Geo. T. Schmidt, Inc.

STYLEWRITE
PROGRAM
Version 2.02

REFERENCE MANUAL

Also includes "Style97" applications

GTS StyleWrite Version 2.02

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Chapter 1

INSTALLING THE SOFTWARE

This chapter explains how to install the software and the (optional) I/O card.

TO INSTALL THE SOFTWARE FOR StyleWrite:

1. Start Windows.

2. Insert the StyleWrite diskette into the "A:" drive.

3. In Windows 95/98/2000,Windows NT 4.x, click the **Start** button, choose the **Run** command, type **a:\setup** in the **Run** dialogue box, and click **OK** .

4. Follow the on-screen instructions to complete the installation of StyleWrite.
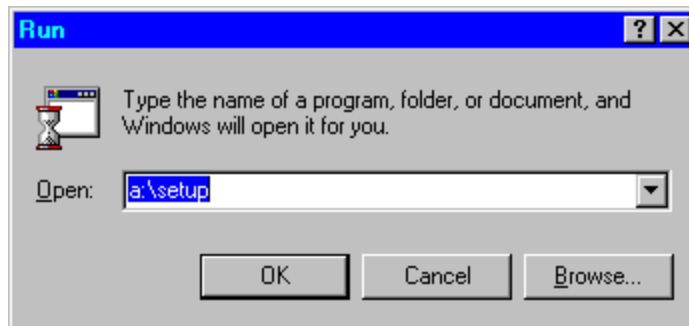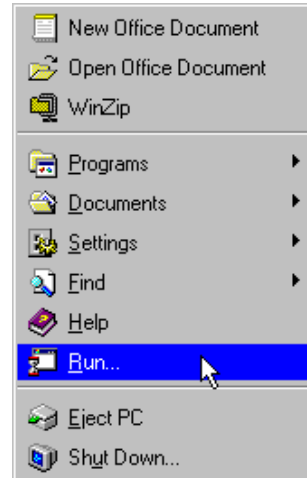
The installation program will create a directory called Style97 on the "C:" drive of the computer. All required files and subdirectories will then be copied to this directory. .
The Style97 sub-directory stores all the **StyleWrite program** and data files.
After installing **StyleWrite** into the Style97 sub-directory, use the control box installation disk, which will copy the **Style104.exe** file in that directory. This starts the program in the controller and allows it to communicate with the digital I/O card.
If the control box with integral floppy is supplied, intstall the software contained on the controller installation disk. This disk will transfer in the autoexec, font and logo files, as well as the Style104.exe program.

INSTALLING THE I/O CARD (APPLICABLE TO OLDER MACHINES)

The I/O card is required for **the older controls, where a PC 104 is not included** in the control box. For later (April '98) control boxes, this card may not be required, unless a Z-axis machine is used.

The I/O card is used by the STYLINER to control the X,Y motors and additional I/O which is available with the system. The card requires a half-length 8 bit slot.

The switch settings should not need to be changed unless other cards are added to the system.

2 3 4 5 6 7 X   ON OFF

9 8 7 6   5 4 3 2

I/O ADDRESS (300 HEX)   **INTERRUPT**   **WAIT STATE**
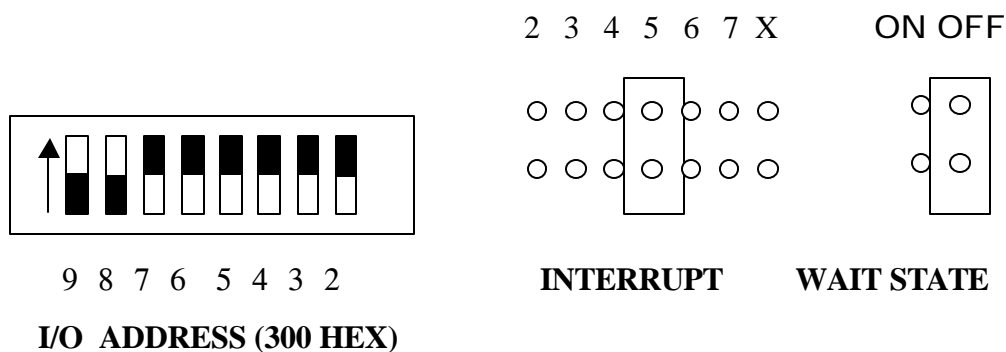
If you add additional cards, confirm that no other I/O devices occupy the address range of the 0x300 to 0x308, or hardware conflicts may occur. Only Interrupt 5 is used by the CIO card. If you experience any problems, remove the additional cards and verify the addresses of all the cards in the computer.

If hardware conflicts occur, contact the Geo. T. Schmidt technical support staff at:

Service Dpt.: 1-800-232-1332

TO INSTALL THE I/O CARD (if required) ON THE COMPUTER:

1. Turn off the power.

2. Remove the cover from the computer. **Be careful not to dislodge any of the cables installed on the boards in the computer as you slide the cover off.**

3. Locate an empty ISA expansion slot in the computer.

4. Push the card firmly down into the expansion bus connector and install the hold-down screw. (If the card is not seated properly, it may fail to operate and could cause damage to the computer)

5. Carefully replace the computer cover.

6. Connect the 37 pin D-shell cable from the control unit to the connector located on the rear of the I/O card.

PROGRAM FILES

To better organize the various files used by the StyleWrite program, several subdirectories are employed. The main program directory that contains the operating files is **C:\Style97**. Under this directory are subdirectories that contain HPGL logo files and font files.

The additional files that you will use will depend upon your particular marking applications. A sample screen is provided below. The actual file names may deviate from what is displayed.

Subdirectories
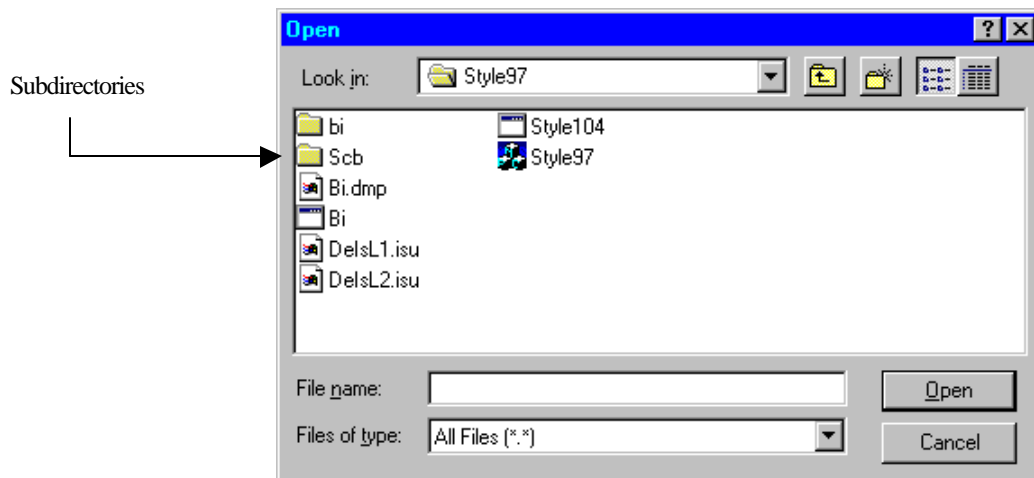
Chapter 2

RUNNING THE PROGRAM

This chapter explains how to start the StyleWrite program, create a file, and make marks.
It details how to mark straight text, radial text, and logos. It also covers incrementing
mark text functions, marking date codes, setting COM ports and prompts, transferring
data files, and defining program functions such as inputs, outputs, and delays.

STARTING THE PROGRAM

TO START StyleWrite:

1. Click **Start** from the menu bar at the main Windows screen.
2. Choose **Programs**, move the mouse to **Style97**, or StyleWrite
   and click on it. (Or, make an Icon on the Desktop, for more convenient access)

Click **Start** to begin.
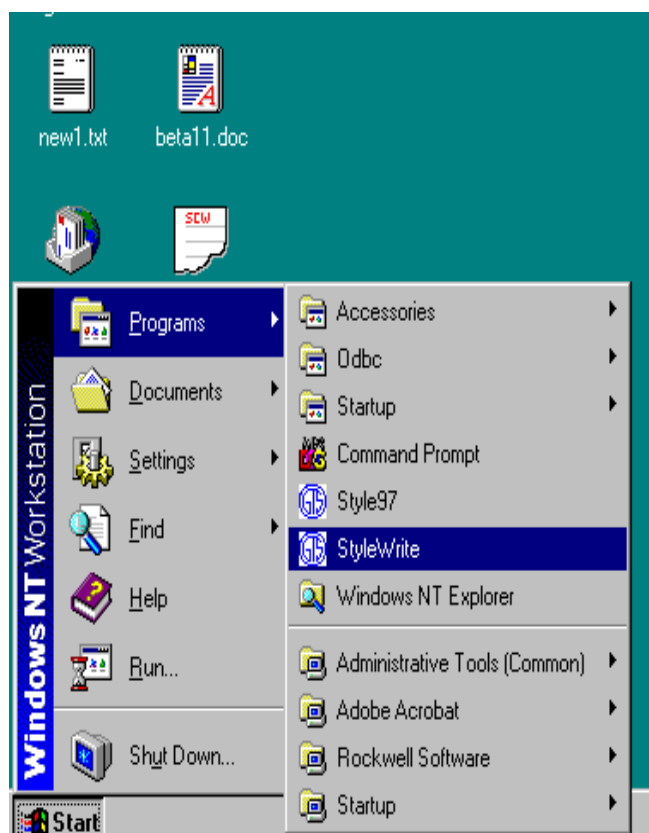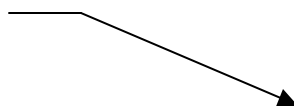
TO CREATE A FILE:

1. Click the **New** button,

    or click **File** and select **New** from the drop down menu.
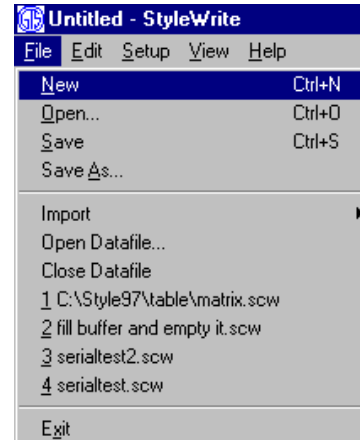
A blank screen will appear. At this point, the file should be saved with a descriptive

name that the user can identify.
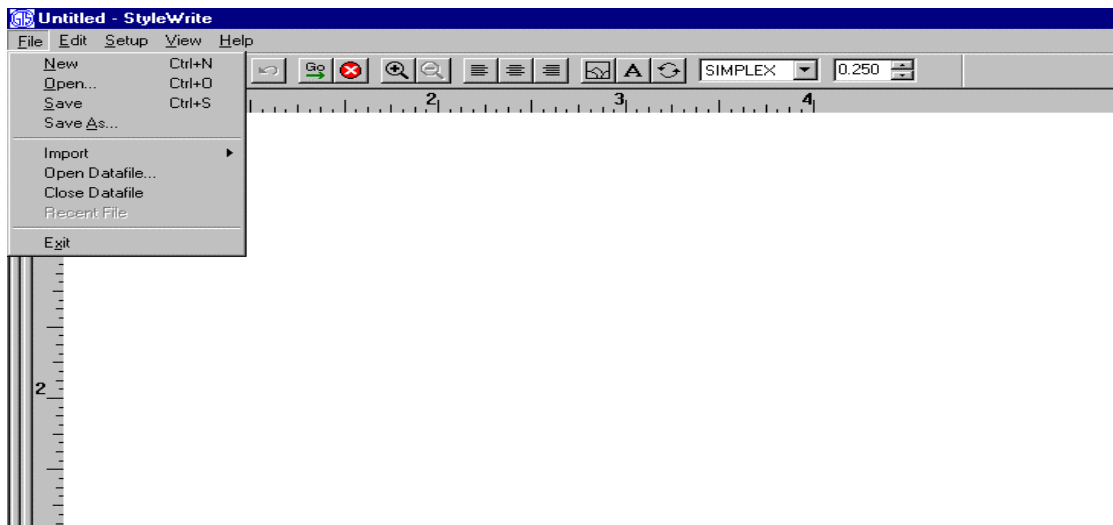
NOTE: At program startup, a **New** screen will appear automatically. The **New**

function can be used to start a new document when another document is already in use on

the main screen.

TO SAVE A FILE:

1. Click the **Save** button,

    or click **File** and select
    Save As from the drop down menu.

2. Type a file name into the **File Name** field on the **Save As** screen.

    (Long file names can be used)

3. Select the desired subdirectory and click **Save**.

Subdirectories

Type in file name here.
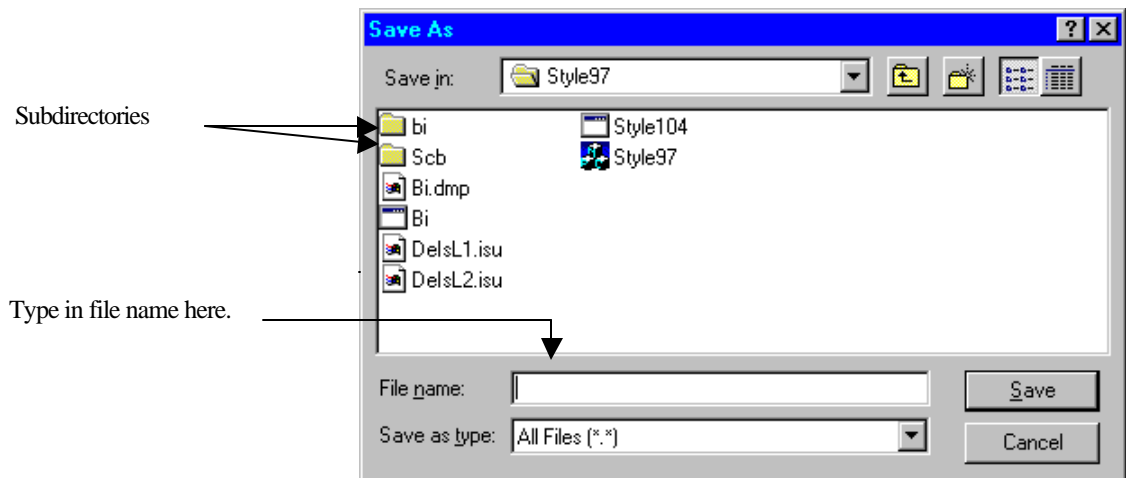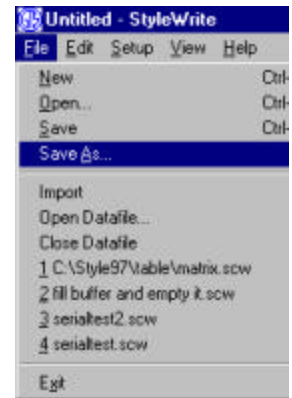
StyleWrite allows the use of long file names. It is not necessary to add a file extension to the filename. This action is performed automatically by StyleWrite.

TO OPEN A FILE:

1. Click the **Open** button,

    or click **File** and select **Open** from the drop down

    menu.

    Or, click directly on the file name shown.

2. Select the desired directory and click

    on the file name to be opened.

3. Click **Open** on the dialogue box.
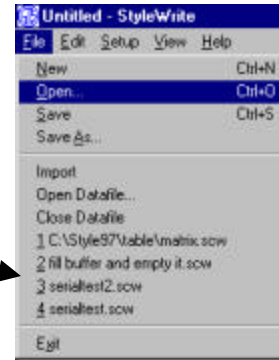
Open dialogue box

(Your screen may look different)

TO EXIT:

1. Click **File** and select **Exit**

   from the drop down menu.

(Your screen may look different)
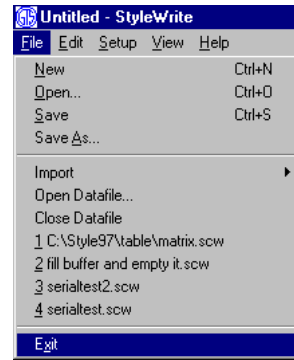
MARKING TEXT

In order to input text into a marking sequence, the **Mark Text** function is used. Within the **Mark Text** function, there are a number of parameters that the user can define to customize the appearance of the mark.

TO MARK TEXT:

1. Click the **Mark Text** button, ![A] or click the **right** mouse button and select **Mark Text** from the menu. After selecting **Mark Text**, "abc" will appear on the screen.

2. Click "abc" with the mouse cursor such that a selection box is drawn around the edges as indicated in the figure below.
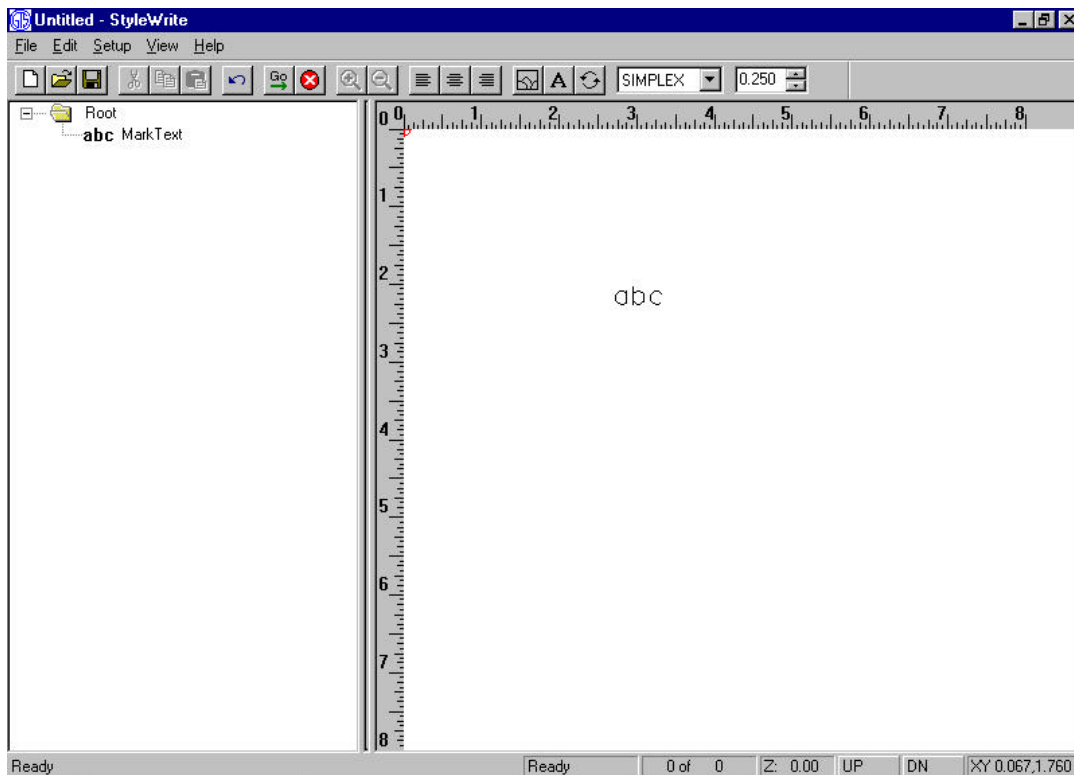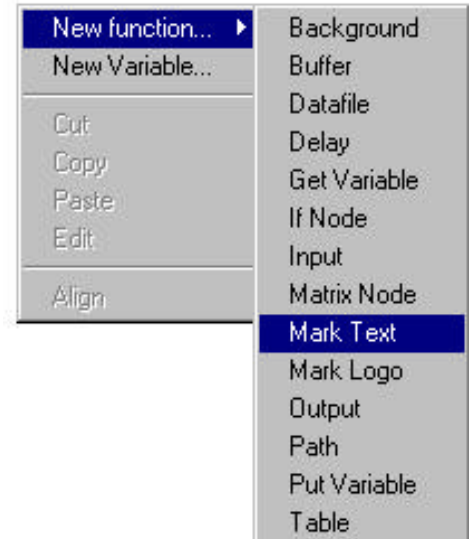
3. Double-click "abc", and the **Mark Text** dialogue box as shown in Figure 2.1 will appear on the screen.

Figure 2.1: Mark Text **Dialogue Box**

Enter text for the mark.
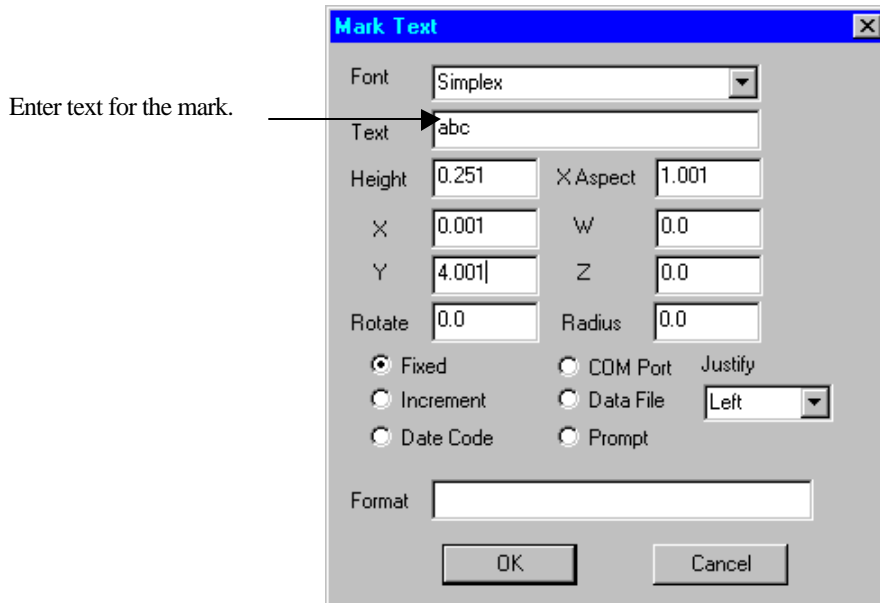
From the **Mark Text** dialogue box, there are a number of fields that may be selected. Explanations for each field are provided below.

Font:	The type of font used to produce the Scroll bar characters. To view the choices, click the scroll bar and select the desired font.
X,Y:	Determines the location of the bottom left hand corner of the text.
Text:	The text field is used to enter the desired text for the mark.
Radius:	Determines the curvature of the arc for the text, or the size of a part being indexed, when INDEX is selected in the JUSTIFY box.
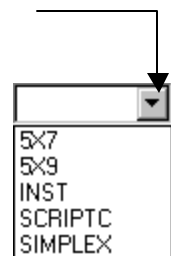
Justify: The justify field determines how the text is

positioned relative to an X,Y point.

Center justified is centered on the X,Y point

and extends equally in the left and right directions.

Index justified text involves the addition of the W axis for marking a

round part.

Left justified text starts at the X,Y point and extends to the right.

Right justified text ends at the X,Y point and extends to the left.

Vertically justified text starts at the X,Y point and extends downward.

Height: The height determines the size of the characters in inches.

A height of 0.0 inches will appear as a dot on the screen.

X Aspect: The X aspect is used to adjust the width of the text. This aspect will adjust

the size of the character, as well as the inter-character gap. A value of 1.0

will produce a normal aspect character. A value of 2.0 will produce a

character of twice the normal width. A value of –1.0 will produce reverse

characters.

Rotate: Specifies the direction of the text. Rotation is measured in degrees in the

counterclockwise direction. A value of 90 will produce a mark directed

vertically downward.

W Axis: The position of the W axis.

Z Axis: The position of the Z axis for this **Mark Text** sequence.

When all of the information has been entered, click **OK**. The mark will appear on the

screen with the specified parameters. A **Mark Text** sequence is required for each line of

text. The above parameters can differ for each line of text created.

RADIAL MARKING

Radial marking is used for marking characters on the arc of a circle.
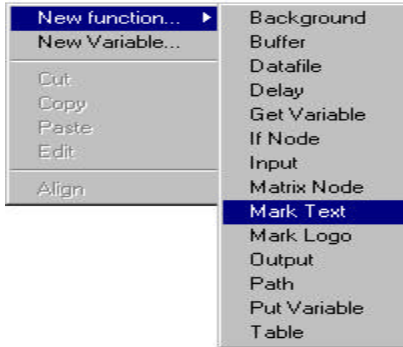
TO RADIALLY MARK TEXT:

1. Click the **Mark Text** button, or click the right mouse button and select **Mark Text** from the menu. After selecting **Mark Text**, "abc" will appear on the screen.

