edited the grid, make sure to group it back together.

Hints on Using the Rotator

You do not need to convert lines to rotate them. Also, lines that have been converted use more figures than a normal line. If you really need to convert lines to polylines, use the Convert tool.

Xact allows the rotation point to be off the screen since you can set the exact coordinates. Be careful when doing this, as rotating a figure off the screen is an easy way to lose it. Should you lose a figure, use the Inquisitor to find it and place it back on the screen.

Rotating text and images is not allowed. If you find you cannot rotate a group, even after you convert it to polylines, it probably has a text object or bit-image in it. To solve this, exit the Rotator, ungroup the figure, deselect the text or bit-image, and activate rotate again. Once the figure has been rotated, it can be grouped with the text and bit-image as before.

Making Linear Copies

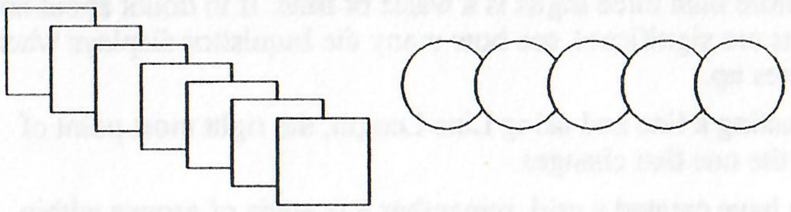
Using Circular Copy is an easy way to make many copies of an object in a straight line. The following instructions assume that you have selected an object and converted it to polylines.

[1] In the Rotator, move the crosshair in the direction you want the copies, either up, down, left, or right of the object.

[2] Select Circular Copy, set an angle of 0, and enter the number of copies you desire.

[3] Set an End distance that is different from the Start distance. If you want the last object to have the crosshair as its center, then set the End distance to 0.

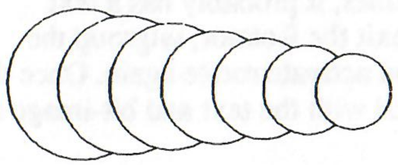
[4] Exit the tool.



This method produces copies that are spaced evenly across whatever distance you designate. To have the copies placed diagonally, move the crosshair on an angle from the object before selecting Circular Copy.

If you'd like to have the copies in an exact line from the original, set the crosshair at the center of the object. Then select XACT and set a new center by changing either the x or y axis (leave one the same). This insures a straight line.

You can also have the copies change in size from large to small and vice versa by changing the End Size setting. This size is a percentage of the original. The example below shows an End Size of 50% of the original figure.



Using Circular Copy to Create Different Figures

Circular Copy is a powerful tool that can produce many different figures depending on the figures used and the options selected. Like anything else, learning to use Circular Copy to its fullest requires experimentation. Below are a few examples to help get you started.

Creating a Spiral

You can create spirals easily with Circular Copy. The following instructions use just a straight line to create the spiral but you can use any object or figure.

To create a spiral, follow these instructions:

[1] Draw a line 1 inch long on an angle.

[2] Activate the Rotator.

[3] Move the crosshair down and to the left of the line.

[4] Click on Circular Copy.

[5] Edit Number to 150 and click on =.

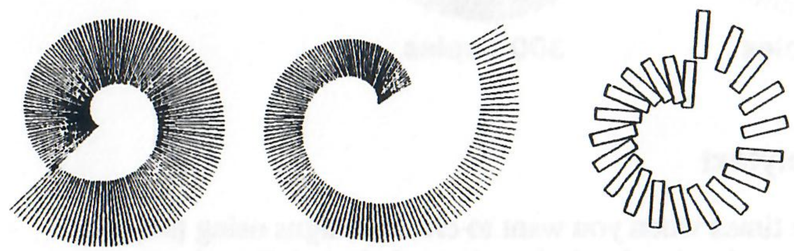
[6] Edit the End Distance to a number greater than the Start Distance.

[7] Click on OK and then Quit.

After you quit, the spiral will be drawn, but remember each line will have an object marker. If you wish to keep the design, group it by selecting Alt + while the object boxes are displayed. Once grouped, you can size and otherwise alter the spiral.

Note that the last copy will be placed over the original. To avoid this, select the number of copies you want, click on the equal sign, then decrease the number of copies by 1.