2. Click "abc" (actually "Radial Mark" is already shown below) such that a selection box is drawn around the edges as indicated in the figure below.
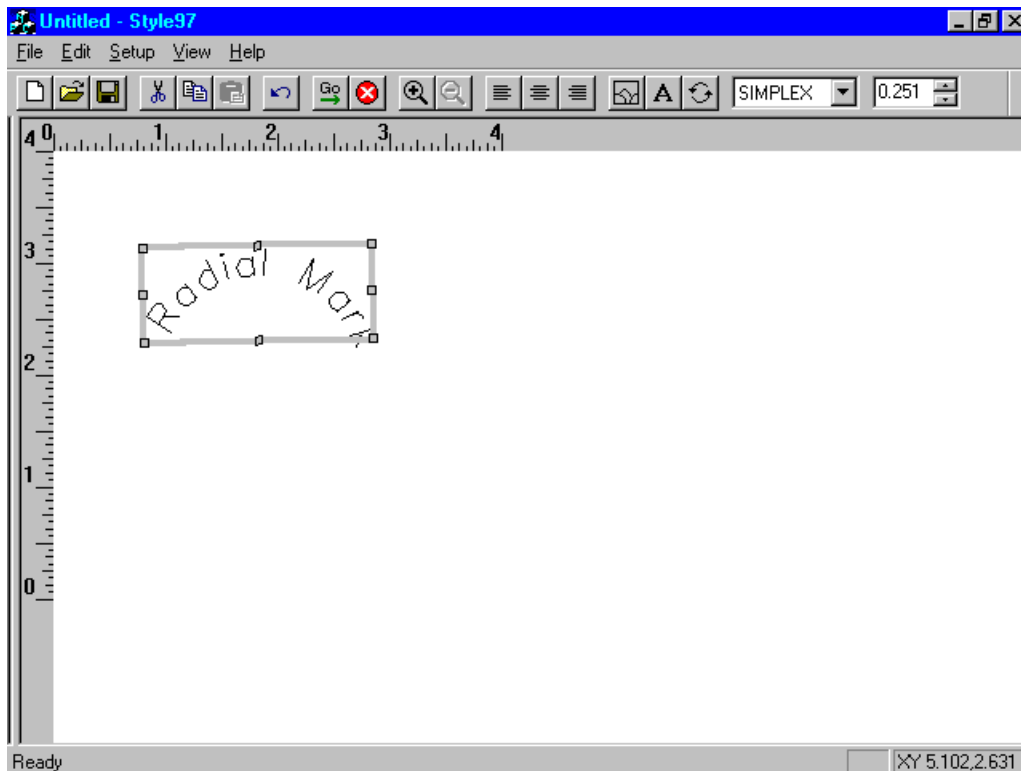
3. Double-click "abc", and the **Mark Text** dialogue box

   will appear on the screen.

4. Enter a value for the radius of the arc in the **Radius** field.

Specify the desired radius size.
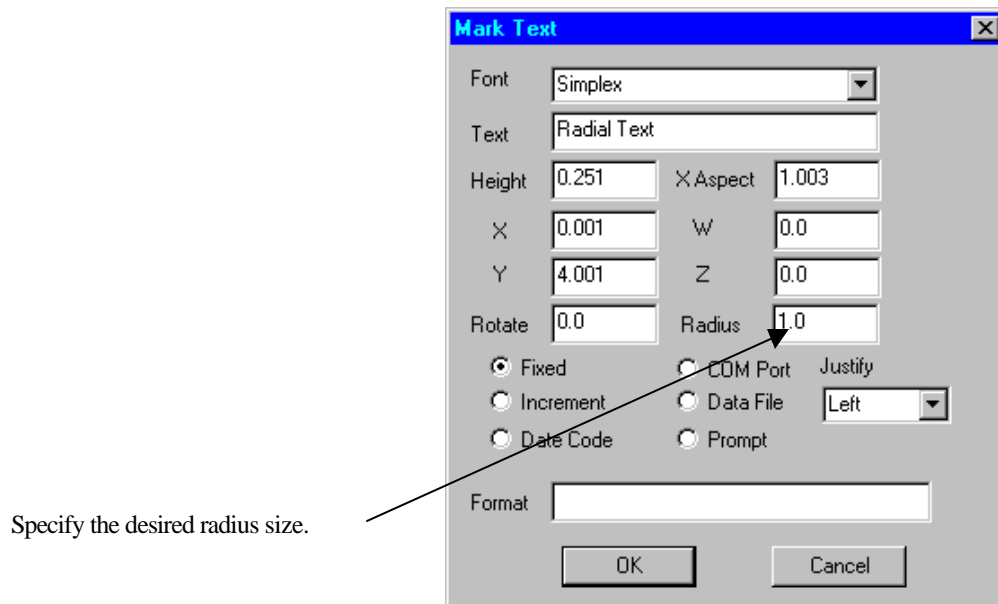
From the **Mark Text** menu, there are a number of fields that may be selected. Explanations for each field are provided below.

Radius: Determines the curvature of the arc. The radius is measured from the center of the arc to the center of the character. A positive value of radius will mark the characters in a convex arc, with the bottom of the characters nearest the center. A radius with a negative value will mark the characters in a concave arc, with the top of the characters nearest the center. If the radius is larger than the marking field, it may be necessary to make the X or Y positions negative.

Font: The type of font used to produce the Scroll bar characters. To view the choices, click the scroll bar and select the desired font.

X,Y: Determines the location of the mark. For **Right**, **Left** and **Center** justified marks, the X,Y values determine the center of the radius.

Justify: The justify field determines how the text is positioned relative to an X,Y point.

Center justified is centered on the X,Y point and extends equally in the left and right directions.

Index justified text involves the addition of a third axis for marking a round part.

Left justified text starts at the X,Y point and extends to the right.

Right justified text ends at the X,Y point and extends to the left.

Vertically justified text starts at the X,Y point and extends downward.

Height: Determines the height of the characters in inches.

X Aspect: The X aspect is used to adjust the width of the text. The aspect will adjust the size of the character as well as the inter-character gap. A value of 1.0 produces a normal aspect character. A value of 2.0 produces a character of twice the normal width. A value of –1.0 produces reverse characters.

Rotate: Determines the direction of the mark. Rotation is measured in degrees in the counterclockwise direction. A value of 90 will produce a mark directed vertically downward.

Z Axis: The position of the Z axis for this **Mark Text** sequence. (Optional)

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W Axis: The position of the W axis for this **Mark Text** sequence. (Optional)

When all the information has been entered, click **OK**. The mark will appear on the screen with the specified radius and in the location designated by the X,Y (and Optional W, Z) coordinates.

INCREMENTING MARK TEXT

A numeric value can be used in the Mark Text sequence to mark parts that need to be serialized. This is useful for simple serialization when the serial number is incremented by a fixed value each time. For sophisticated serialization methods, incrementing a simple value in this manner is not practical.

TO INCREMENT MARK TEXT:

1. Double-click on the text such that the **Mark Text** dialogue box appears on the screen.
2. Select **Increment** from the list of field parameters on the **Mark Text** dialogue box.
3. Enter the initial value into the **Text** field.
4. Enter the incrementing value into the **Format** field.

Insert initial value here.

Select **Increment.**

Insert incrementing value here.
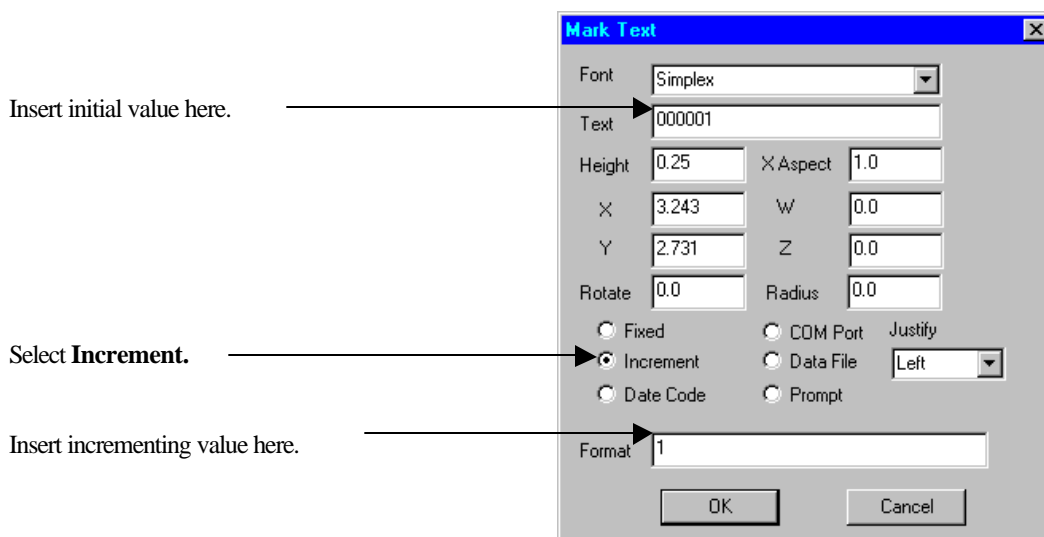
When all the data has been entered, click **OK**. The initial value input into the **Text** field will appear on the screen. Each time the mark sequence is executed, this number will increase by the defined increment.

NOTE: To retain the value of the variable for the next marking session, the file must be saved before exiting. This can be important for serialized parts.

MARKING DATE CODES

Date codes can be marked on parts for tracking purposes.

TO MARK DATE CODES:

1. Double-click on the text such that the **Mark Text** dialogue box appears on the screen.

2. Select **Date Code** from the list of field parameters on the **Mark Text** dialogue box.

3. Enter the desired date format into the **Format** field.

Select **Date Code** field.

Enter date code format.
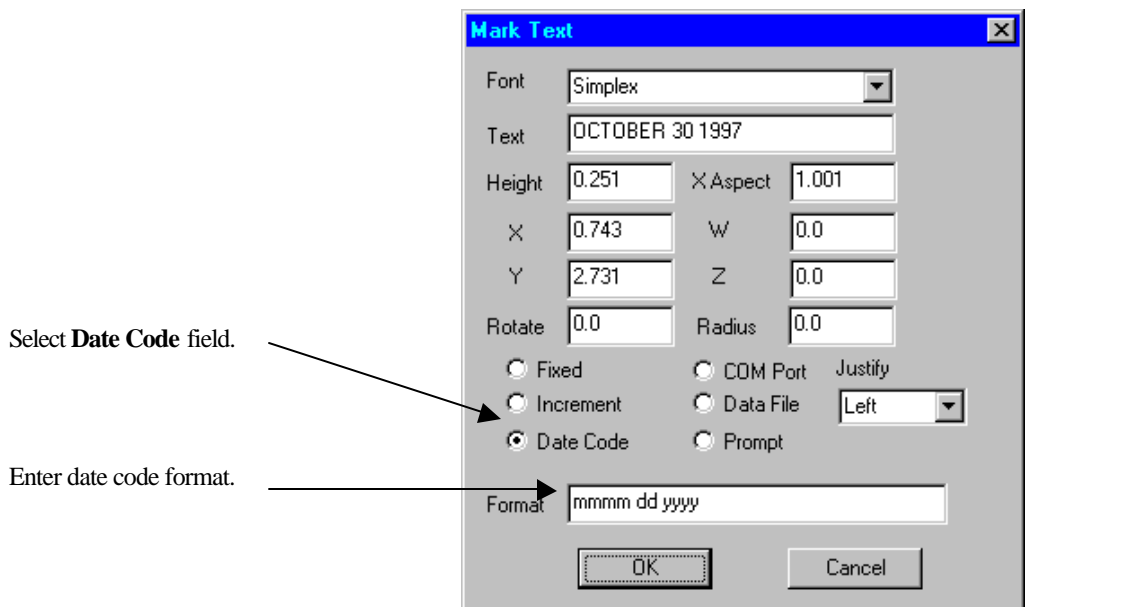
When all information has been entered, click **OK**. The date code will appear on the screen in the format selected. The current date is displayed automatically.

On the following page are the various date code format translations that can be combined to customize the style of the date to be marked. The following examples indicate the date code format translation used, and the resulting date code mark.

Some text can be added to the Format box and will appear with the date code on the screen, and will be marked.

(MM/DD/YYYY Text Marked = 10/23/2000 Text Marked)

"MMM-DD-YYYY" = "FEB-06-1998"

"YYWW" = "9806"

<div align="center">"YYJJJ" = "98037"</div>

Following are **Date Code Format Translations:**

Year:	"YYYY"	=1998
	"YY"	=98
	"Y"	=8
Month:	"MMMM"	=FEBRUARY
	"MMM"	=FEB
	"MM"	=02
	"M"	=2
Day:	"DDDD"	=FRIDAY
	"DDD"	=FRI
	"DD"	=06
	"D"	=6
Hour:	"HH"	=02[A]
	"H"	=2
Minutes:	"MM"	=09[B]
Seconds:	"SS"	=45
	"AA"	=AM or PM
	"A"	=A or P
Week:	"WW"	=06
Day of Year:	"JJJ"	=037
	"JJ"	=37

The time format can be specified as a 12 or 24 hour format. If the designator "A" appears after a time format, the 12-hour format will be used. If it is not found, the 24-hour format will be used.

NOTE:
- [A] 12 or 24
- [B] Must have a "H" or "HH" in front of it.
- The date code reflects the current status of the computer's time and date settings. To change the date, the settings must be changed in the Control Panel of Windows.® Or, click on the clock in the start menu.

  Note: The clock in the control box will be automatically updated when the box is initialized by the host PC.

SETTING THE COM PORT

The **COM Port** field of the **Mark Text** dialogue box is used to set the hardware parameters for the use of non-standard communications ports.

TO SET THE COM PORT:

1. Double-click the text such that the **Mark Text** dialogue box appears on the screen.

2. Select **COM Port** from the list of field parameters in the **Mark Text** dialogue box.

Select **COM Port**.
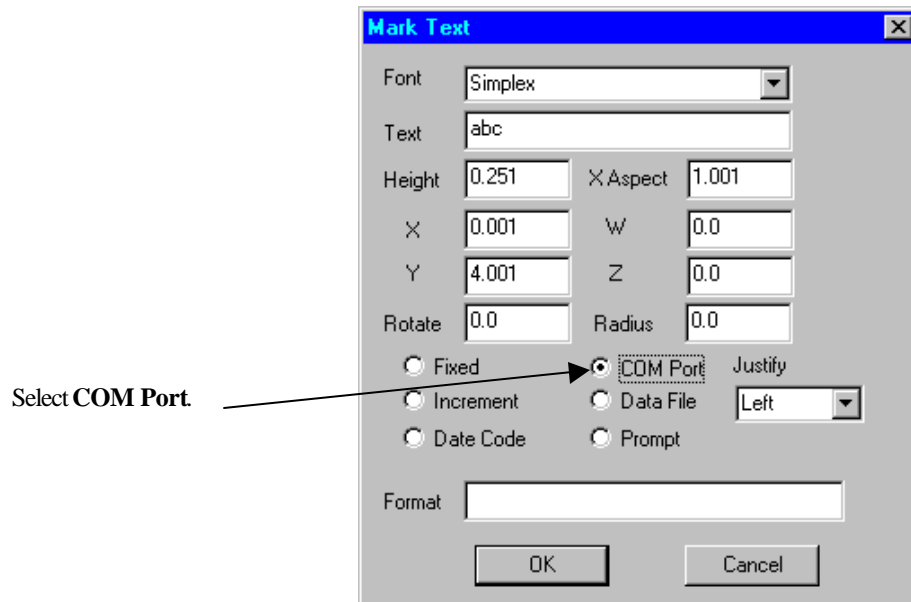
3. Click **OK**.

4. Click **Setup** and select **Aux Port** from the drop down menu.

   The **Aux Port** dialogue box will appear as shown in
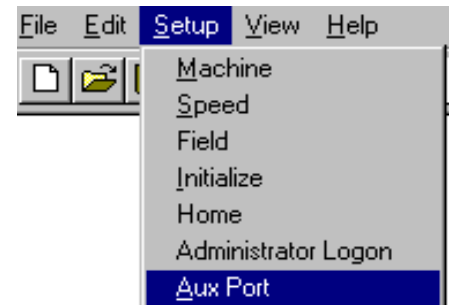
Figure 2.2 on the following page.

Figure 2.2: Aux Port Dialogue Box
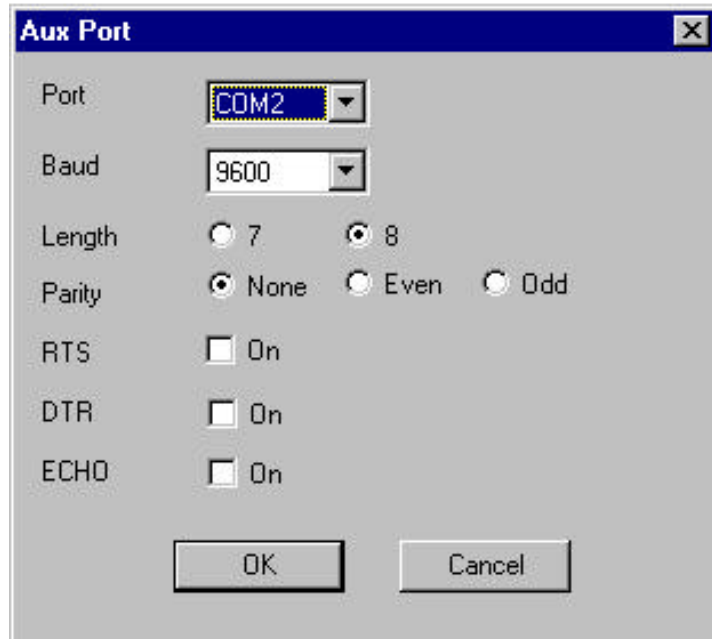
5. On the **Aux Port** dialogue box, select the correct settings for the external
    Communications device, and click **OK**.

At this point, the computer is configured for external communications. All of the
parameters of the transmitting and receiving devices must be set to the same value to
communicate properly.

For **internal mode**, the port on the Host Computer is used.

For **external mode** the port on the Control Box is used.

* Refer to Chapter 9 for information on formats and delimiters.

Within the **Mark Text** dialogue box, the **Data Files** parameter may be selected in order to retrieve data for input into a marking sequence.

TO TRANSFER DATA FILES:

1. Click the **Mark Text** button and "abc" will appear on the screen.
2. Double-click "abc" such that the **Mark Text** dialogue box appears on the screen as shown below.

Select **Data File**.

Enter the desired format for data transfer using control characters* into the **Format** field.
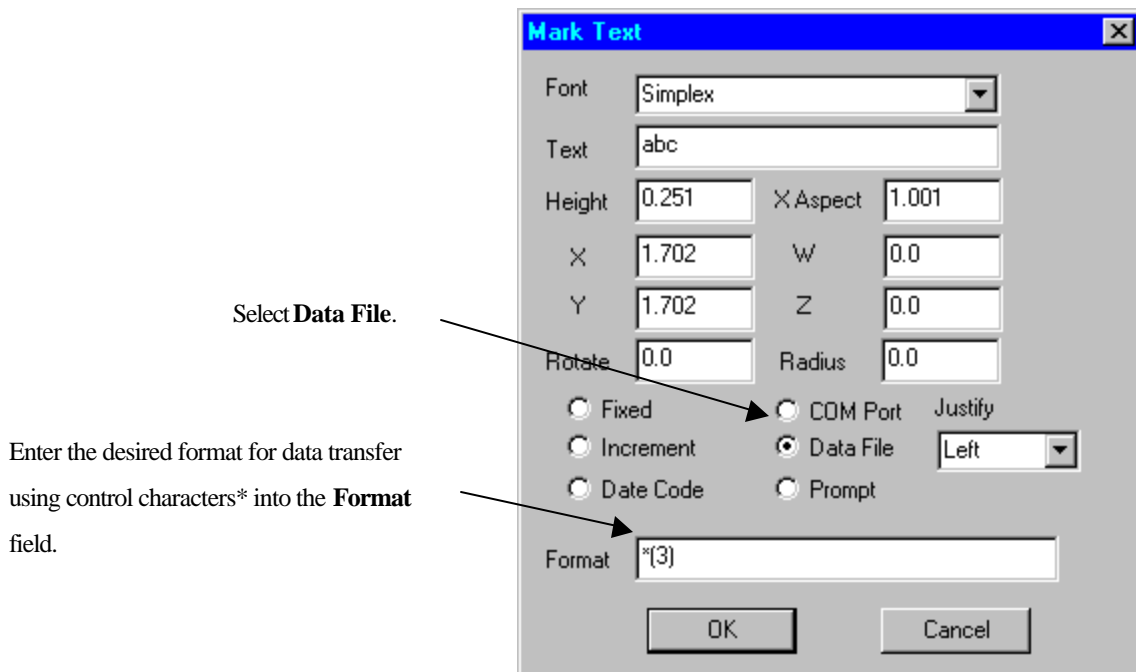
3. Click **Data File**, and enter the control characters for the desired data file transfer into the **Format** field.
4. Click **OK**.
5. Click the **GO** button, and the **Open** dialogue box will appear.
6. Select the desired data file from its directory and click **OK**. The marking sequence will begin transferring the data according to the specified delimiters.
* NOTE: Data control characters and formats are discussed in detail in Chapter 9.

The **Prompt** function within the **Mark Text** dialogue box allows the operator to enter data into a marking sequence that may vary for each mark. Marking a nameplate is an example of where a prompt might be used, in order to change the name being marked on the plate with each marking sequence.

TO SET THE PROMPT:

1. Click the **Mark Text** button and "abc" will appear on the screen.
2. Double-click "abc" such that the **Mark Text** dialogue box appears on the screen as shown below.

Select **Prompt**.

Enter desired text for the prompt into the **Format** field.
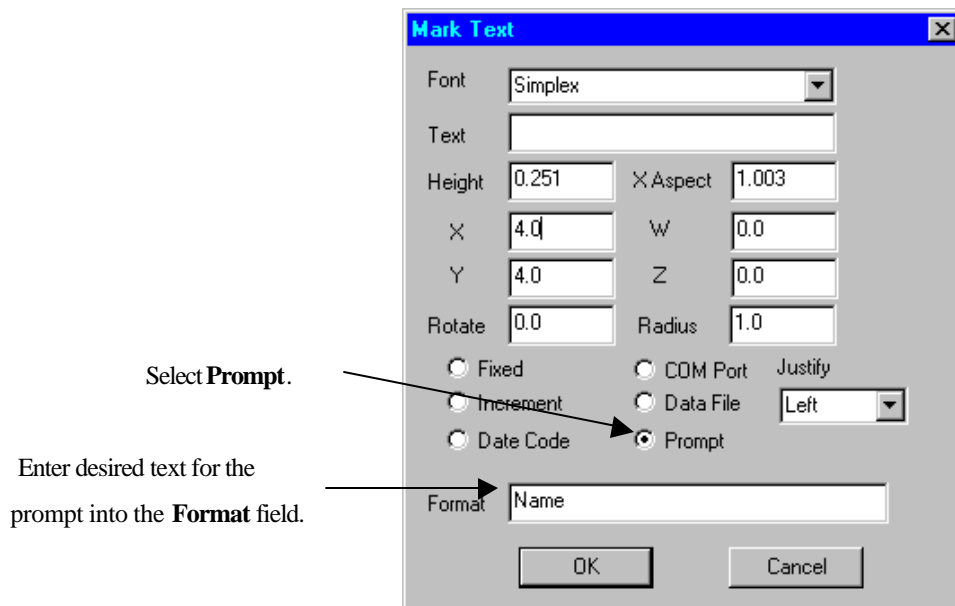
3. Select **Prompt** from the **Mark Text** dialogue box, and enter the desired text for the prompt into the **Format** field.
4. Click **OK**.

The prompt is now set. Upon execution of the marking sequence, a prompt dialogue box will appear on the main screen, awaiting input from the operator. A sample screen is shown in the figure below.

Sample of a multiple **Prompt** Screen

Prompts are entered into the **Format** field of the **Mark Text** dialogue box, and displayed on the **Prompt** screen when the marking sequence is executed. The operator enters the appropriate data for each marking sequence.

The **Mark Logo** function is used to mark an image. Image files with the extensions .BIL or .PLT can be opened by StyleWrite. When a .PLT file is opened, it is converted to a .BIL file and placed in the BI directory of the StyleWrite program.

TO MARK A LOGO:

1. Click the **Mark Logo** button,   or click the right mouse button and select **Mark Logo** from the menu.

2. Select the logo to be marked from the **Open** screen, and click **Open**. The logo selected will appear on the main screen.
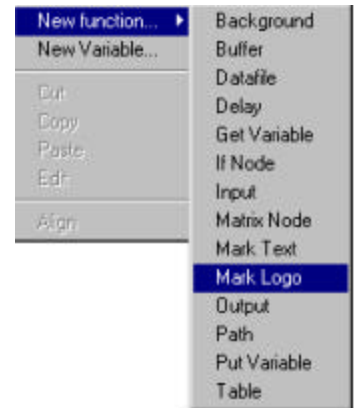
Select a desired logo, and click **Open**.
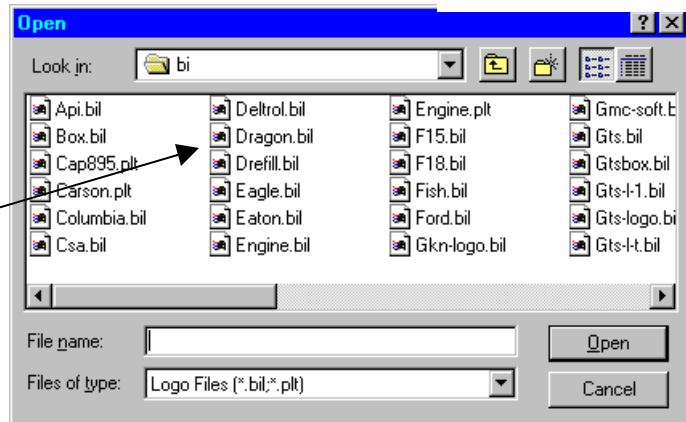
3. Click on the logo such that a selection box is drawn around the edges as shown in the figure below (You may have to drag the logo into the window, to see the whole logo.)

Selection Box
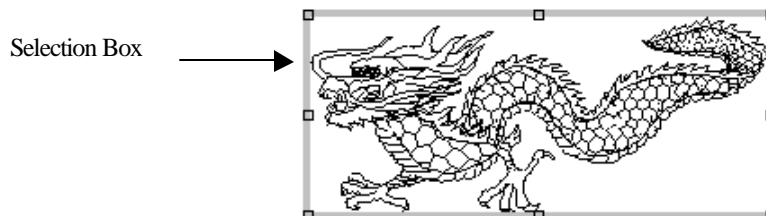
4. Double-click the logo, and the **Mark Logo** dialogue box will appear.

Scroll through the available logos by clicking here.

Radius marking
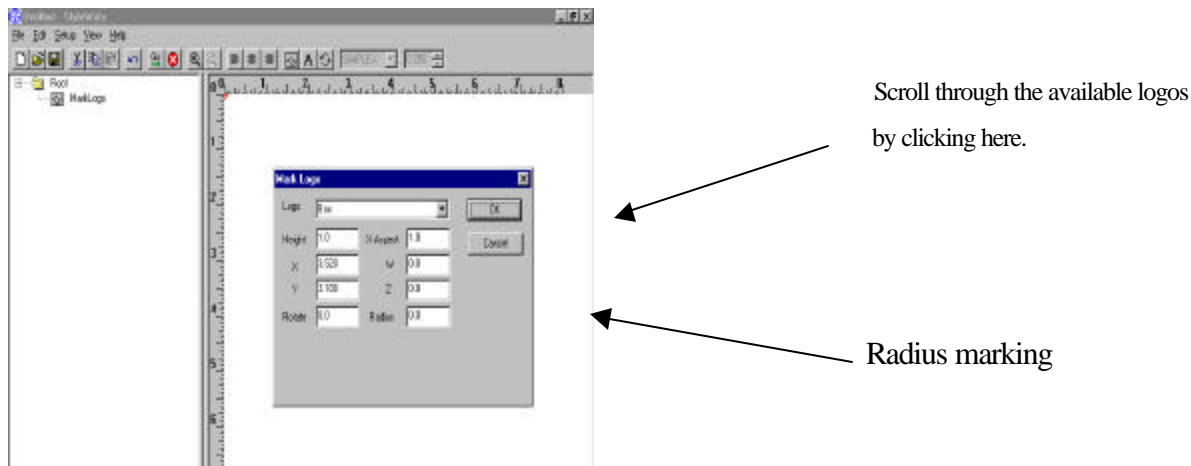
Explanations for each field of the **Mark Logo** dialogue box are provided below.

Logo: The image file of the logo to be marked.

Height: Determines the size of the object.

X,Y: Determines the location of the bottom left corner of the graphic.

X Aspect: The X aspect will adjust the width of the object. The X aspect will not
                   affect the height of the object, it will only stretch or shrink the image in
                   the X direction. A value of 1.0 will produce a normal aspect image.

Rotate: Determines the direction of the mark. Rotation is measured in degrees in
                   the counterclockwise direction. A value of 90 will produce a mark
                   directed vertically downward.

Z Axis: The position of the Z axis for this **Mark Logo** sequence.

W Axis: The position of the W Axis.

Radius: When set to a value greater than Zero, will activate the W Axis. This will
                   allow marking around a part. That value will be the radius of the part.

When all the information has been entered, click **OK**. The logo will appear on the screen
with the specified parameters.

SETTING THE SPEED AND TIMING

Setting the speed allows you to vary the depth and thickness of each mark. The faster the speed, the shallower and thinner the mark. When you receive your StyleWrite program, the speed will be set at 500 steps/sec. Setting the timing of the stylus introduces a delay between when the stylus is energized and begins to move, and also when the stylus is de-energized and jumps to the next character. The timing can also be set specifically for dot dwell functions such as marking dot matrix fonts.

TO SET THE SPEED:

1. Click **Setup** and select **Speed** from the drop down menu. The **Speed** dialogue box will appear.
2. Set the desired values in the various fields by clicking and dragging the cursor over the bars from left to right.
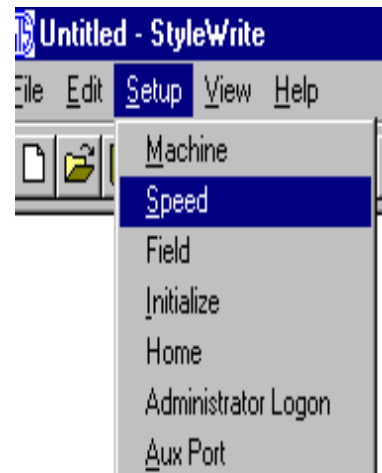
Click and drag the bars using the mouse.
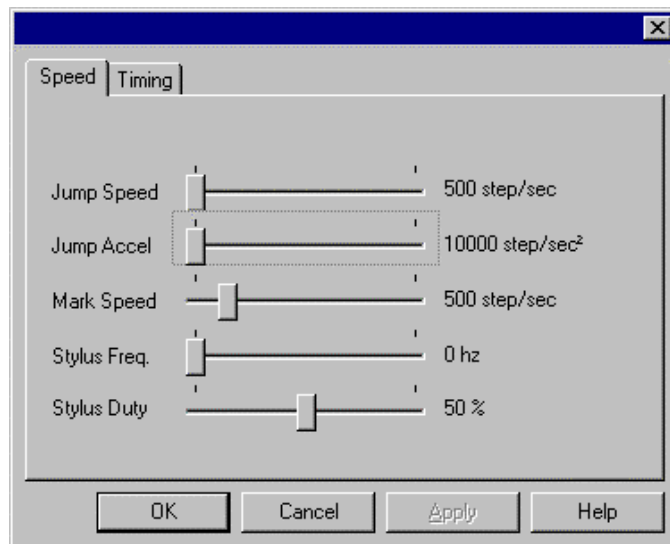
1. Click **Setup** and select **Speed** from the drop down menu. The **Speed** dialogue box will appear.

2. From the **Speed** dialogue box, click **Timing** in the upper left hand corner of the dialogue box. The **Timing** portion of the **Speed** dialogue box will be displayed.

3. Enter the desired values into the various parameters of the **Timing** dialogue box.
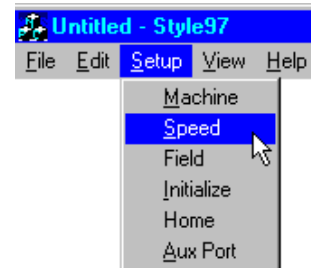
Click **Timing** to view the **Timing** portion of the **Speed** dialogue box.
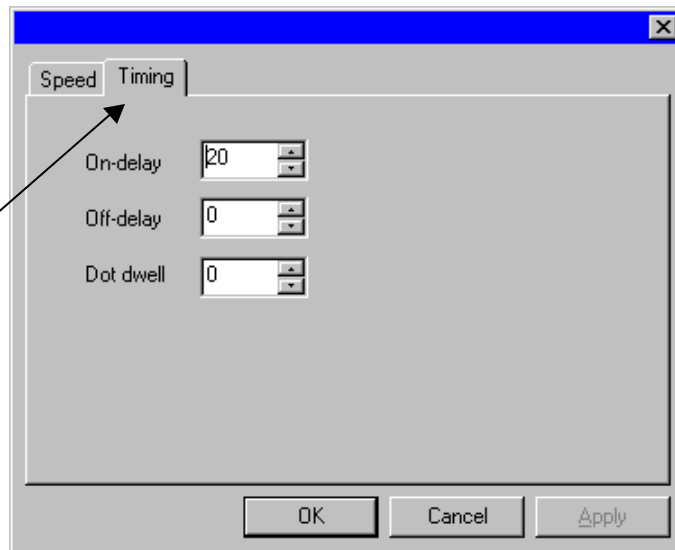
From the **Speed** dialogue box, there are a number of fields that may be selected. Explanations for each field are provided below.

On-delay   Introduces a delay between when the stylus is energized and when the stylus begins to move. If the **On-delay** is too short, the beginning portion of the character may be missing. If it is too long, there will be a feathering at the beginning of the character. The units are in milliseconds.

Off-delay   Introduces a delay between when the stylus is de-energized and when the stylus jumps to the next character. If the **Off-delay** is too short, the mark trails the next character. If it is too long, there will be a loss of cycle time. The units are in milliseconds.

Dot Dwell   Used only for the dot matrix fonts. The **Dot Dwell** controls the amount of time spent on each dot. Increasing the time increases the depth of the dot. The units are in milliseconds.

Jump   Refers to motions when the stylus is not marking. There are three parts to jump motion. The initial movement will occur at the **Jump Speed** rate, followed by an acceleration period that will continue until the maximum rate is achieved. The **Jump Accel** determines how quickly the stylus accelerates. The units for the **Jump Speed** and **Jump Accel** rates are in steps per second on the X axis. The Y axis will be normalized to the X axis. The **Jump Speed** rate can range from 500 to 5,000 steps/sec. The **Jump Accel** rate can range from 10,000 to 30,000 steps/sec^2.

Mark Speed   Determines the speed of the stylus motion during the mark. The nominal value of 500 is shown in the dialogue box, but to make the mark deeper, the **Mark Speed** can be reduced. <u>Increasing the marking speed produces a shallower and less defined mark.</u> The range for **Mark Speed** is from 250 (producing a deep mark) to 2000 steps/sec (producing a very shallow mark).

Stylus Freq.   The frequency setting determines the number of times that the stylus solenoid is energized per minute. Changes to this setting allow the user to control the appearance of the mark. A lower setting will produce a mark with fewer impact points per character. The setting can be set low so that the mark almost appears to be a dot matrix font. Too high of a frequency setting causes the solenoid to stay on without oscillating. The nominal setting for the ET (Extended Throw) stylus is between 45-75 Hz. For the "standard" stroke stylus, set this value to 0 Hz.

Stylus Duty   This setting determines the time difference between the stylus solenoid energized state and the de-energized state. This setting is used in conjunction with the frequency to produce the depth and quality of the mark desired. The nominal setting for the ET stylus is between 40-70%. Typically, the frequency and duty cycle parameters are used with the "extended stroke" stylus to control the length of stroke and depth of mark. For the "standard" stroke stylus, set this value to 50%.

When the fields have been set to the desired values, click **OK**. The speed is now set to the new value. Run a marking sequence to test the new value. Try different values for the speed until the depth and thickness of the mark is acceptable for your application.

NOTE: The speed of the marking, the frequency, and the duty cycle, work in conjunction with each other. A change to one of the parameters may affect the performance of the others. These settings are somewhat subjective to the user. Different values should be tried until the type of mark desired is achieved.

The **Path** function provides a means for the operator to program the stylus to avoid striking an obstacle that may lie in its marking path. By defining a series of paths, the operator can program the stylus to maneuver about the grid, avoiding any obstructions it would normally have encountered. The **Path** function also plays a role when the Z axis is involved in a marking sequence. This function appears in the logic of the marking sequence and can be seen on the left side of a split screen. For further information about the split screen function, refer to the **Split** screen topic on page 75.

A sample of where a **Path** function might be used is shown below. Obstructions are represented by the two circles and the rectangle within the marking grid.

The stylus will follow the sequence shown by the arrows.
After marking the text, the stylus moves through the user-defined paths, and avoids the obstructions on the marking surface.

Simplex Sample Text
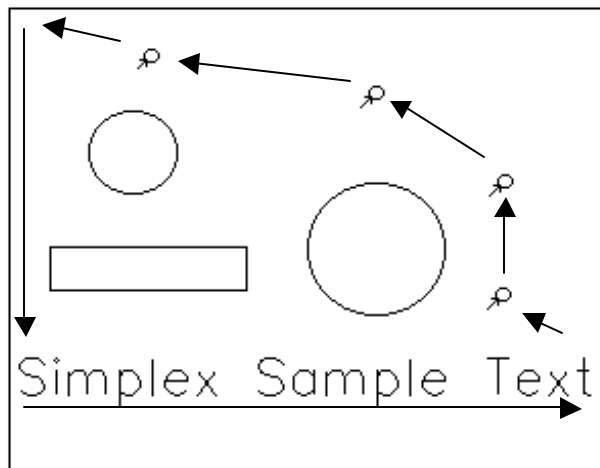
In defining a **Path** function, the **Stylus Locator** plays an important role. The **Stylus Locator** is a symbol used to signify the location of the actual stylus with respect to the on screen grid used in the StyleWrite program. Movement of this indicator on the screen corresponds to movement of the actual stylus on the STYLINER marking machine. The symbol for the **Stylus Locator** is shown below.

Stylus Locator symbol

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TO DEFINE A PATH FUNCTION:

1. With the part in place, click and drag the **Stylus Locator** to a position on the screen where the stylus path is void of any obstructions. Visually reference the movement of the stylus over the part to ensure there is no contact between the stylus and the part.

2. Position the mouse pointer directly over the **Stylus Locator** position on the grid.

3. Click the right mouse button and select **Path** from the **New** menu. A **Path** symbol will appear on the screen at the location of the **Stylus Locator**.

4. Continue plotting **Path** functions on the grid until the stylus has an unobstructed path to the **Home** (0,0) position.

New function... ▶	Background
New Variable...	Buffer
	Datafile
Cut	Delay
Copy	Get Variable
Paste	If Node
Edit	Input
	Matrix Node
Align	Mark Text
	Mark Logo
	Output
	Path
	Put Variable
	Table
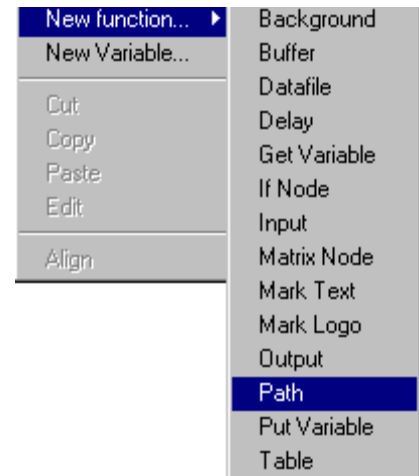
Stylus Locator symbol ⊕   **Path** symbol

Once the **Path** functions have been defined, test the settings to ensure the stylus does not strike any of the obstructions by clicking the **GO** button on the toolbar.

Note:

When inserting or editing from the **New** menu, select the function after which the new function should **follow** first, then click on the new function. If the new function must **precede** that function, start with holding down the **shift key, prior to selection**. If you select the **root** directory first, the function will be added to **the end.**

An **If Node** is a special function that can either be used, or be ignored in a marking sequence, depending upon input from the operator or other external source. If initiated, the **If Node** will cause the marking sequence to execute the functions within the **If Node** logic branch, which is a subset of the primary program logic. If the **If Node** is not initiated, the marking sequence will follow the primary program logic marking sequence. The **If Node** function appears in the logic of the marking sequence and can be seen on the left side of a split screen.

Primary program logic

The functions within the **If Node** are a subset of the primary program logic.
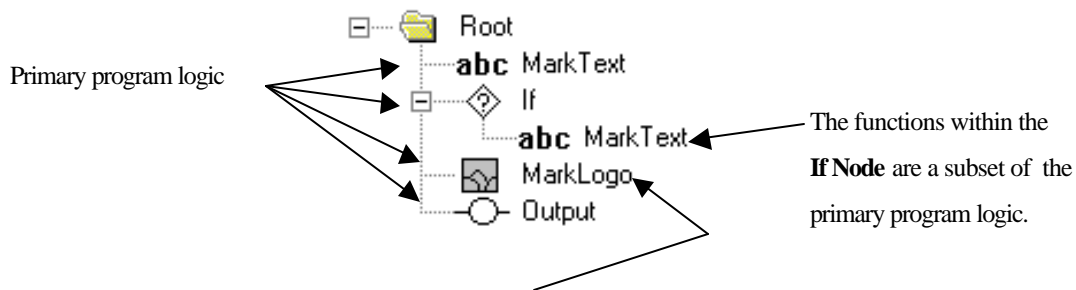
Ref. When adding a function **after**, say, Mark Logo, select Mark Logo first. To place a function **before** Mark Logo, start with **holding down the shift key** first.

Double-click **If** to prompt the **If Node** dialogue box.
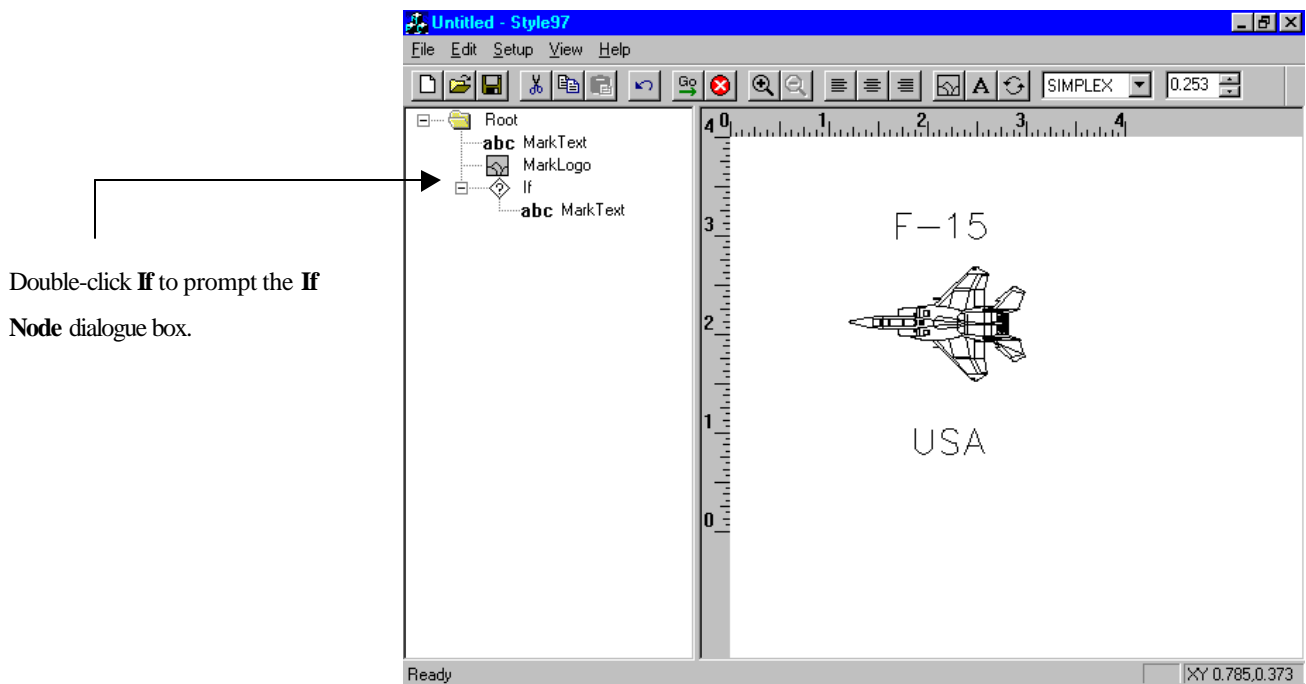
TO SET AN IF NODE:

1. Click the **right** mouse button and select **If Node** from the **New** menu.
2. Double-click **If** on the left half of the split screen. The **If Node** dialogue box will appear.
3. Select **Input** and enter the address for the desired input device into the **Parms** field.

    OR

    Select **Ask**, and enter an operator prompt into the **Parms** field.
4. Click **OK**.
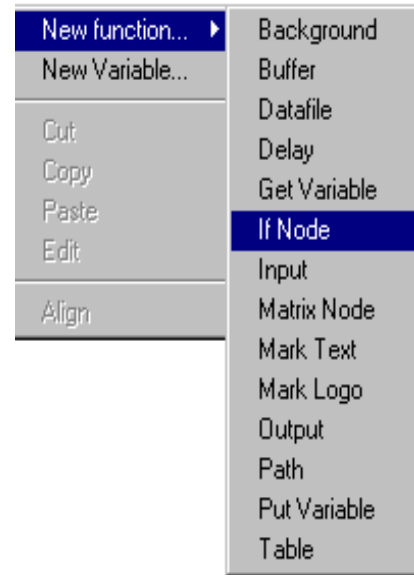
Within the **If Node** function, there are three parameters that the operator may define. For each **If Node** selection, only one of these parameters may be selected. The three parameters are **Input, Expression** and **Ask**.

When **Input** is selected from the **If Node** dialogue box, the logic within the **If Node** function will only be executed once the specified input is made. If the input device is not made, the program will continue to execute the remainder of the marking sequence.

Select **Input** and define the address for the desired
Input in the **Parms** field.

See note on next page.
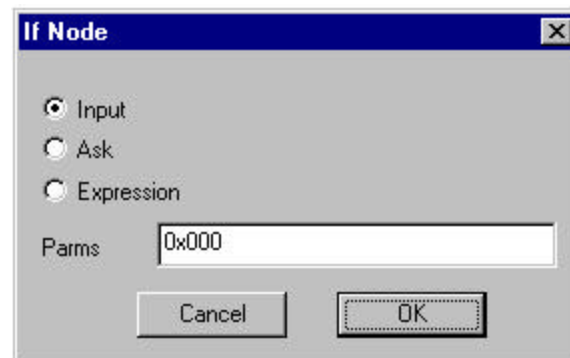
When **Ask** is selected from the **If Node** dialogue box, the logic within the **If Node** function will only be executed with the operator's approval following a prompt that will appear on the main screen during the marking sequence. The question for the prompt can be entered into the **Parms** field of the **If Node** dialogue box. When the StyleWrite program encounters the **If Node** in the program logic of the marking sequence, the prompt defined by the **If Node** will appear on the screen. This allows the operator to choose whether or not to perform the marking sequence located within the **If Node** branch of program logic.

Select **Ask** and enter a prompt into the **Parms** field.
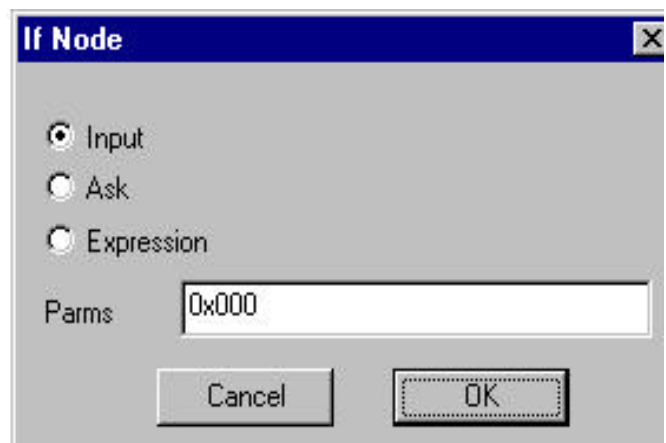
NOTE: A valid I/O address consists of a '0x' and a hexadecimal value. Refer to the schematics for the available hexadecimal values. More than one value may be used for each function, and can be (and) or (or) together. An example of each is shown below. If a value is preceded with a '+', then turning ON the input will activate the function. If a value is preceded with a '-', then turning OFF the input will activate the function. To disable a predefined function, enter a value of 0x000.

0x110 & 0x120 & 0x140 = (0x110) and (0x120) and (0x140)

0x110 | 0x120 | 0x140 = (0x110) or (0x120) or (0x140)

See Chapter 11 for further information.

CONDITIONAL EXPRESSIONS

Conditional expressions are another type of value that can be used in an IF_NODE. Conditional expressions rely on variables and operators to determine the value. An expression is evaluated each time the statement is executed. A value greater than zero will evaluate true. A value of zero or less than zero will evaluate false. Expressions must be enclosed in parentheses. Below is a list of available operators for expressions, in their order of precedence:

'^'	Power
'*'	Multiplication
'/'	Division
'+'	Addition
'-'	Subtraction
'>'	Greater than
'<'	Less than
'='	Equality
'&'	Logical and
'|'	Logical or
'!'	Invert

An example of a conditional expression is shown below.
(@count < 5)
(@count + 20)
(@count < 5 & @count>2)
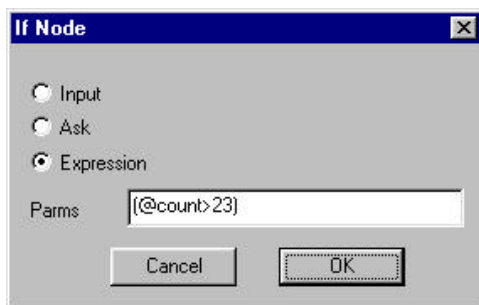

Note:
Variables cannot be changed using the above symbols. They are used for comparison logic only.