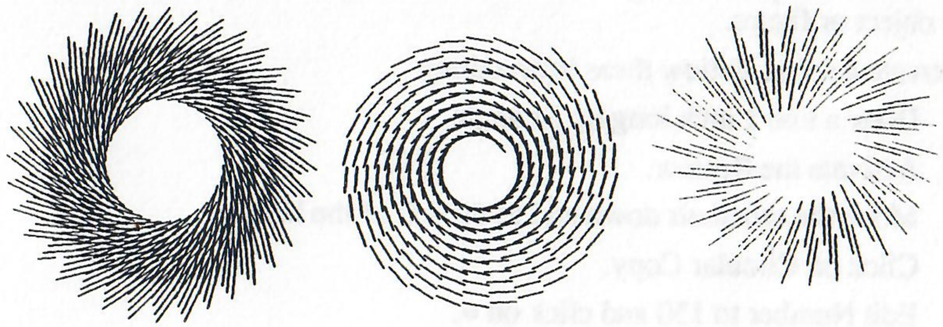
This directions above produce an outward spiral. To produce an inward spiral, edit the End Distance to be less than the Start Distance.



Creating a Continuous Spiral

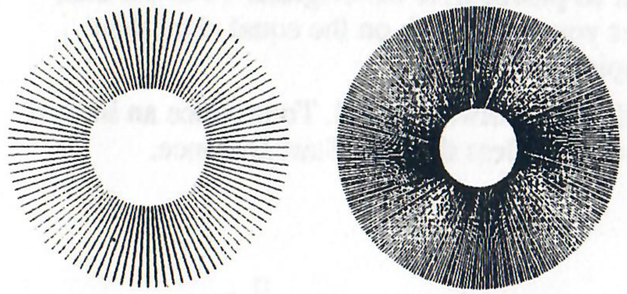
You can create a continuous spiral that goes beyond 360 degrees. Instead of clicking on the equal sign, edit the angle setting, for instance to 12 degrees and as before, set a new End distance.

Here are several different designs made just by altering the number of objects and the angle.



Creating a Doughnut (Toroid)

To make a doughnut, follow the same steps as for a spiral but leave the Start and End Distance the same.



100 copies

300 copies

Rotating Polytext

There may be times when you want to create designs using polytext labels. To create the circular design shown below, follow these instructions:

[1] Using the Polytext tool, type in the words "Rotate Text.".Use Normal style and 1/4" height.

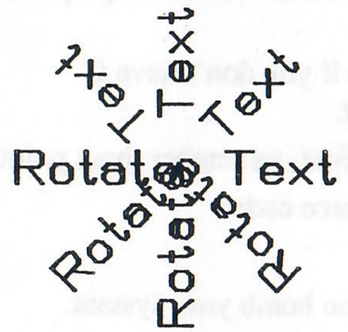
[2] Select the Rotator, and click on Home to set the rotation point at the center of the text label.

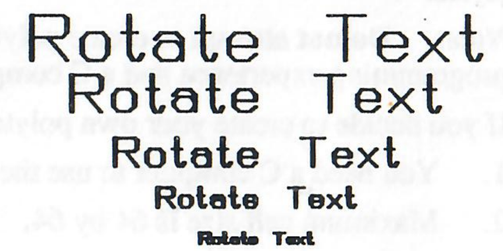
[3] Click on Circular Copy.

[4] Set the number of copies at 3.

[5] Set the angle to 45 degrees.

[6] Press Return, and then Quit.





You can vary this by making more copies, setting a different angle, and changing the end size and using a different object to rotate, like a box.

Don't forget that after you have created a polytext label, you can size and stretch it, as well as change the line style and thickness to create even more designs.

Hints on Using the Convert Tool

Sometimes converting a multi-level group with lots of objects can take quite awhile. Just be patient. Also, a drawing made of lines, like a loaded Athena II file, does not usually need to be converted.

Hints on Using Polytext

Even though the figures used to create polytext are as efficient as possible, polytext can use up many figures quickly. Do not use polytext as a replacement for regular text as it is meant primarily for labels.

Polytext is made up of polylines and groups of polylines, so if a letter doesn't quite please you, explode it (if you need to) and then edit the polyline.

Creating Your Own Polytext Font

If you have programming experience and a C compiler, it is possible to create your own polytext font. Unlike normal text that is created using a font editor, polytext is created entirely with code. The code for the polytext style used in Easy-Tools is included on the disk. It is commented and can be copied and used to create additional polytext styles.

Note: **Do not** attempt to create polytext if you don't have C programming experience and a C compiler.

If you decide to create your own polytext font, remember these points:

1. You need a C compiler to use the source code.
2. Maximum cell size is 64 by 64.
3. Defining the characters incorrectly can bomb your system.
4. Maximum font file size is less than 8K. (The bottom of the buffer is used for other things so if your font is scrambled, it's probably too big.)
5. Easy-Tools doesn't have a very big stack and the fonts use recursion, so macros that call macros that call macros that call .>BOOM<.
6. Closely follow the rules contained in the comments at the top of the source file for success.
7. Filled areas are allowed (this can make some really neat fonts).
8. Kern tables are currently not used. It's there for possible future expansion.
9. Share your creations!!!

Final Note: Creating a polytext font is a job that takes a lot of time and experimentation. Unless you are willing to invest the time and effort, it is something best left alone.