The **Output** function can be used to trigger a light indicator, turn on a clamping device, or initiate any number of other operations as the result of an action by the marking sequence. The **Output** can be triggered after a particular mark, by placing the **Output** function after the mark in the logic of the marking sequence, as seen on the split screen shown below.

Placing the **Output** function after a mark will trigger an output such as an indicator light, clamping device, etc.
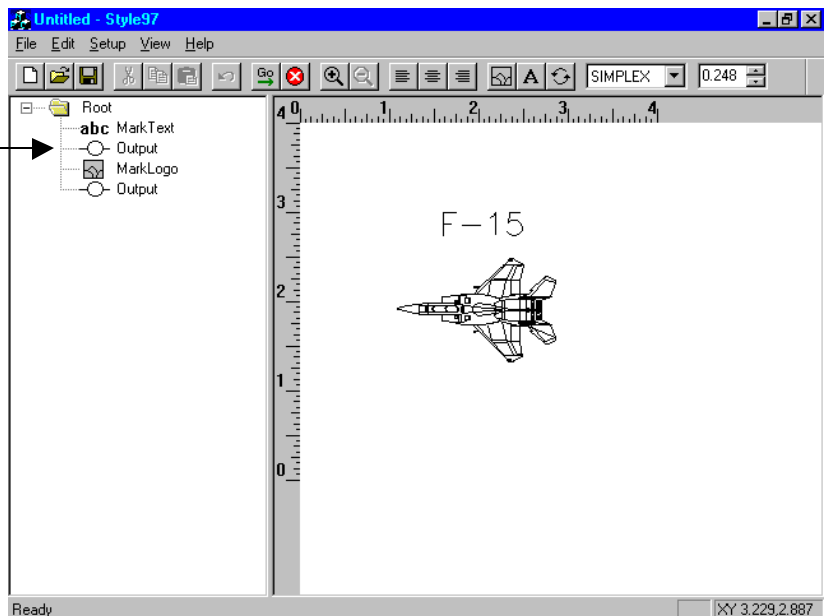
TO SET THE OUTPUT FUNCTION:

1. Click the **right** mouse button and select **Output** from the **New** menu.
2. Double-click **Output** on the left half of the split screen. The **Output** dialogue box will appear.
4. Enter the address for the desired output into the **Output** field.
4. Click **OK**.

Enter desired **Output** address.

The specified address is set to trigger an output when the mark prior to the output in the program logic has been made.

The output function may be used to turn off an output. This is done using the – minus sign, instead of the + plus sign, as shown above.

By selecting Delay, a timer is placed in the sequence, to allow the input to remain on, for a minimum amount of time. This stops any further processing of the file, until "timed out."

The **Input** function is used to trigger a marking sequence in response to an external stimulus input device such as a push button, part locator, etc.   In order to initiate a marking sequence, either the **GO** button on the main screen of StyleWrite must be selected, or input address in the predefined menu must be made. The **Input** function appears in the logic of the marking sequence and can be seen on the left side of a split screen. A sample screen is shown below.

By placing an **Input** function prior to the **Mark Logo** function, the **Mark Logo** sequence will not be initiated until the input is made.
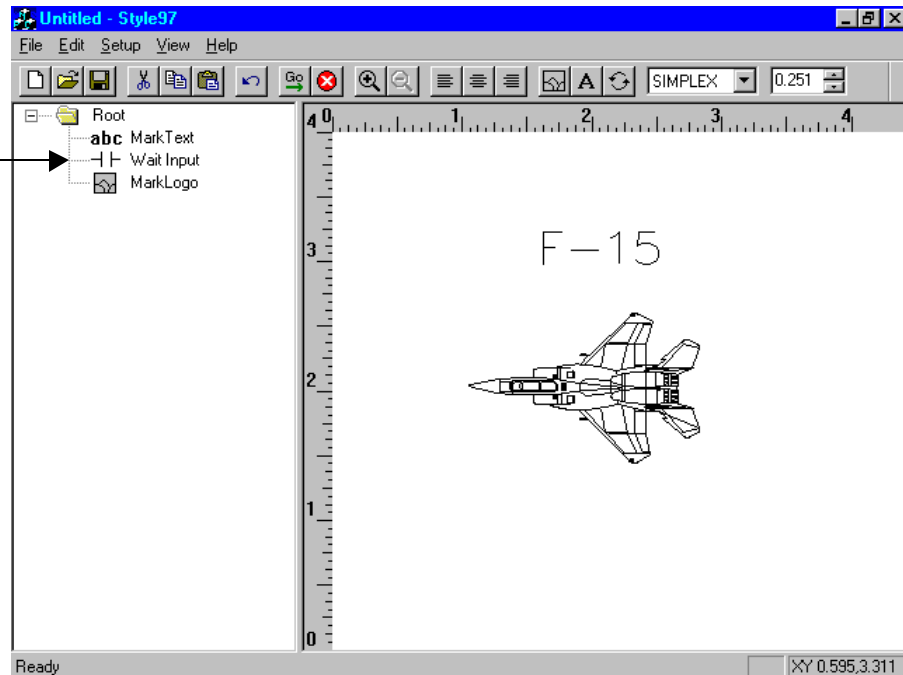
TO SET THE INPUT FUNCTION:

1. Click the **right** mouse button and select **Input**
    from the **New** menu.
2. Double-click **Wait Input** on the left half of the
    split screen. The **Input** dialogue box will appear.
3. Enter the address for the desired input into the **Input**
    field.
4. Click **OK**.

New function... ▶	Background
New Variable...	Buffer
	Datafile
Cut	Delay
Copy	Get Variable
Paste	If Node
Edit	**Input**
	Matrix Node
Align	Mark Text
	Mark Logo
	Output

Input Dialogue Box

Enter desired **Input** address.
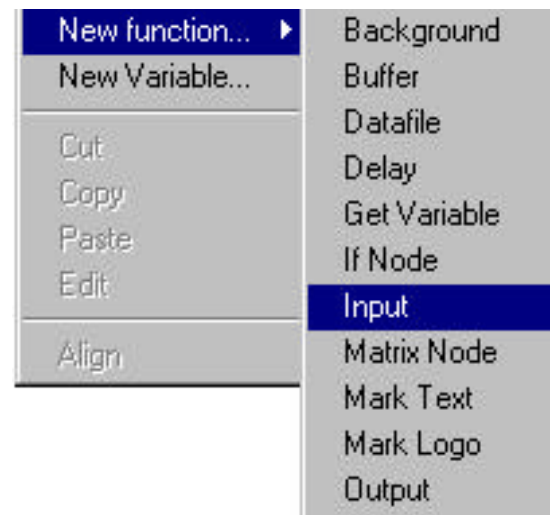
Input	✕
	OK
	Cancel
Input	+0x000
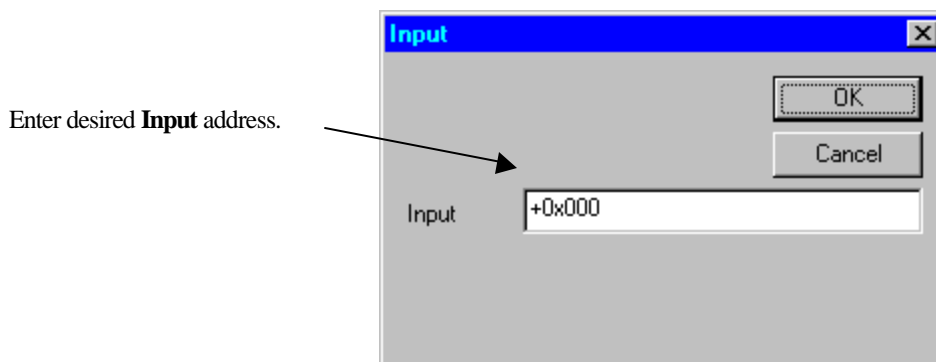
The specified address is set to trigger a mark when the input device has been made.

NOTE: A valid I/O address consists of a '0x' and a hexadecimal value. Refer to the
schematics for the available hexadecimal values. If a value is preceded with a
'+', then turning ON the input will activate the function. If a value is preceded
with a '-', then turning OFF the input will activate the function. To disable a
predefined function, enter a value of 0x000.

SETTING A DELAY

The **Delay** function is used to provide a time buffer within a marking sequence.   The time delay can be placed in the logic of the marking sequence to allow the operator to rotate a part, clamp a fixture, or perform other duties that would require the stylus to be stopped.
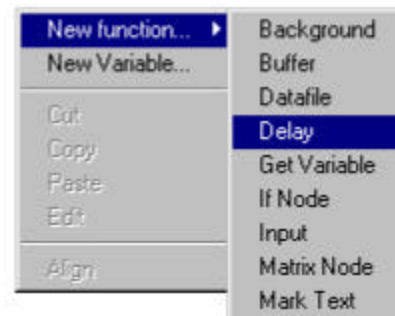
TO SET A DELAY:

1. Click the **right** mouse button and select **Delay** from the **New** menu.
2. Double-click **Delay** on the left half of the split screen. The **Delay** dialogue box will appear.
3. Enter the desired time of delay into the **Seconds** field.
4. Click **OK**.

The marking sequence following the **Delay** function in the program logic will be executed after the time period specified has elapsed.

Delay Dialogue Box

Enter the desired time delay into the **Seconds** field.
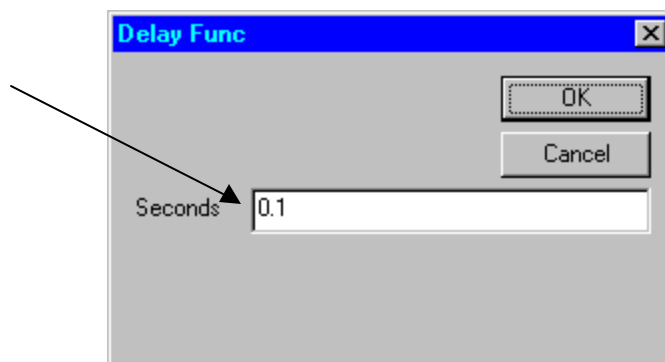
ACTIVATING A MARKING SEQUENCE

After a marking program sequence has been defined by the user, the part can then be marked. In order to initiate a marking sequence, either the **GO** button on the main screen of StyleWrite must be selected, or the user predefined input address must be made.

TO ACTIVATE A MARKING SEQUENCE:

1. Click the **GO** button in the toolbar,

    or actuate the input device hooked up to the user defined address.

The STYLINER will begin marking the part upon activation of the **GO** button. If the 0x110 input has been pre defined for program startup, actuating this input will also activate the stylus and commence marking. The 0x110 address is often linked to a push button near the machine to initiate the marking operation.

ABORTING A MARKING SEQUENCE

If for any reason, the marking sequence needs to be aborted, the **STOP** button can be activated to abort the mark. The mark is also aborted when the E-Stop input is made.

TO ABORT A MARKING SEQUENCE:

1. Click the **STOP** button in the toolbar.

   At this point a dialogue box will appear on the screen providing three user options as depicted below.
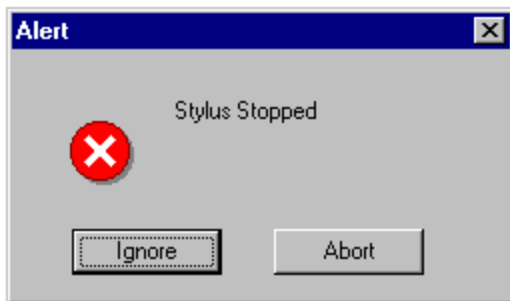
2. Select the desired option, and the program will abort the marking sequence, try marking again, or ignore the stop request per operator selection.

BUFFERS

Buffers are used to provide a temporary storage location for marking data that is received in advance of when it is required to be used. The buffer data is kept on the hard drive at all times, so the buffer is non-volatile.

A buffer preview screen is available that displays the previous, current and next records of the buffer, as well as buttons for advancing, reversing and manually inserting records in the buffer. This screen is accessed by clicking the *view* button and then the *buffer* buttons in the main menu bar.
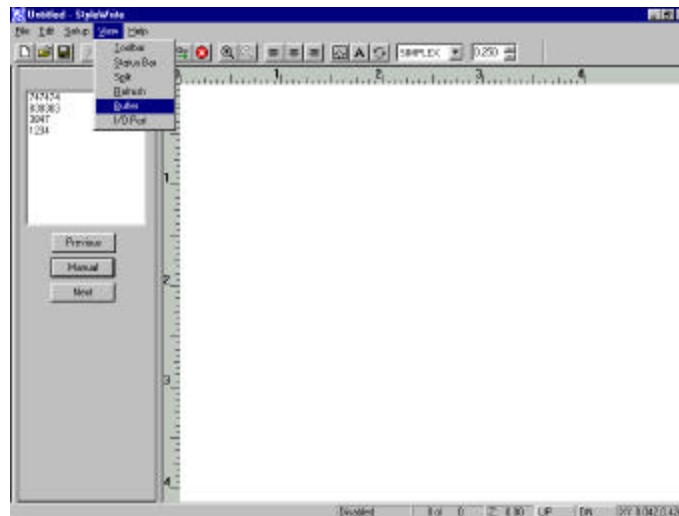
The buffer can be edited by clicking on the *Edit* and then *Buffer* in the main menu. In this window you can insert, delete and define records.
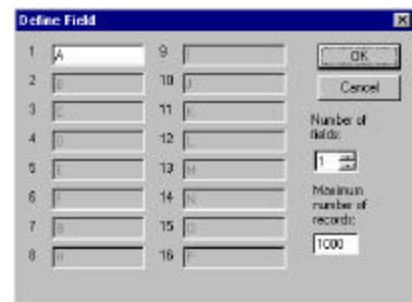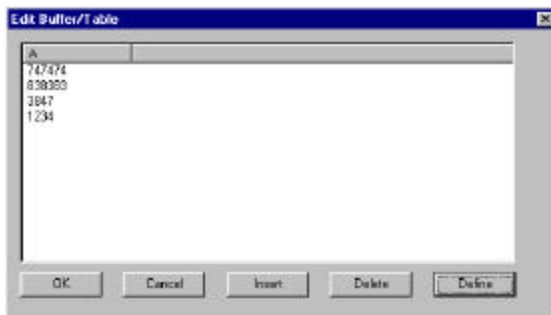
In the *Define Field* window you can set the amount of fields, the maximum number of records and assign the different variables for the buffer fields.

Get Put Buffer

The buffer is a sequence of information. This command allows you to get and put data in many different ways. This command can run in the program sequence or in the background.

Get Top: Gets the data from the top of the list.

Get Bottom: Gets the data from the bottom of the list.

Put top: Puts the data at the top of the list.

Put Bottom: Puts the data at the bottom of the list

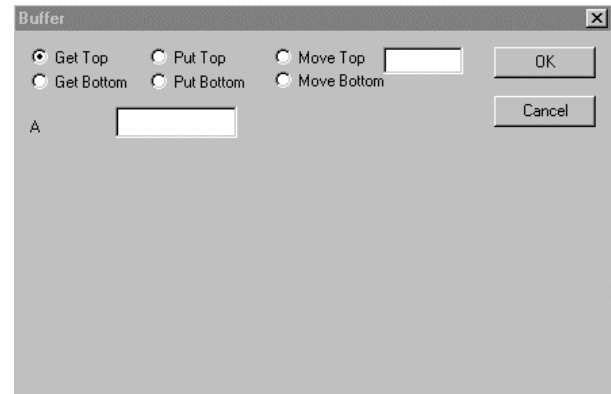**Move Top**: Moves the pointer toward the top of the list by a predefined value**.**

Move Bottom: Moves the pointer toward the bottom of the list by a predefined value.

TABLES

Tables are used to provide a miniature database for handling marking information. They can hold up to sixteen fields of information that can be looked up every time a getvar command is executed and a match is found in the index field.

The first field of a record is always the index. The additional fields are used to hold associated data. Just like buffers, there are no restrictions on the field's names since they are used only for display purposes. When a task is used to search a table, it will search for an exact match of the data supplied to the first field of each record. When a match is found, the remainder of the fields is assigned the remaining variable fields. Information can be placed (put) or obtained (get) from a table function.
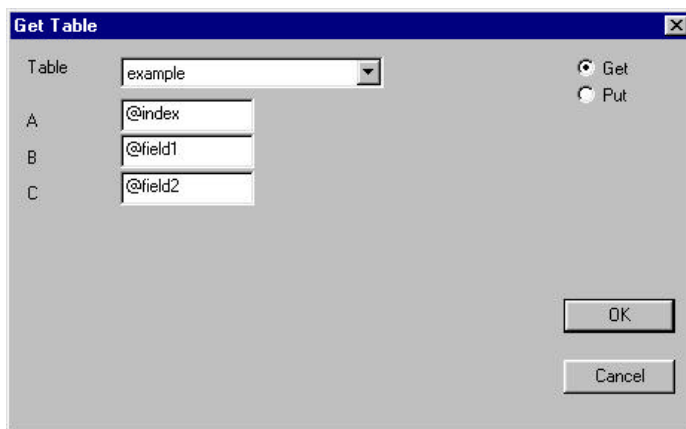
See the Appendix I   for implementation information.

VARIABLES

Variables are used when it is desirable to have something change during the operation of the program. For instance, suppose you wanted to mark a part with a part number and a serial number. The part number could remain constant, but the serial number must change for each part. In this case, you would need a variable to represent the serial number.

A variable can have a maximum amount of 30 characters. It must only contain characters with ASCII codes from 1 to 127 because the eighth bit is always made zero. The variables are terminated within the program with an ASCII zero. There are 100 storage locations available to be used as either strings or variables.
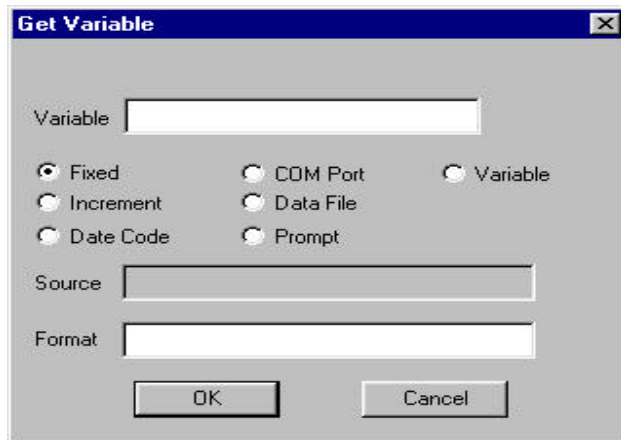
The information stored in a variable can represent nearly anything you want it to. It can hold the information you want to mark or the information on how to mark. For example, one variable could hold the number to be marked and a different variable could hold the height of characters to be marked. Variables can be used for almost any field within a function.

To use a variable, you need only reference the variable in the function by including the name of the variable preceded by the '@' character. For example, instead of entering the characters to be marked "1234" you enter the variable name @NUM. You can also select or create a new variable by right clicking by a field and selecting one from the *select variable* window.
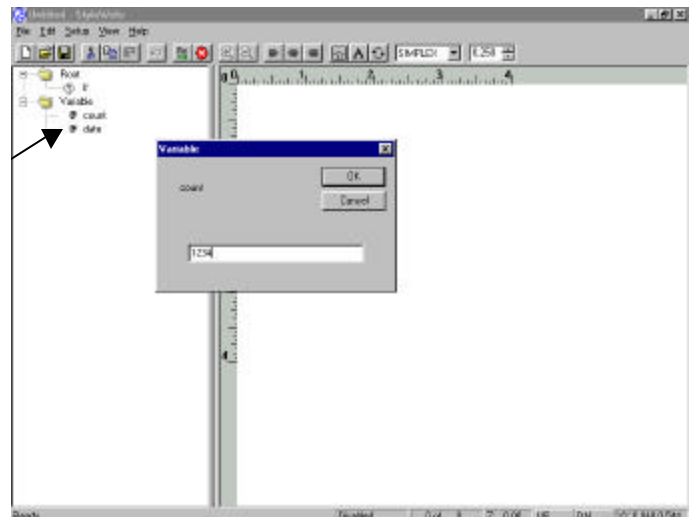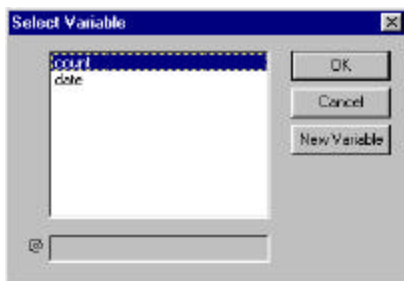
It is possible to change the value of a variable by clicking on the variable name in the split screen.

Get Variable

Fixed:	This will assign a value to the variable (the value is placed in the Format field).
Increment:	This will increment a variable by the value in the format box (it can also decrease a number by adding a minus in front of the value).
Date code:	Will look at the date or time of the computer's clock and assign that value to the variable depending on the format in the format field (see page 17 for more information on formats and date code).
COM port:	Gets string value from a select COM port. The COM port setting is in the Main menu under SETUP – AUX PORT.
Date File:	Gets information for a data file. The format field sets-up how the data is retrieved.
Prompt:	Will open a window prompt for the operator to enter information for the keyboard or a bar code reader keyboard wedge.
Variable:	This will copy variable from the source field to the variable field. Format field can be used to filter information or to do math functions.

Put Variable
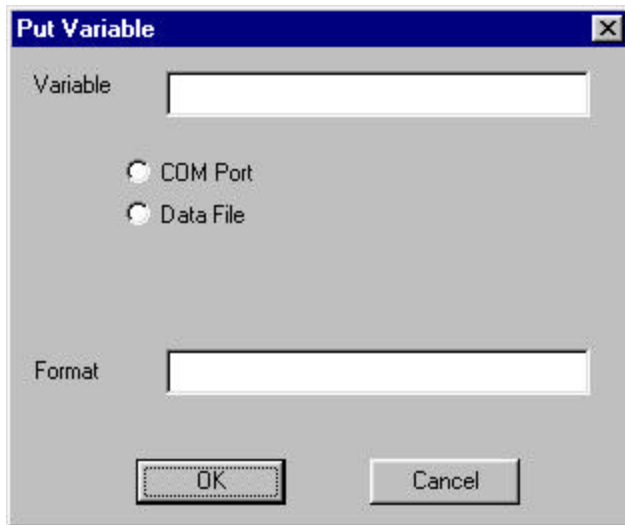
COM Port: Outputs information from a variable to a COM port. The COM port setting is in the Main menu under SETUP – AUX PORT.

Data File: Outputs information from a variable to a data file.
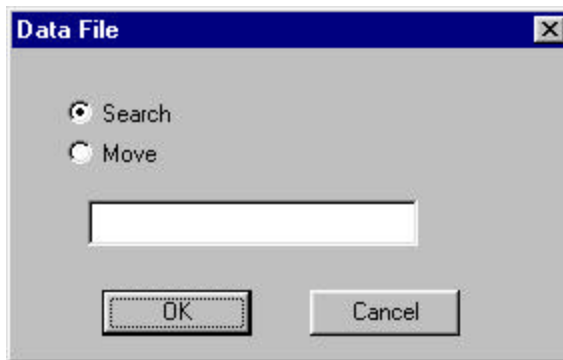
Data file

Search: Searches through a data file for a particular value of data and looks at the information that follows that value.
Move: Will move through a data file by a pre-defined value set-up in the format field.

Background

The background function allows for the unit to multi-task items, which need constant operation. For example; communications with another unit to build a table, while making a mark

Matrix Node

The matrix is a branch statement that is used to produce an array of mark text and mark logo commands.
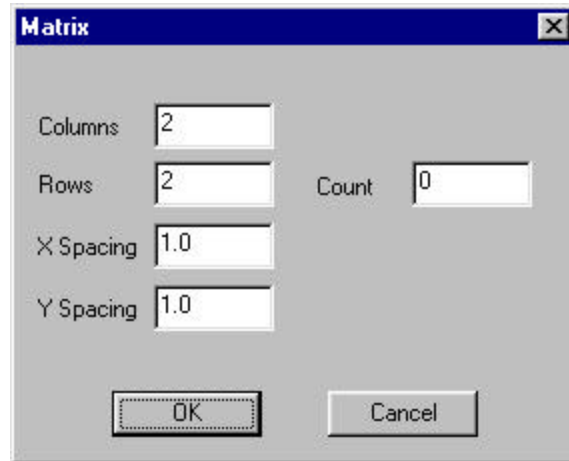
New Mark Logo Function

Rotary logo marking is now part of the mark logo command

Security

Operator security functions can be controlled by left clicking on Setup, then Administrative Logon. An entry box for the password function will appear. If no password is set, left clicking on Ok will allow for editing in the administrator mode. If an administrator password has been entered, this password must be re-entered for any further security privileges.
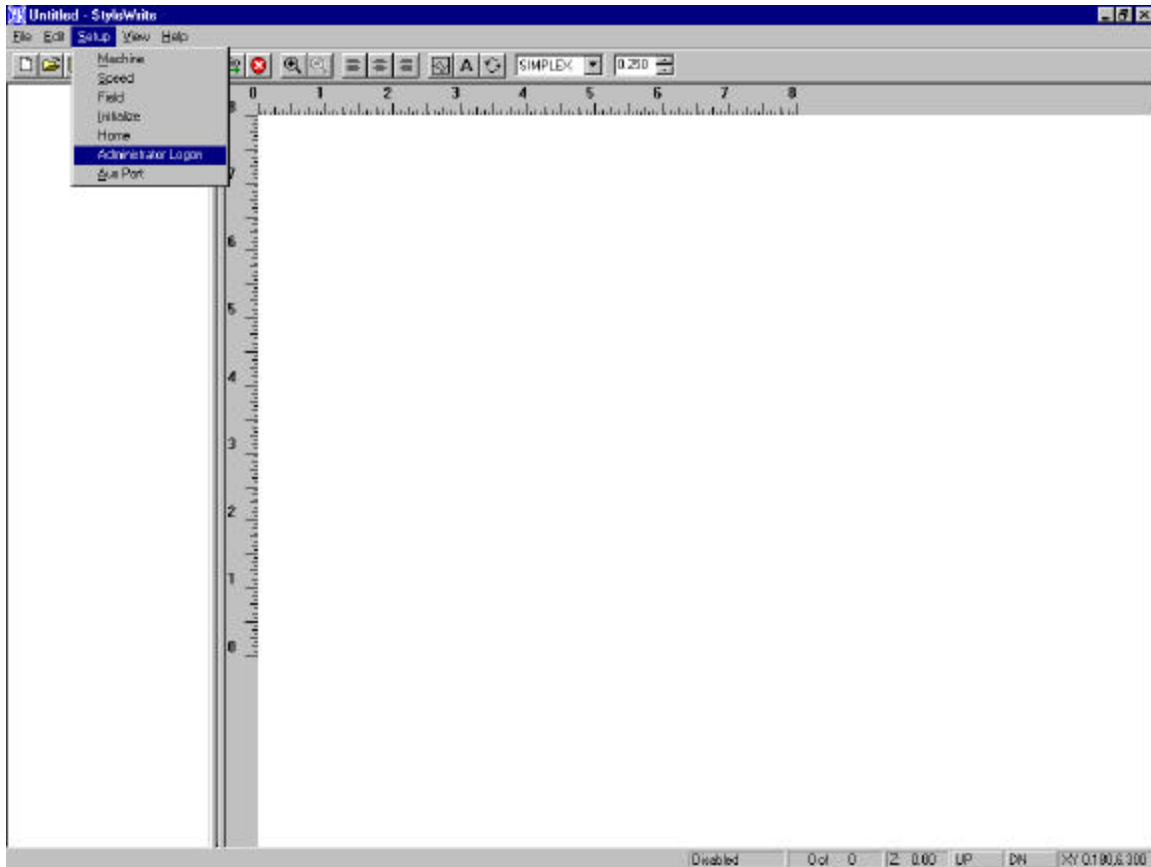
After clicking ok a new selection Administrator is available from the pull down menu.

Left clicking on the Administrator button will allow the selection of the following menu options:
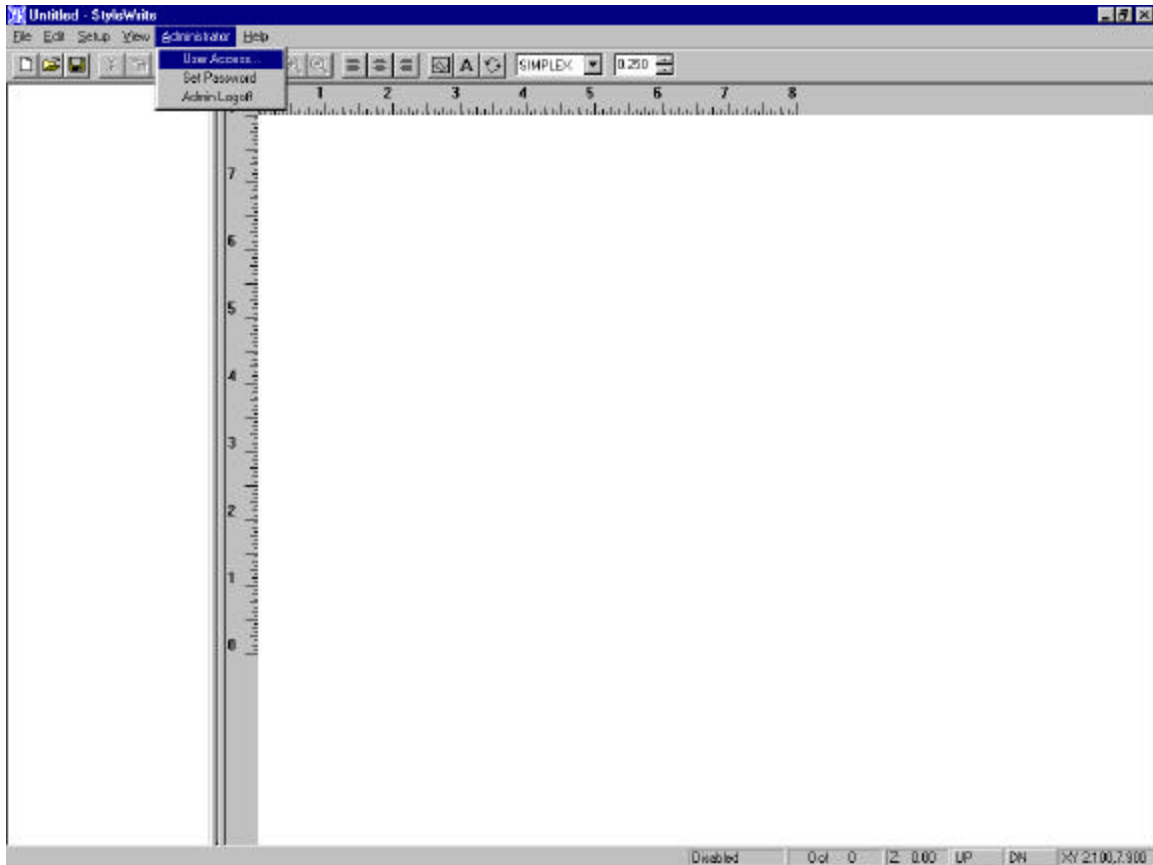
User Access: This brings up a selection box called Security. (example shown on next page)

Set Password :   This brings up a selection box where the password is entered and verified.

Admin logoff :   This removes the selection from the main menu, and prevents any further changes to the security level for the operator.

The security box allows the access to the functions to be blocked when not in the administrator mode. When a checkmark is present the function will be excluded from the operators privileges. When a function has a checkmark it will appear in gray and cannot be selected (highlighted).
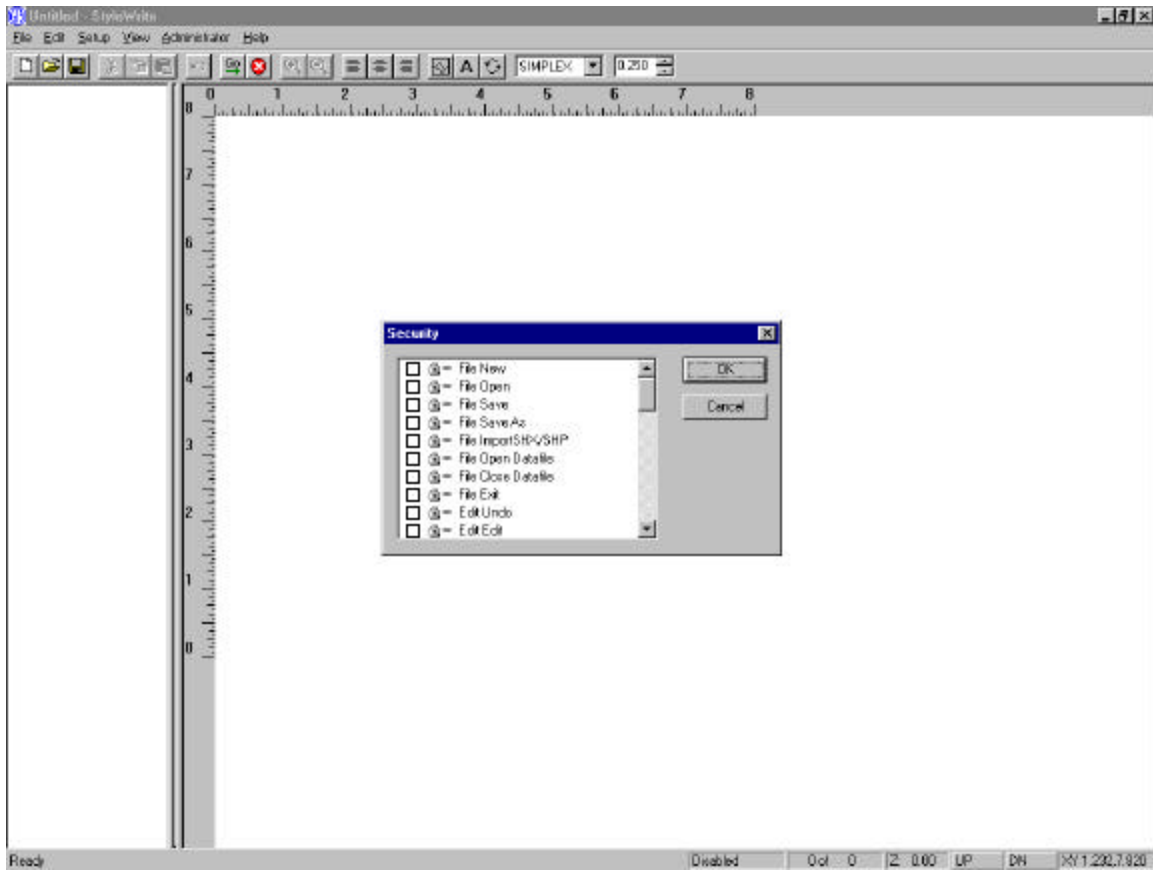
Chapter 3

THE GRAPHIC EDITOR SCREEN EDITOR

The graphics screen editor provides an easy way to change a mark interactively by quickly trying alternatives. Text and graphics can be edited and manipulated on the screen and the results can be viewed prior to executing the marking sequence.

EDITING THE GRAPHICS WITH THE MOUSE

Editing graphics on the graphics screen is a quick point and click operation with the use of the mouse. Objects can be dragged and dropped to change their position on the screen. Objects can also be scaled, stretched and rotated . In addition, there is a zoom function that allows the user to view details of the graphic.

In the graphics editor, a graphic or text string is selected for an operation by placing the mouse cursor over the object and clicking the left mouse button. This draws a selection box around the object as shown in Figure 3.1. Clicking the left mouse button in a location outside of the selection box will deselect the object, and the selection box will disappear. Additional objects are selected in the same manner.

Figure 3.1: Dragon Logo

Selection Box
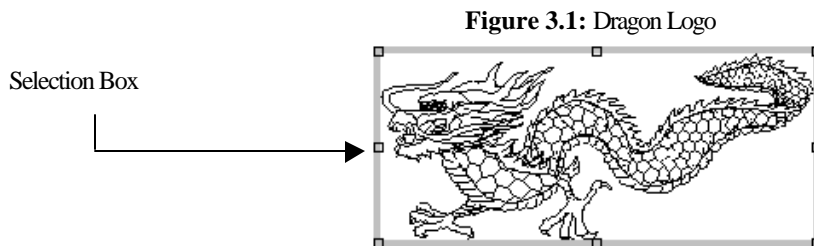
Once all of the elements of the mark have been established, you may wish to arrange the elements to mark at a particular location. Positioning elements in the graphics screen editor is easily done using the mouse.

TO POSITION THE MARK:

1. Click on the object to be edited such that a selection box is drawn around the object.
2. Double-click the object, and the **Mark Logo** dialogue box will appear as shown.

Mark Logo	☒
Logo	Dragon ▼	OK
Height 1.001	X Aspect 1.001	Cancel
X 0.0	W 0.0	
Y 0.0	Z 0.0	
Rotate 0.0	Radius 0.0	
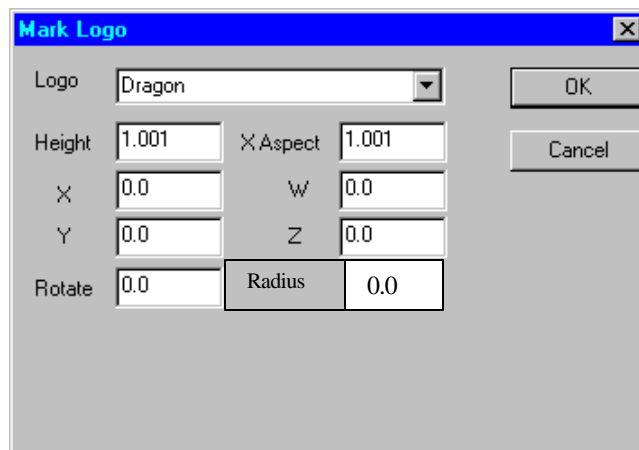
From the **Mark Logo** dialogue box, there are a number of fields that may be selected. Explanations of each field are provided below.

Logo: Determines the logo to be used for the mark.

Height: Determines the size of the logo.

X,Y: The values specified in the X and Y fields represent the location of the lower left hand corner of the logo.

X Aspect: The X aspect is used to adjust the width of the logo. A value of 1.0 will produce a normal aspect logo. A value of 2.0 will produce a logo twice the normal width. A value of –1.0 will produce reverse characters.

Rotate: Determines the direction of the mark. Rotation is measured in degrees in the counterclockwise direction. A value of 90 will produce a mark directed vertically downward.

Z Axis: The position of the Z axis for the **Mark Logo** sequence.

When all the information has been entered, click **OK**. The logo will appear on the screen with the specified parameters.

TO MOVE AN OBJECT:

1. Click and hold on the object to be moved such that a selection box is drawn around the object as shown in Figure 3.2.

2. Drag the box to the desired location on the screen and release the mouse button.

Figure 3.2: Dragon Logo
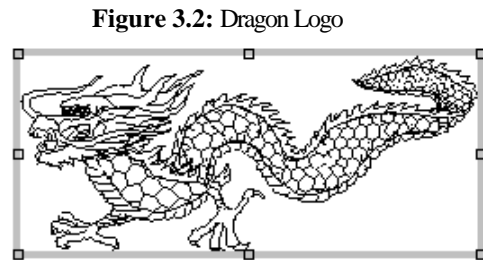
At this point, the object will be dropped into the new location.

Objects can be grouped together on the screen in order to be relocated within the marking field.

TO GROUP OBJECTS:

1. Click and hold the left mouse button.
2. Drag the cursor such that a dotted box appears, mirroring the movement of the cursor on the screen. The dotted box is shown below in Figure 3.3.
3. Drag the box so that it encompasses the objects that are to be grouped together, and release the left mouse button. The objects selected will now have selection boxes around them as seen in Figure 3.4.
4. Click on any of the objects that have a selection box, and drag the selection to the desired position. Each of the objects highlighted with a selection box will be moved accordingly.

Figure 3.3: Grouping Objects on the Screen

Figure 3.4: Moving Grouped Objects
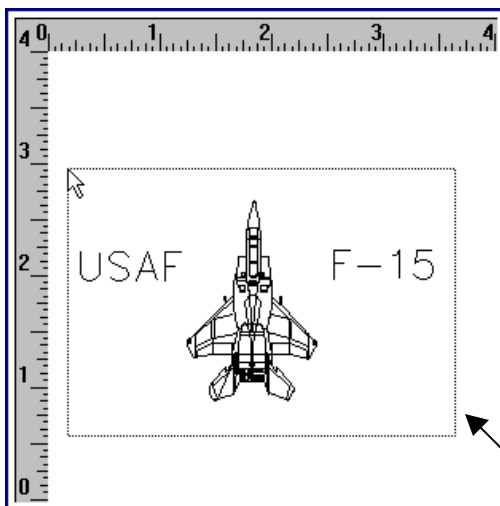
When clicking the left mouse button, a dotted box can be dragged to encompass the objects to be grouped.
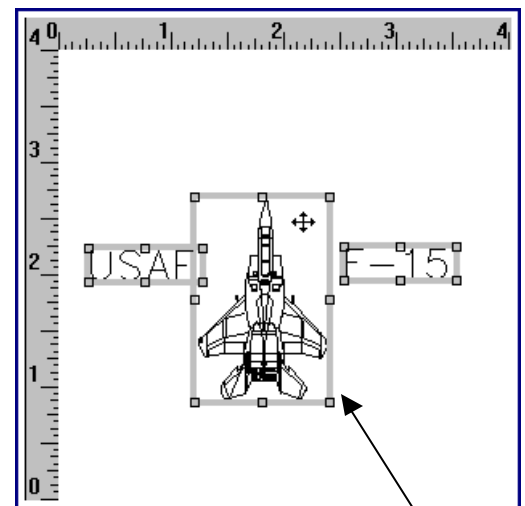
Objects grouped on the screen together will be highlighted with a selection box.

TO SCALE AN OBJECT USING THE MARK LOGO SCREEN:

1. Click on the object to be scaled such that a
   selection box is drawn around the object
   as shown in Figure 3.5.
2. Double click the object, and the **Mark Logo**
   dialogue box will appear as shown below.

Figure 3.5: Dragon Logo
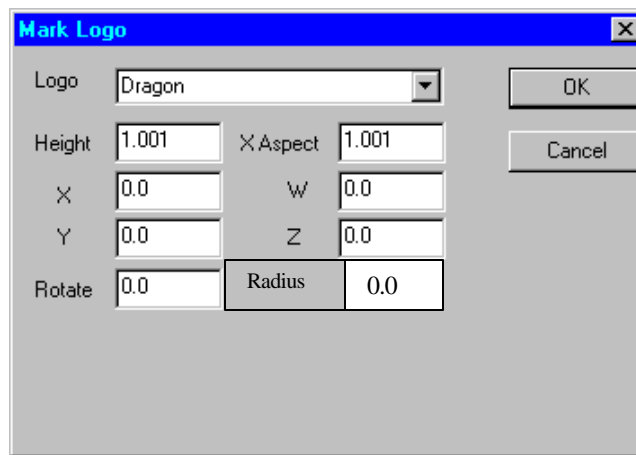
3. Enter a value into the **Height** parameter.

The value entered into the height parameter will scale the object in proportion to the
original size of the object. A value of 2.0 produces an object that is scaled to twice the
size of the original. A value of 0.5 produces an object that is scaled to half the size of the
original. A negative value, such as –1.0 inverts the object on the screen.

When all the information has been entered, click **OK**. The logo will appear on the screen
with the specified parameters.

TO SCALE AN OBJECT USING THE MOUSE CURSOR:

1. Click on the object to be scaled such that a
   selection box is drawn around the object
   as shown in Figure 3.6.
2. Position the mouse cursor above one of the
   four corners of the selection box such that the
   cursor changes form as shown below.

Figure 3.6: Dragon Logo
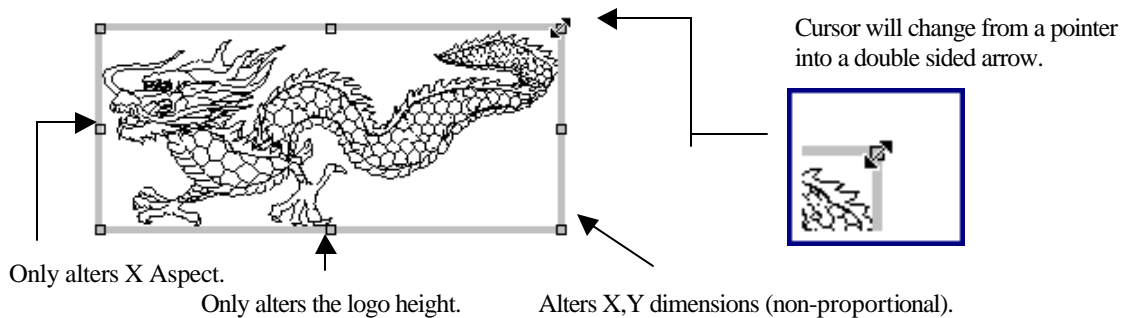
Cursor will change from a pointer
into a double sided arrow.

Only alters X Aspect.

Only alters the logo height.

Alters X,Y dimensions (non-proportional).

3. Click and drag with the new cursor to scale the object to the desired size. The object
   will be redrawn to the new scale.

Before scaling

After scaling
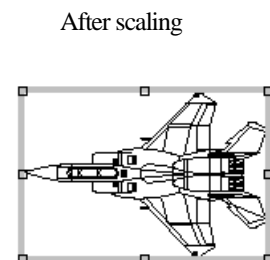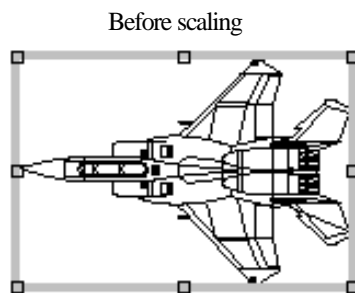
Rotating an object can be done in one of two ways. The object may be rotated in 15 degree increments by using the rotate button, or it can be rotated any desired amount by using the **Mark Logo** dialogue box.

TO ROTATE AN OBJECT USING THE ROTATE BUTTON:

1. Click on the object to be rotated such that a selection box is drawn around the object as shown in Figure 3.7.
2. Click the **Rotate** button.

Figure 3.7: F-15 Logo
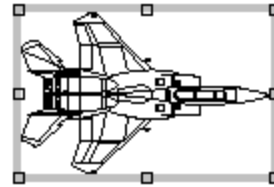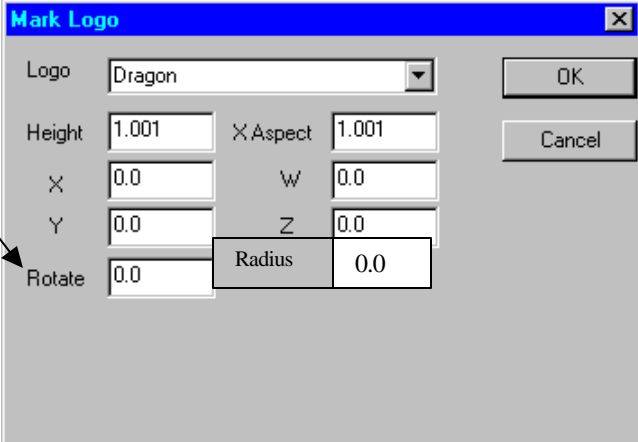
Each click will rotate the object in 15 degree increments in the counterclockwise direction. Pressing the **SHIFT** button on the keyboard while clicking, will rotate the object in the clockwise direction.

15 degree increments
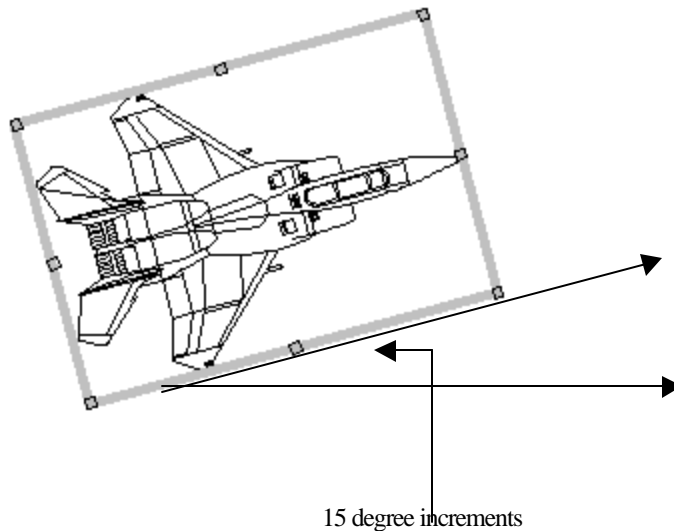
TO ROTATE AN OBJECT USING THE MARK LOGO DIALOGUE BOX:

1. Double-click the object to be rotated such that
    the **Mark Logo** dialogue box appears as shown below.

Rotate field is incremented in degrees.

```
Mark Logo                                    ×

Logo     Dragon                    ▼        OK

Height   1.001      X Aspect  1.001        Cancel

  X      0.0            W      0.0

  Y      0.0            Z      0.0

Rotate   0.0        Radius        0.0
```

2. Enter a value for the number of degrees for the object to be rotated.

When all the information has been entered, click **OK**. The object will be displayed on
the screen rotated to the specified angle.

SETTING THE X ASPECT OF AN OBJECT

TO SET THE X ASPECT OF AN OBJECT:

1. Click on the object to be edited such that a selection box is drawn around the object.

2. Double-click the object such that the **Mark Logo** dialogue box appears as shown below.
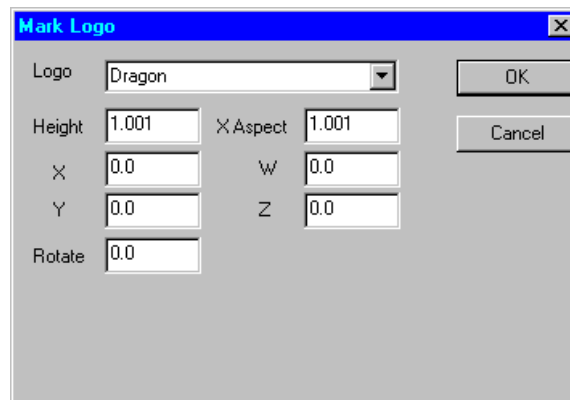
3. Enter a value into the **X Aspect** field, or drag the mouse on the sides of the selection box as indicated in the figures below. A value of 1.0 will produce a normal aspect logo. A value of 2.0 will produce a logo twice the normal width.

When all the information has been entered, click **OK**. The object will be displayed on the screen redrawn to the new scale.

Before applying X Aspect   After applying X Aspect

Drag to change
X Aspect.
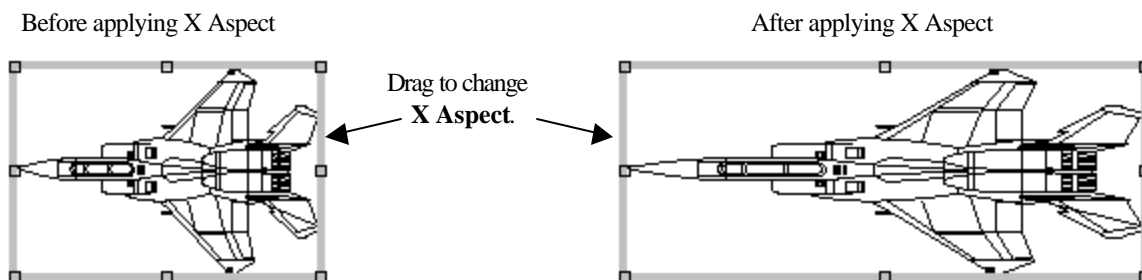
TO ZOOM THE VIEWING AREA:

1. Click the **Zoom In** button.

2. Use the sliding columns on the X and Y axes to move the viewing area.
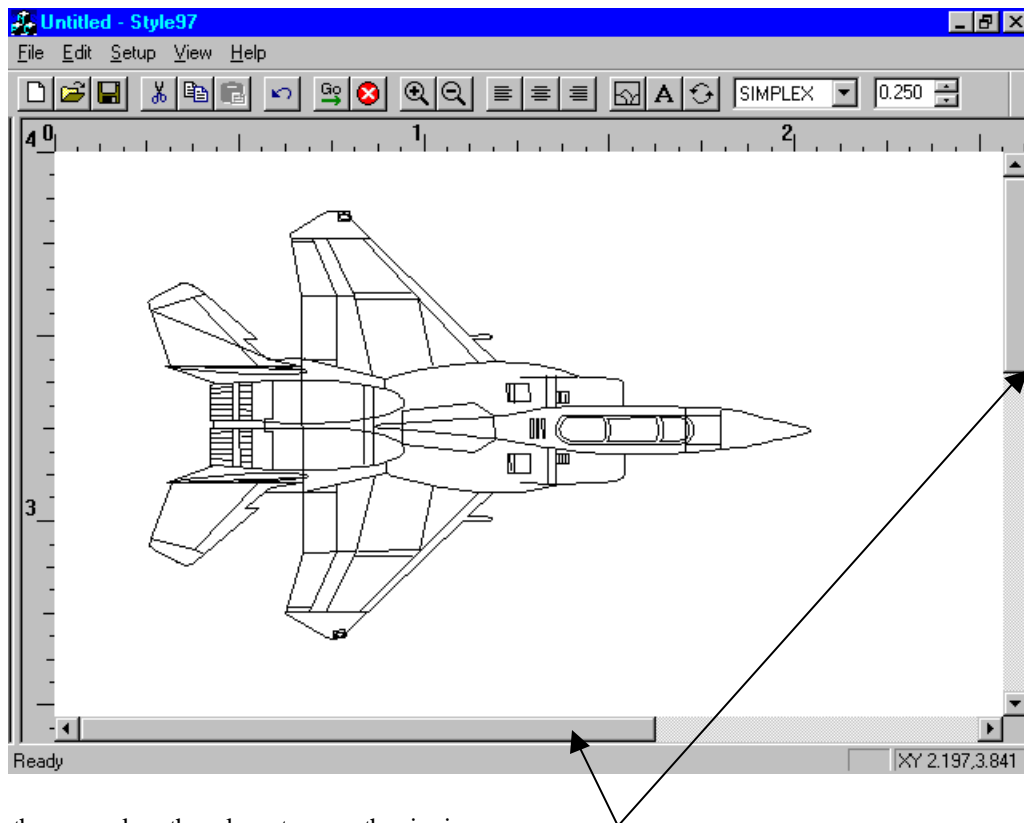
Drag the cursor along the column to move the viewing area.

3. Click the **Zoom Out** button in succession to return to the original view.
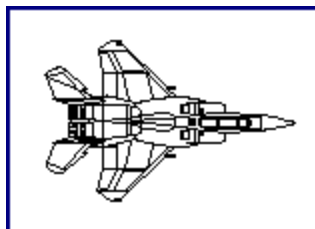
Before Zooming   After Zooming
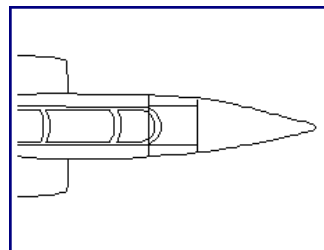
CHANGING THE FONT

TO CHANGE THE FONT TYPE:

1. Click the text to be altered such that a selection box is drawn around it.

2. Click the font scroll bar located in the toolbar. A drop down menu of available fonts will appear.

3. Select the desired font by clicking on the font name from the drop down menu.

The text will appear on the screen in the new font style.

Figure 3.8: Font Styles
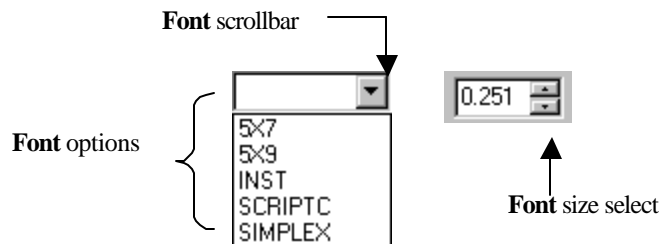
TO CHANGE THE FONT SIZE:

1. Click the text to be altered such that a selection box is drawn around the text.

2. Place the cursor over the font size select portion of the toolbar, as shown in Figure 3.8.

3. Click the up arrow to increase the size of the font.

4. Click the down arrow to decrease the size of the font.

The text will appear on the screen with the new size font. Values are in inches.

CONVERTING HPGL FILES

If you have access to AutoCAD (e.g. Acad LT, Acad13, Acad 14 or AutoSketch) system, the marking images can be developed and transferred to the StyleWrite software. The images must be plotted to a specific HPGL file, and imported into the StyleWrite program. Appendix H shows the step-by-step procedures.

When producing a drawing to be used by the StyleWrite program, there are a few guidelines to follow. The limits of the drawings should be set to the marking field size of your STYLINER (e.g. 2x3, 4x4 or 8x8 etc.) The bottom left corner should be at coordinates 0.0, 0.0. The image should be drawn in its final size.

If you are given the option of using the plotter fonts or the CAD fonts, choose the CAD fonts since the plotter fonts will only appear when you use the plotter.

Filled objects can be used, but at the expense of cycle time.

When plotting the drawing:

- The drawing should be plotted to a file.
- The scaling should be set one to one.
- Use pen 1 for marking vectors and pen 8 for non-marking vectors.
- Plot the limits of the drawings (0.0, 0.0 to 4.0, 4.0 or 8.0, 8.0).
- Select the HP 7475 plotter as the plotter type.
- The plot file must have a file extension of ".PLT".
- The file is automatically converted to a ".BIL" file, and stored in the BI directory upon opening the file in StyleWrite.

To import images from a CAD or other graphics program, they must be in the Hewlett Packard Graphics Language (HPGL) format. However, not all CAD systems will be compatible, and we only tested and recommend the AUTOCAD program.

Chapter 4

MAIN SCREEN

The StyleWrite software consists of drop down menus that provide access to the various functions that control the stylus marking sequence. When one of the categories in the main menu is selected, a drop down menu for that category appears. Function selection is made form this drop down menu.

Minimize screen

StyleWrite Main Screen

Exit

Hide screen

Title Bar

Menu Bar

Toolbar

Untitled - Style97

File   Edit   Setup   View   Help

SIMPLEX   0.250

Reference grid for positioning shows entire marking field.

Ready

XY 0.857,3.931

Describes the function of a toolbar button, and the status of the stylus.

Indicates position of the cursor on the grid.

Status Bar
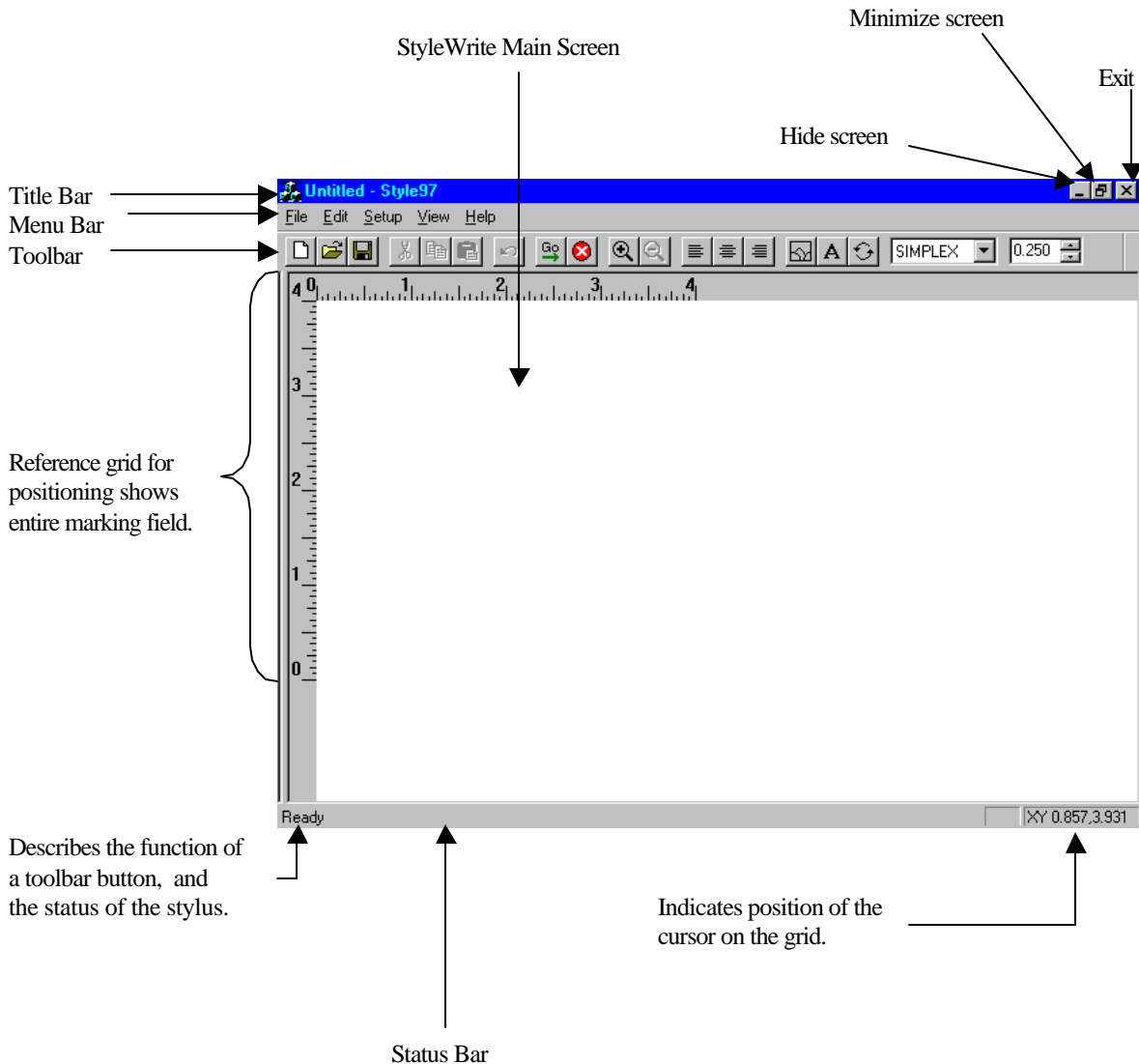
MENU BAR

The user controls the operation of the StyleWrite program by making selections from the menus. The main headings are visible as a bar across the upper portion of the screen. As a selection is made from the main heading menu, a drop down menu appears. Further selection from the drop down menu either performs a function directly, or opens a dialogue box to define parameters for the desired function.

The menu bar contains the following drop down menus:
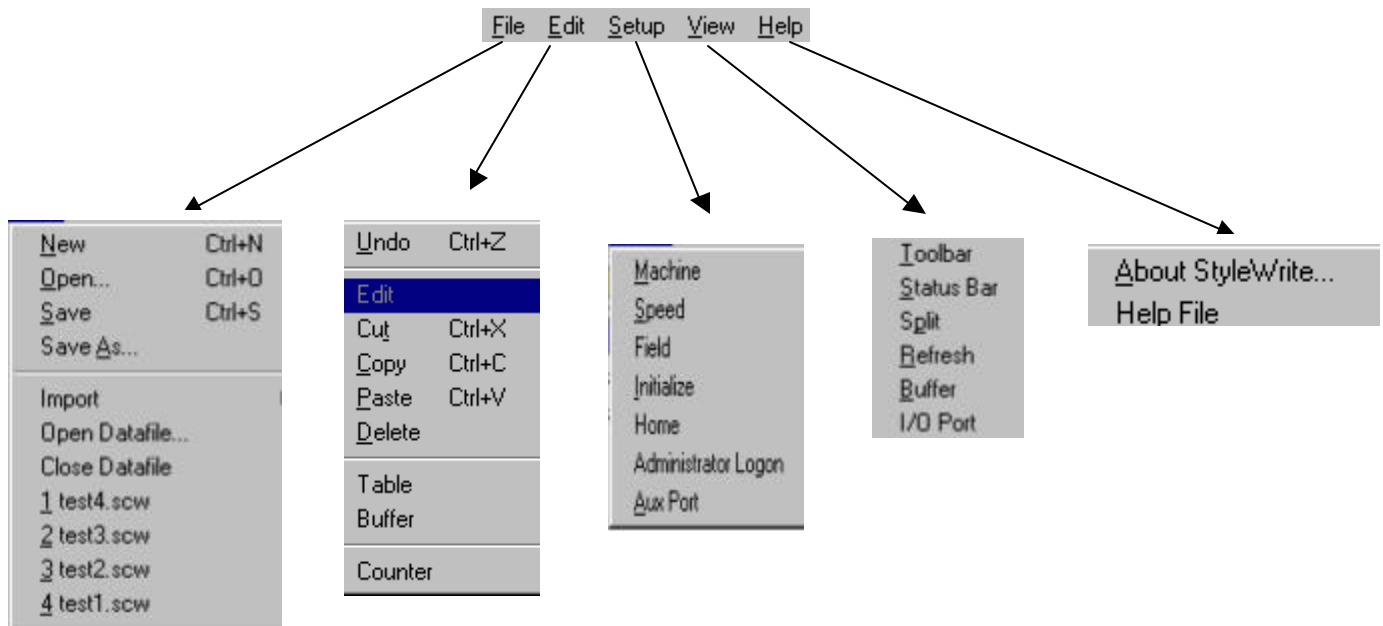
Viewing the drop down menu from a main heading category is accomplished by clicking the mouse cursor on the heading name. From the drop down menu, a further function selection can be made. There is only one level of drop down menus in StyleWrite. Therefore, all the available functions are shown when the drop down menu appears.

Activating a function will either execute that function immediately, or bring up a dialogue box that prompts the user to enter data to complete the operation of a particular function.

TOOLBAR

In addition to the use of the drop down menu, there are also a number of buttons that perform functions identical to those offered by the drop down menu. These buttons, located in the **Toolbar**, can save time by limiting cursor movement.

You can dock the toolbar to any edge of the StyleWrite main screen by double-clicking on it, and dragging it to the desired location. To know the function of a particular button in the toolbar, position the mouse pointer over the button, and its function will be displayed on the status bar in the lower left hand corner of the screen.

StyleWrite **Toolbar**

Chapter 5

FILE MENU

The file menu allows the operator to create, open, and save files, and exit the program.

To access the file menu from the main screen, click **File**. The file menu will open.

Click **File** to the open drop down menu.
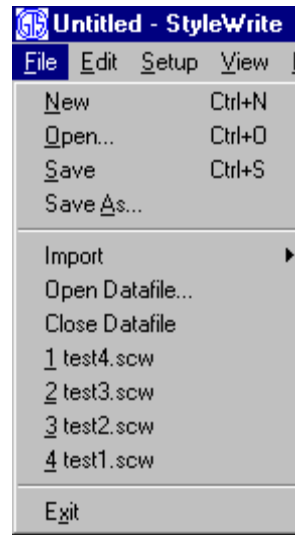
FILE NEW

To create a new file, click **New** from the **File** drop down menu, or click the **New** button.

The contents of default files can be programmed to contain any desired tasks and functions. The initialization task typically contains the functions to allow marking and should be included in the default file. If no default file exists, then the screen will be completely blank.

Click the **New** button, or select

New from the drop down menu.

Recently opened documents can be

opened directly by clicking on the

file name.
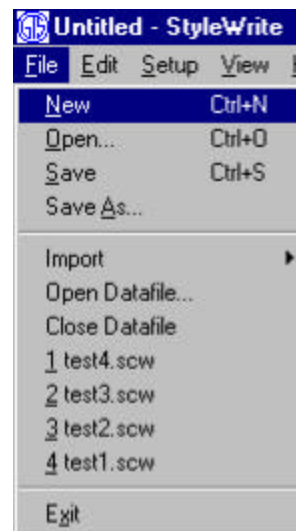
FILE OPEN

To open a file from the hard disk drive, select **Open** from the **File** drop down menu, or click the **Open** button. The **Open** dialogue box will appear on the screen.

Open Dialogue Box

Open file button
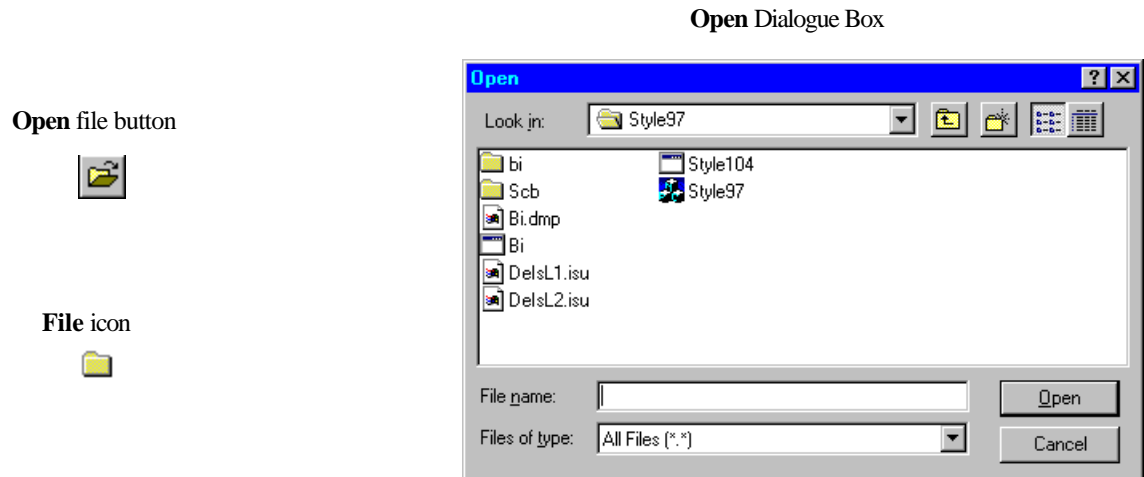
File icon

Enter a file name without any extension into the **File Name** field, and click **Open**. The selected file will be opened. If you do not remember the file name, click on the file icon to see the listing of files in that directory.   Select the desired file by double-clicking the file name.

To open a file from the A: floppy drive, select **Open** from the drop down menu. Click the **Look in** field drop down menu, and select $3^{1}/_{2}$ **Floppy (A:)**. A listing of the files available on the diskette in the A: floppy drive will be displayed. Select the desired file by double-clicking with the cursor.
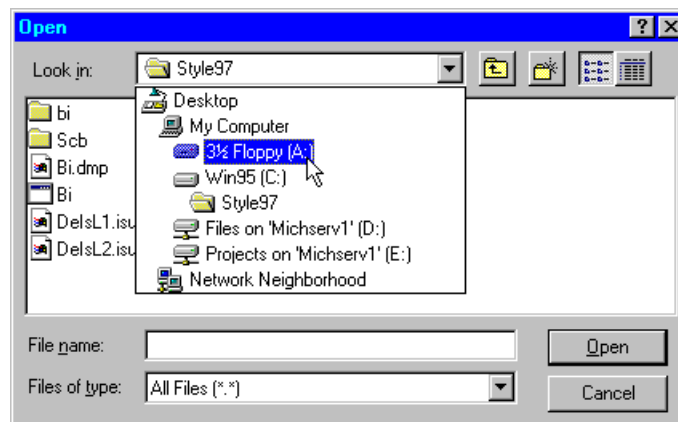
FILE SAVE

To save a file to the hard disk drive for the first time, select **Save As** from the drop down menu, or click the **Save** button. The **Save As** dialogue box will appear on the screen. Subsequent saves can be made by selecting **Save** from the drop down menu.

Click the **Save** button, or select

Save As from the drop down menu.

Save As Dialogue Box
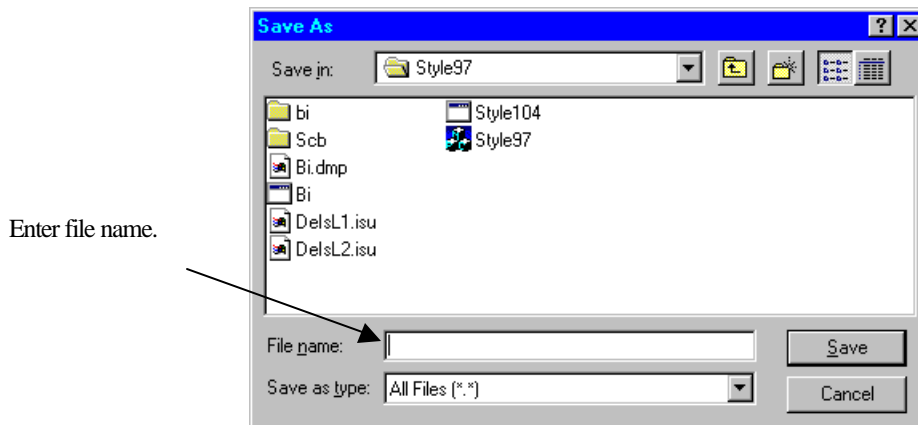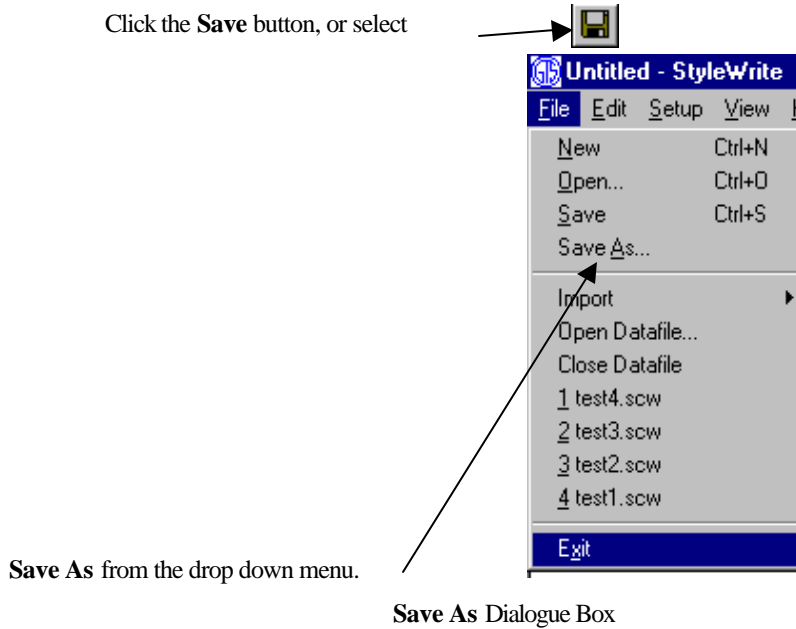
Enter file name.

Enter a file name in the **File name** field of the dialogue box, and click **Save**. The file can be saved without an extension. StyleWrite automatically adds a file extension. If you wish to overwrite an existing file with a new version, select the file name from the directory listing, and click **Save**. This action prompts a dialogue box on the screen asking whether or not to overwrite the file. Click **Yes** to overwrite the existing file.

To save a file to your floppy drive, select **Save As** from the drop down menu. Click the **Save in** field drop down menu, and select $3^1/_2$ **Floppy (A:)**. The file will be saved to the designated floppy drive.

Sample file name saved to the A: floppy drive.
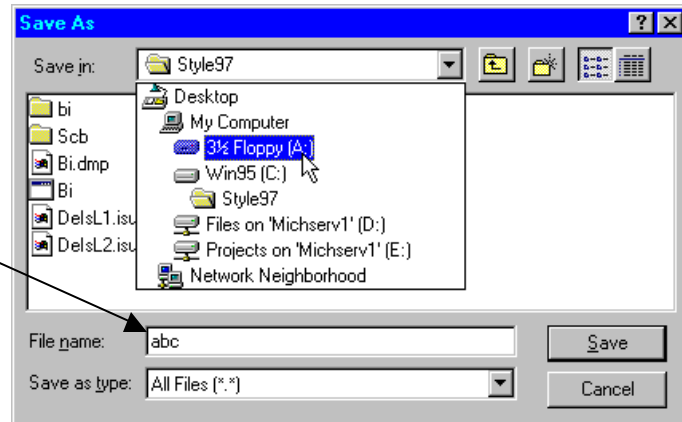
FILE EXIT

To exit, click **File** and select **Exit** from the drop down menu, or click the ⊠ button in the upper right hand corner of the screen. If the current windows session has not been saved, a dialogue box will prompt you do so before exiting the StyleWrite program.

Select **Exit** from the drop down menu.

OR

Click the "X" in the upper right hand portion of the screen to exit.
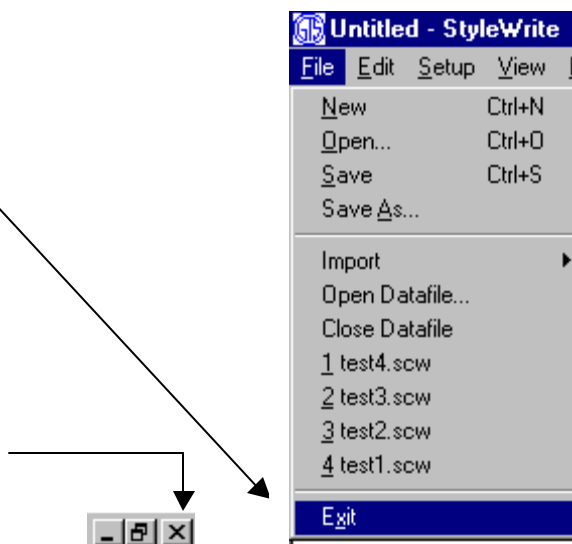
Import SHP and SHX fonts.

Will convert SHP and SHX CAD font files to the STYLEWRITE font file, the conversion program is located at FILE / IMPORT / SHX/SHP on the main menu.
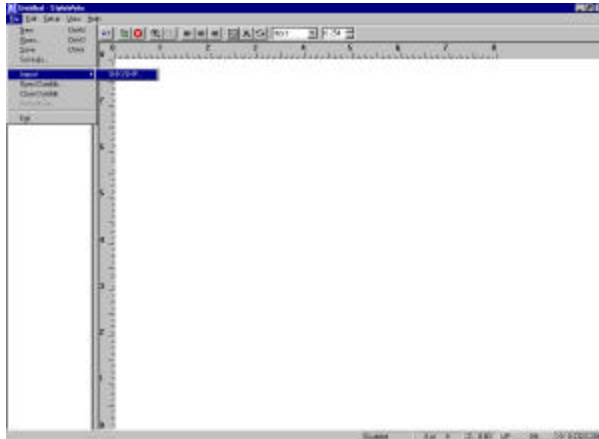
The fonts to be converted are selected from the proper folder and the open button is then pressed. See example below
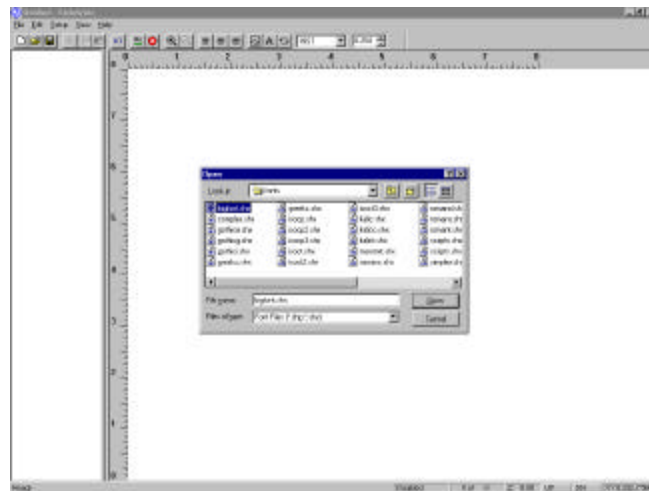
The font to be converted is selected using the drop down menu. After pressing Open, or in the Mark Text menu, the font will be available on the drop down menu, as shown below.
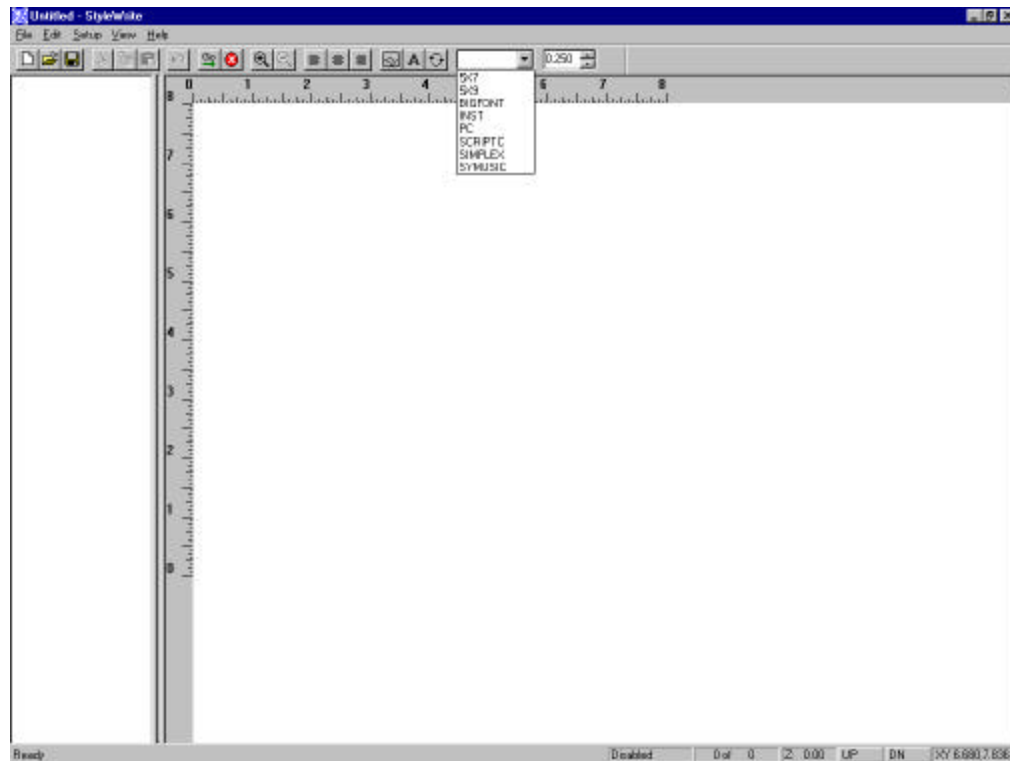
Chapter 6

EDIT MENU

The **Edit** menu allows the user to undo functions, and cut, copy, and paste objects and text.

UNDO

To undo an unwanted action, select **Undo** from the **Edit** drop down menu or click the **Undo** button. The **Undo** function will only undo the action immediately prior to its selection.

Click the **Undo** button, or select
Undo from the drop down menu.
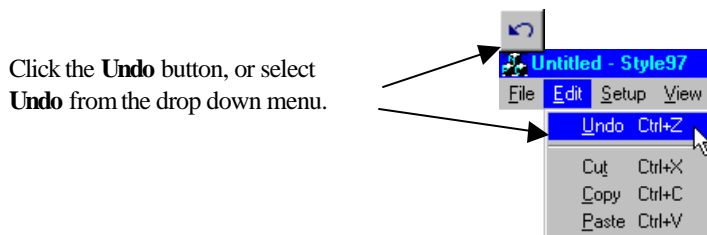
CUT

To cut an object or text, click the selection such that a selection box is drawn around the object. Next, select **Cut** from the **Edit** drop down menu, or click the **Cut** button.

Click the **Cut** button, or select
Cut from the drop down menu.
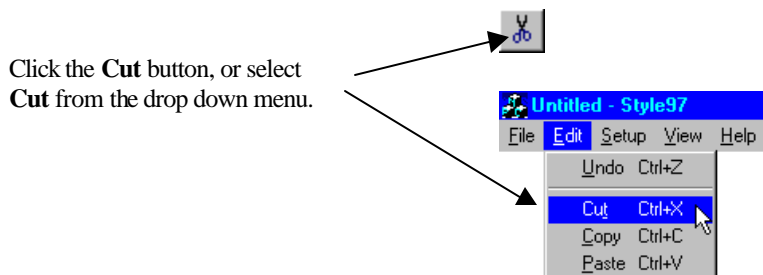
COPY

To copy an object or text, click the selection such that a selection box is drawn around the object. Next, select **Copy** from the **Edit** drop down menu, or click the **Copy** button.

Click the **Copy** button, or select
Copy from the drop down menu.
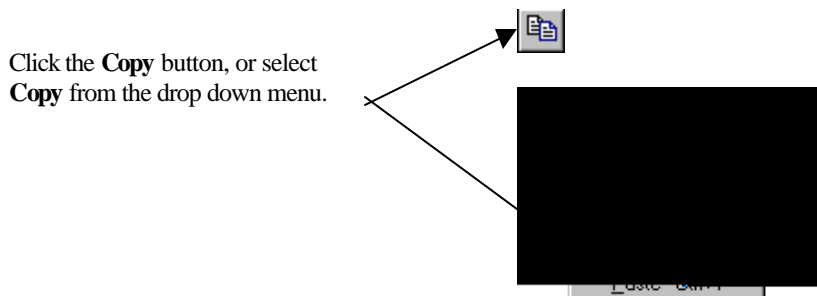
PASTE

To paste an object that has already been cut or copied, select **Paste** from the **Edit** drop down menu, or click the **Paste** button. An object may be repeatedly pasted on the grid by continuing to click the **Paste** button.

Click the **Paste** button, or select
Paste from the drop down menu.
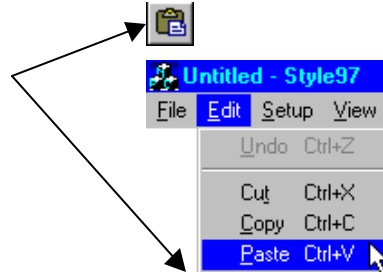
Chapter 7

SETUP MENU

The **Setup** menu allows the user to define parameters for the operation of the StyleWrite program. The menu offers the following functions:

- Allows the user to define machine settings for internal and external I/O addresses, or disable I/O's.
- Allows the user to set the speed and timing of the stylus.
- Allows the user to define the dimensions and location of the marking field.
- Allows the user to initialize the marking sequence.
- Allows the user to reset the stylus to the home position on the grid.
- Allows the user to define auxiliary ports for external I/O interface.
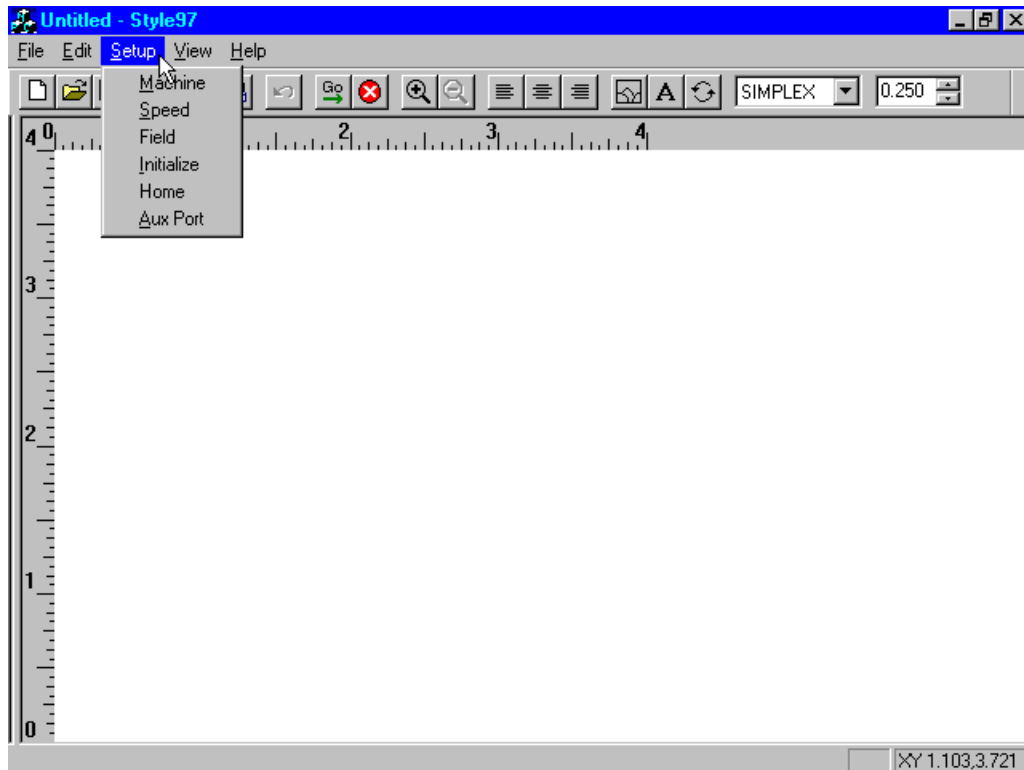
The **Machine Settings** dialogue box allows the user to disable the machine, change the default setting of the internal addressing, define parameters for external communications, and select a dynamic input function.

Machine Settings Dialogue Box
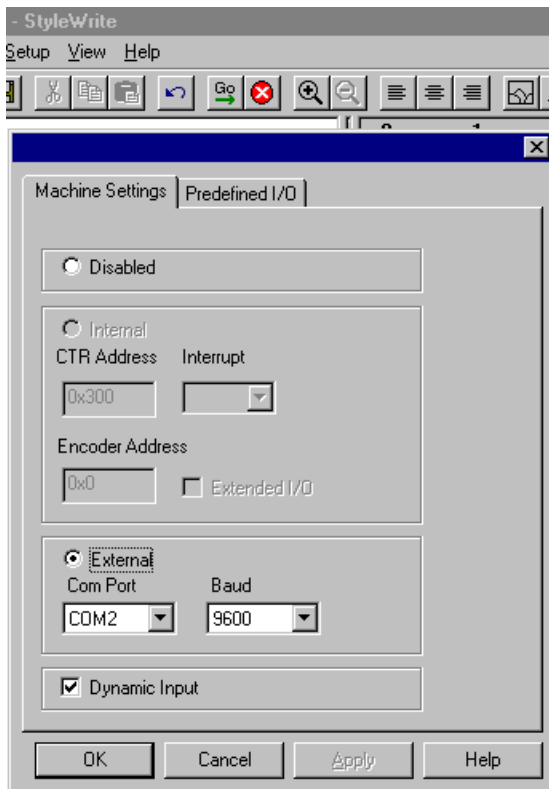
Disable   Allows the user to disable the stylus. This option is selected when a controller is not attached to the computer.

Internal   Allows the user to change the default settings of the internal address. This mode is used when a card is placed in one of the computer's ISA slots. It will only allow you to run one machine at a time, and the computer must be hooked up to the controller at all times while running. The default settings are set to **Address** 0x300, and **Interrupt** 5. If changes are made in defining the addresses in the software, hardware changes must be made accordingly.

External   Allows the user to define the settings for communications with the controller. This feature allows the downloading of the programming, fonts and logos of the controllers. Depending upon the number of COM ports in the computer, it is possible to run more than one controller at a time. It is also possible to run more than one head from one computer through the use of the **External** mode. The **Com Port** and **Baud** rate for the external communications link are selected in accordance with the parameters of the external communications device.

Dynamic   Provides the operator with the option of either having marking
Input   functions displayed permanently on the screen, or displayed dynamically, as they are marked by the stylus.

<figure>
Untitled - StyleWrite

e Edit Setup View Help

Machine Settings | Predefined I/O

INPUTS
Trigger   0x0
Reset   0x0
Acknowledge   0x0
Part Present   0x0
E-Stop   0x0

OUPUTS
Fault   0x0
Audible   0x0
Ready   0x0
Cycle Complete   0x0

OK   Cancel   Apply   Help
</figure>
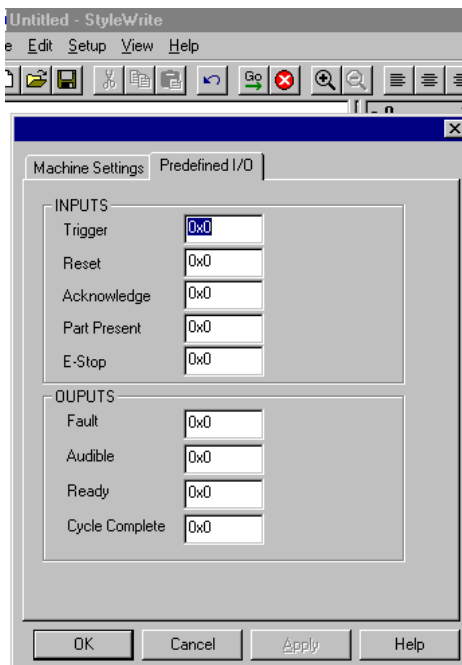
SPEED

The speed of marking, as well as the definition and resolution of the mark can be controlled.

These parameters can be adjusted in the program by selecting different values for the **Speed** function.

To access the **Speed** dialogue box, click **Setup** and select **Speed** from the drop down menu. The **Speed** dialogue box will appear on the screen as shown below. This dialogue box provides two screens that can be toggled between by selecting **Speed** or **Timing** from the upper left hand corner of the box.

Speed Dialogue Boxes

| **Jump** | Refers to motions when the stylus is not marking. There are three parts to jump motion. The initial movement will occur at the **Jump Speed** rate, followed by an acceleration period that will continue until the maximum rate is achieved. The **Jump Accel** determines how quickly the stylus accelerates. The units for the **Jump Speed** and **Jump Accel** rates are in |

steps per second on the X axis. The Y axis will be normalized to the X axis. The **Jump Speed** rate can range from 500 to 5,000 steps/sec. The **Jump Accel** rate can range from 10,000 to 30,000 steps/sec^2.

Mark Speed   Determines the speed of the stylus motion during the mark. The nominal value of 500 is shown in the dialogue box, but to make the mark deeper, the **Mark Speed** can be reduced. <u>Increasing the marking speed produces a shallower and less defined mark</u>. The range for **Mark Speed** is from 250 (producing a deep mark) to 2000 steps/sec (producing a very shallow mark).

Stylus Freq.   The frequency setting determines the number of times that the stylus solenoid is energized per second. Changes to this setting allow the user to control the appearance of the mark. A lower setting will produce a mark with fewer impact points per character. The setting can be set low so that the mark almost appears to be a dot matrix font. Too high of a frequency setting causes the solenoid to stay on without oscillating. The nominal setting for the ET stylus is between 45-75 Hz. For the "standard" stroke stylus, set this value to 0 Hz.

Stylus Duty   This setting determines the time difference between the stylus solenoid energized state and the de-energized state. This setting is used in conjunction with the frequency to produce the depth and quality of the mark desired. The nominal setting for the ET stylus is between 40-70 %. Typically, the frequency and duty cycle parameters are used with the "extended stroke" stylus to control the length of stroke and depth of mark. For the "standard" stroke stylus, set this value to 50%.

On-delay   Introduces a delay between when the stylus is energized and when the stylus begins to move. If the **On-delay** is too short, the beginning portion

of the character may be missing. If it is too long, there will be a feathering at the beginning of the character. The units are in milliseconds.

Off-delay   Introduces a delay between when the stylus is de-energized and when the stylus jumps to the next character. If the **Off-delay** is too short, the mark trails the next character. If it is too long, there will be a loss of cycle time. The units are in milliseconds.

Dot Dwell   Used only for the dot matrix fonts. The **Dot Dwell** controls the amount of time spent on each dot. Increasing the time increases the depth of the dot. The units are in milliseconds.

NOTE: The speed of the marking, the frequency, and the duty cycle, work in conjunction with each other. A change to one of the parameters may affect the performance of the others. These settings are somewhat subjective to the user. Different values should be tried until the type of mark desired is achieved.

The **Field** selection from the **Setup** menu allows the user to define the dimensions of the marking field.

To define these values, click **Setup** and select **Field** from the drop down menu. The

Field dialogue box will appear.

Field Dialogue Box

	Field		Steps	
X	8		1200	
Y	-8		1200	
W	0		0	
Z	0		0	
Z Idle	0			

Field X	Distance between zero X and the end of the X marking field.
Field Y	Distance between zero Y and the end of the Y marking field.
Field W	Circumference of the part to be marked in outer diameter marking.
Field Z	Distance between zero Z and the end of the Z marking field.
Steps X	Number of steps between zero X and the end of the X marking field.
Steps Y	Number of steps between zero Y and the end of the Y marking field.
Steps W	Number of steps between zero W and the end of the W marking field.
Steps Z	Number of steps between zero Z and the end of the Z marking field.
Z Idle	Position to start from when in cycle (not starting from home)

When all the information has been entered, click **OK**. The marking field will be

displayed on the screen with the new parameters.

INITIALIZE

The **Initialize** function establishes all of the settings for the machine. To **Initialize** the machine, click **Setup** and select **Initialize** from the drop down menu

Select **Initialize** from the drop down menu.
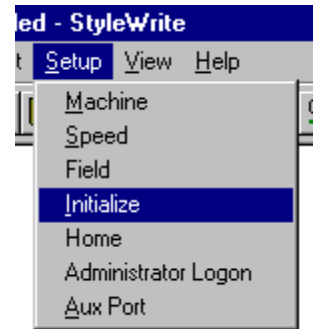
HOME

The **Home** function is used to return the stylus to the initial starting condition on the marking grid. This initial point is located at (0,0).

To return the stylus to the **Home** location, click **Setup** and select **Home** from the drop down menu.

Click **Setup**, and select **Home** from the drop down menu.
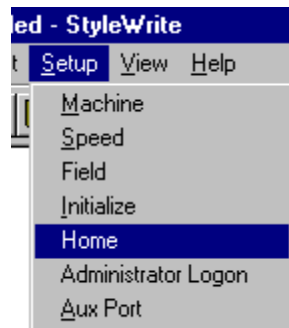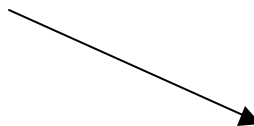
AUX PORT

The **Aux Port** function is used to define the COM port and its related parameters for the purpose of external communication.

To access the **Aux Port** screen, click **Setup** and select **Aux Port** from the drop down menu. This will prompt the **Aux Port** dialogue box to appear on the screen. All of the values of the transmitting and receiving devices must be set to the same value to communicate properly.

Click **Setup**, and select **Aux Port** from

the drop down menu.
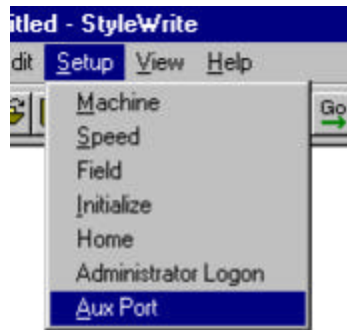
Enter the correct settings into the various fields of the **Aux Port** dialogue box.
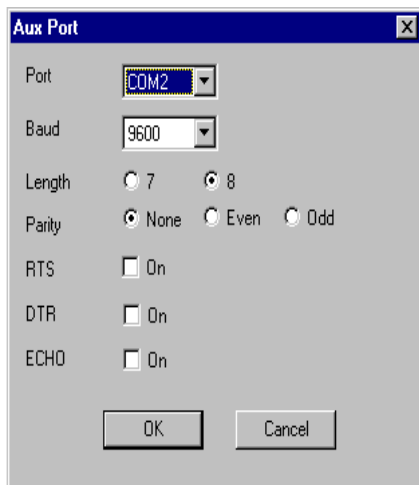
Aux Port Dialogue Box

Advanced Functions - Security Setup.

Administrator Log-On:

The Administrator Log-on is defaulted with no security. It must be changed if it is the intent to limit the operator's access to program functions. It is accessed as follows:
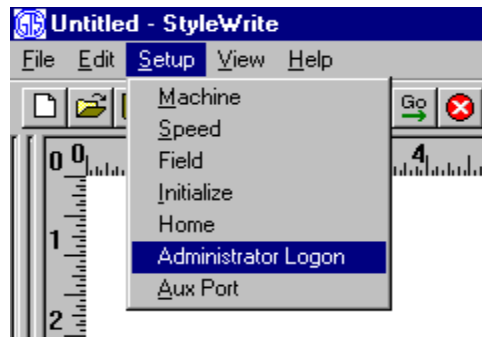
Once the enter key is pressed, or the administrator log-on is clicked, the logon window will appear. Here the password you selected is entered. This action adds a new item (Administrator) to the tool bar.
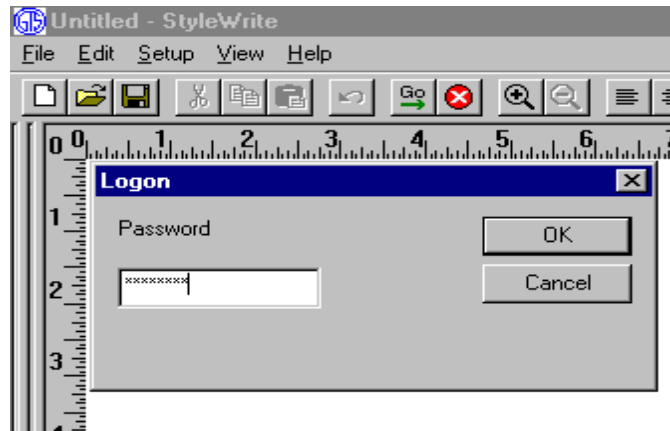
Changing the security requires programming User access capabilities. The menu to use for limiting user access is selected from the tool bar after the Administrator has logged on. (Administrator, User Access and then pressing enter.

Security

After a window appears for security the boxes next to the locks can be checked to limit the access to the functions of the program. In the following example the ability to save a file has been limited so that the operator is not able to save changes he has made to the program. This could be used to preserve existing templates from future changes unless authorized by the administrator.

The changes are made by clicking on the box next to the function. When finished making the security changes click ok.
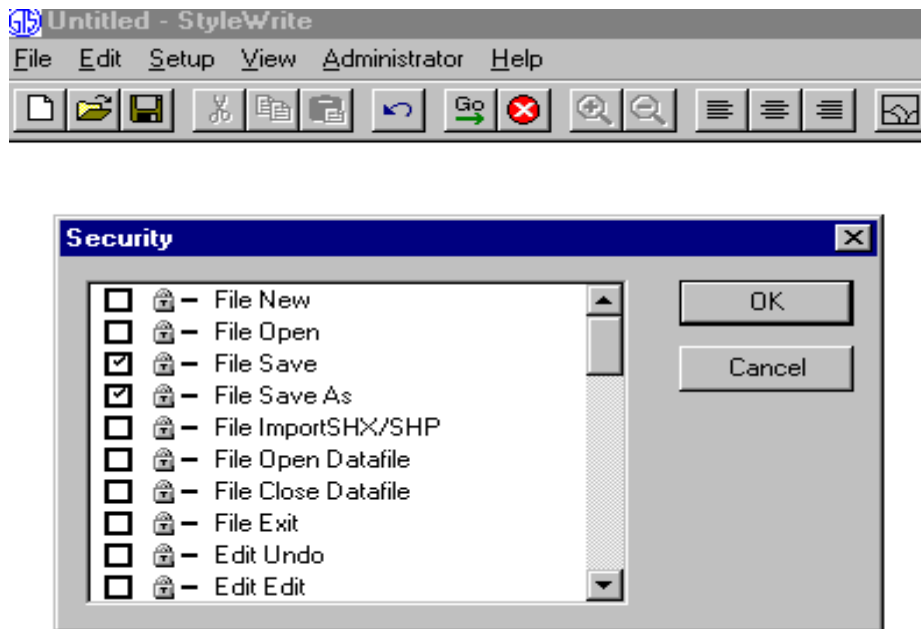
Set Password

The following shows where the actual password for the administrator can be changed in the program. It is important to safeguard this program with a password when the software is installed. If not done, any person could place his/her password in the system and cause the software to not fully function (by changing access levels). Pressing enter at set password, displays the entry areas for the passwords.
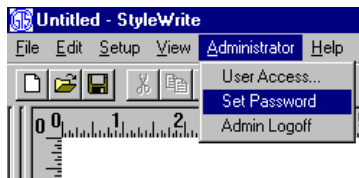
When entering the password - and confirming the password - they must match. If they do not the OK box stays gray and will not allow the password change. When the passwords match the program will allow the changes to be accepted and the OK can be pressed.
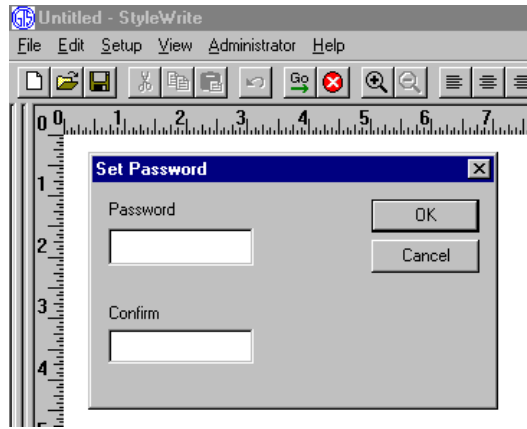
Admin Logoff

Selecting this and pressing enter exits the StyleWrite system from the Administrator functions and removes Administrator from the menu bar.

VIEW MENU

The **View** menu provides the user with the option to configure the display according to one's preferences. The options available enable the user to display or hide the toolbar and status bar, view a split screen, or refresh the screen.

TOOLBAR

The toolbar enables the user to avoid unnecessary mouse movements that are encountered when using the drop down menus, by clicking a single button to perform the same task. Many, but not all, StyleWrite functions have an equivalent toolbar button that performs the same function as if it had been executed through the drop down menu.

To display the toolbar on the main screen, click **View** and select **Toolbar** from the drop down menu. The toolbar will remain on the screen until the function is turned off.

Click **View**, and select **Toolbar** from the drop down menu.
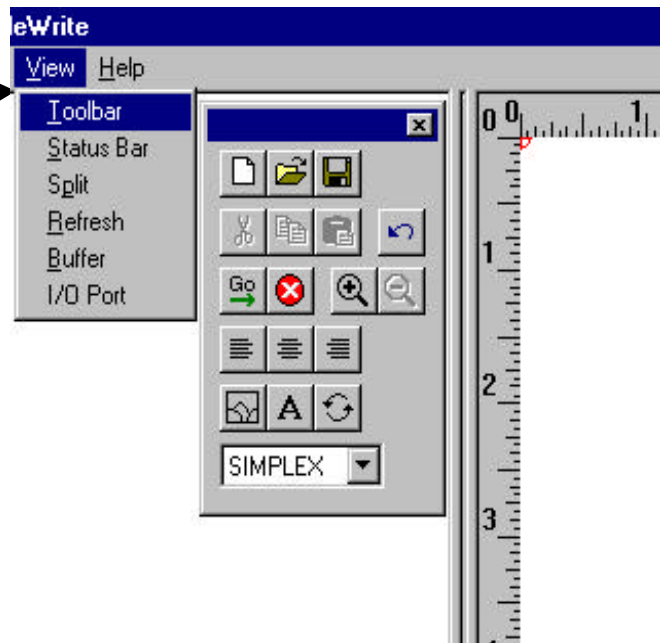
The toolbar can be positioned at any edge of the StyleWrite main screen by double-clicking on it, and dragging it to the desired location. To view the function of a particular button in the toolbar, position the mouse pointer over the button, and its function will be displayed on the status bar in the lower left hand corner of the screen.

Vertical **Toolbar** can be positioned on either the left or right side of the main screen.

Horizontal **Toolbar** can be positioned at either the top or bottom of the main screen.

STATUS BAR

The status bar is a useful tool that displays the status of the stylus, and provides the user with a brief description of the function that a particular toolbar button performs.

The status bar is located across the length of the bottom portion of the screen, as shown in the figure below.

Status Bar serves to display the status of the stylus, Cursor location

the function of a button, or the location of the cursor on the screen.
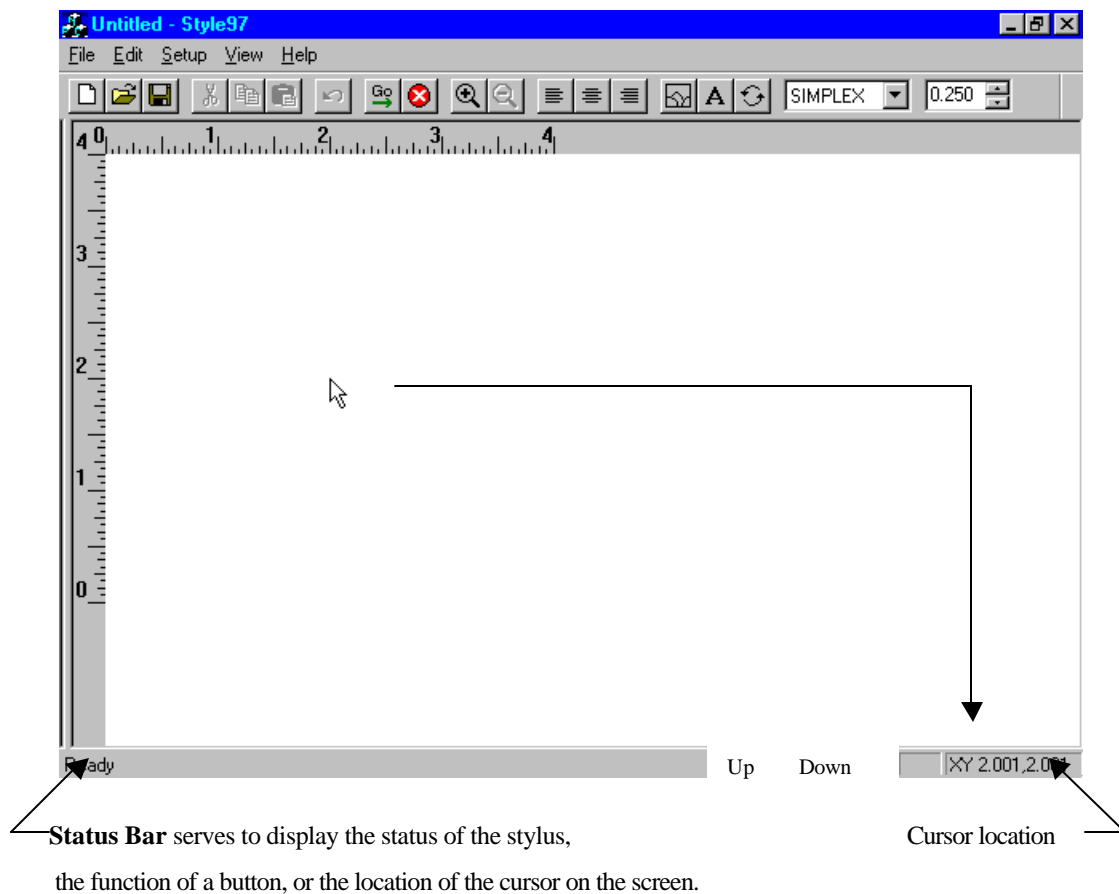
To view the function of a button in the toolbar, drag the mouse cursor over the button of interest. The function of the button will then be displayed in the lower left hand corner of the screen. In the lower right hand corner of the viewing area, the location of the cursor on the screen is displayed. As the mouse cursor is moved, the coordinates change to reflect the movements.

SPLIT

The **Split** screen option allows the user to view the actions that will be performed by the stylus in the marking sequence. During the normal view, the marking sequence portion of the main screen is hidden.

To view the split screen, click **View** and select **Split** from the drop down menu. The mouse cursor will automatically relocate at the far left side of the screen. Drag the new cursor toward the left or right to the desired location, and click the left mouse button to release. At this point, the screen will appear split, as shown below.
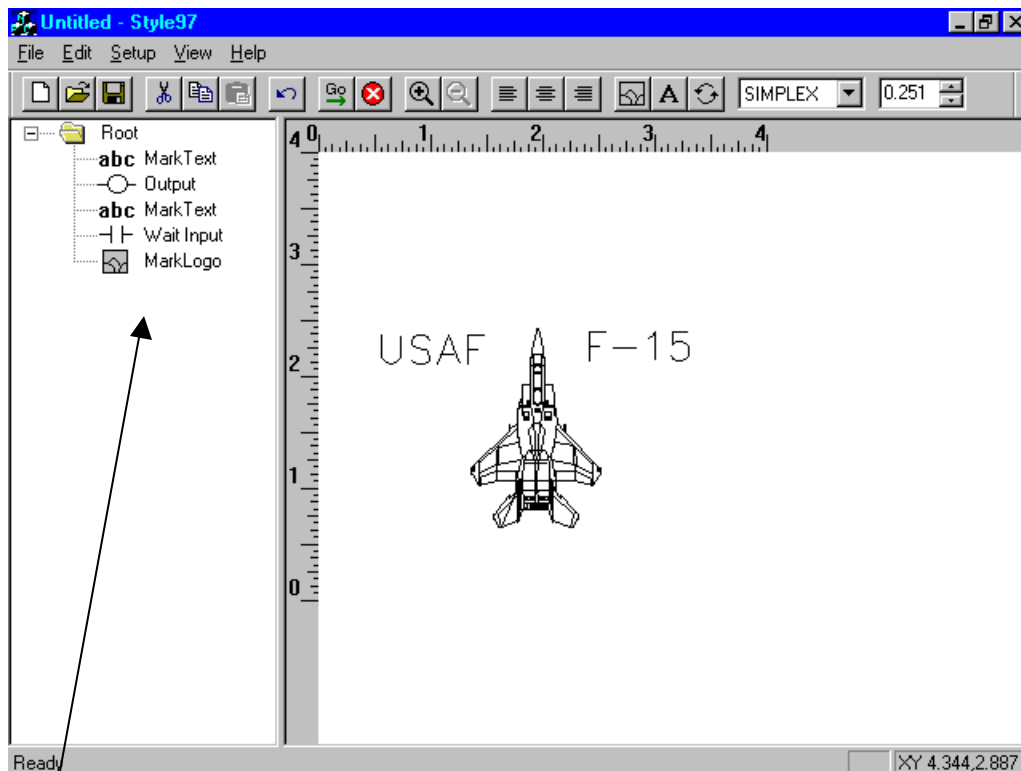
The marking sequence is displayed on the main screen after activating the **Split** function.

REFRESH

The **Refresh** function resets the main screen.

To refresh the screen, click **View** and select **Refresh** from the drop down menu. The
screen will automatically be refreshed.

Click **View**, and select **Refresh.**
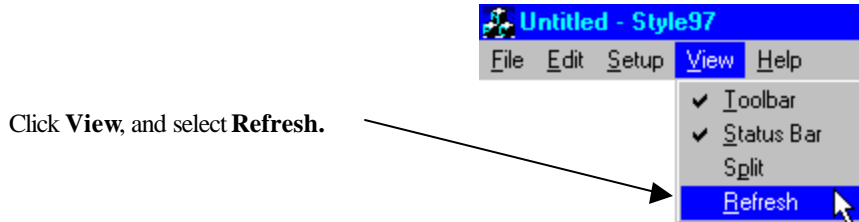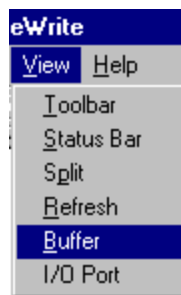
View Buffers

The view buffer functions allows the operator to modify or to view the contentsof the buffer. This is done by selecting View, then Buffer, and double clicking or pressing <enter>
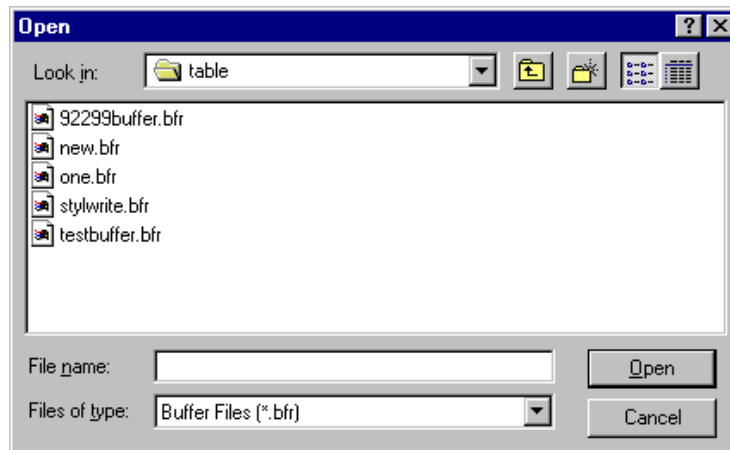
A file is either selected from the list or a new file can be created by typing in a new name for the buffer.
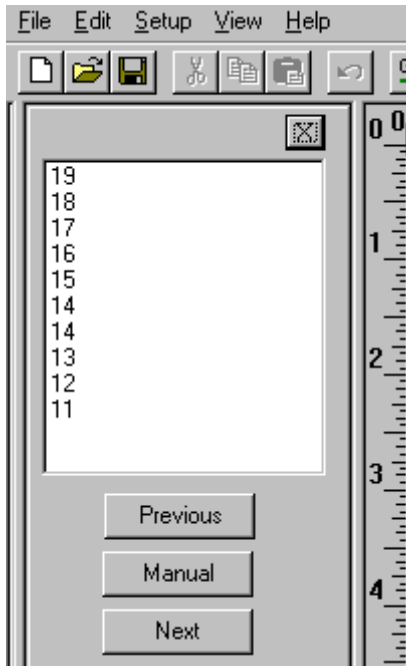
The Previous and Next buttons allow for the movement up and down the list. The Manual function always adds to the top of the variable list that is displayed. Data may be modified by selecting next, to move up in the list. As soon as it appears, it can be replaced using the manual function.
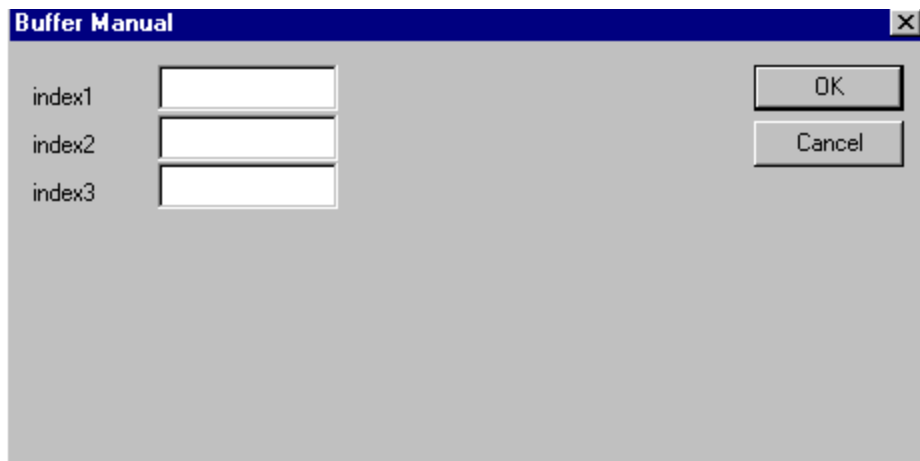
When a new buffer is pressed, a screen with only 1 field is displayed. When right clicked, an additional menu appears, prompting for Cut/Copy/Past/SelectVariable. If variable is selected, it will be displayed with the "@" sign between it.

I/O PORT
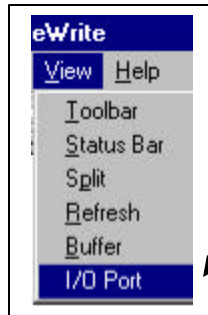
View I/O port allows the user to diagnose the I/O points when the machine is stopped. Outputs can be turned on by pushing on the radio buttons, such as e.g 0x208.
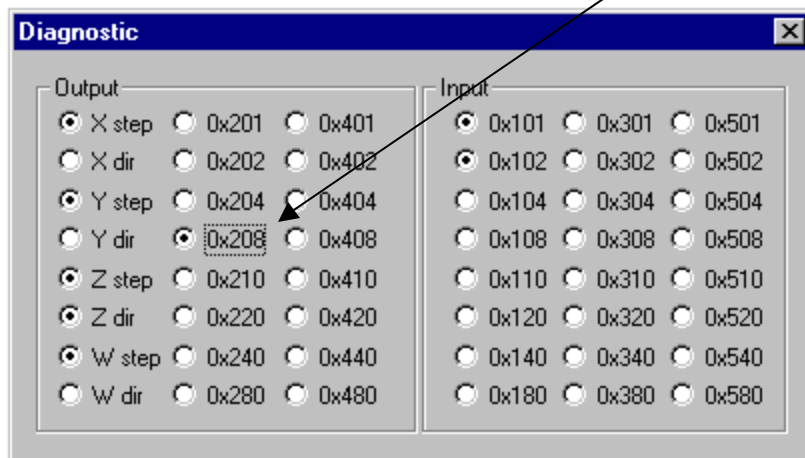
Inputs cannot be changed. However, outputs can be "forced" on, and will remain on until re-set by the program being initialized.

CHAPTER 9

DATA FILES

DATA STREAM

The data file and serial communication interfaces make it possible for external devices to communicate with the StyleWrite program. To keep the interfaces simple, both the serial and the data file interface are treated as stream devices. A stream device will behave as though a continuous stream of data is available. Characters are removed from the stream one character at a time, until all the requirements are met. When the next tag comes along, the characters are once again removed, one at a time, starting with the next character in the stream.

Data delimiters are special characters that appear between the data. The stream should contain the delimiters to separate the data fields. Delimiters prevent the data in one field from showing up in another field. The delimiters can be any character such as commas, semicolons, carriage returns, or control codes.

The data stream requirements are as follows:

- No translations are possible. The characters must be represented as ASCII text, as they appear on the tag.
- No index or mapping is required. The characters are removed according to the format specified.
- No header information should be present.

FORMATS

The format specification will determine how the data is removed form the data stream. A format is specified as a parameter of the function that uses a format specification. A format is used to filter out the data from the delimiters, or any other unwanted characters, and copy only the valid data into a destination variable. The destination variable is also specified as a parameter of the function.

Formats consist of matching characters, copying characters, and discard characters. A matching character is any character that is used as a delimiter to separate the data and the data format. The matching characters are not copied to the destination, they are only used to confirm the proper alignment of the data stream.

The copying characters, '?' and '*', copy whatever character appears next in the data stream, to the destination. The '?' will copy a single character, and the '*' will copy as many characters as needed until the next matching character is found, or the variable is full.

The discard character is used to remove data from the data stream. The discard character, '!', will take the next character on the data stream, regardless of what it is, and discard it.

Characters that can appear in **Format** on the **Mark Text** screen include:

'*' Wildcard   Copies all characters from the source until the next matching
                         character of the format is found.

'?' Single   Copies a single character from the source string to the destination
                         string.

'!' Discard   Discards the current source string character.

(qty)   Repeats the operation for the number of times specified in qty. For
                         example, '!(3)' discards three characters.

'#' Checksum   Indicates that a character is part of a checksum operation and
                         should be added into the running checksum to determine the
                         validity of the data received.

The format string can have a maximum length of 32 characters. It must only contain characters with ASCII codes from 1 to 127. Strings are terminated within the program with an ASCII zero.

The ASCII character codes from 1 to 31 are called the control characters. A control character is displayed as two characters. The first character is always the carat symbol, (^), and the second is the corresponding uppercase letter or symbol such as 'A' for 1, 'B' for 2, etc. Although the control characters are displayed as two characters, they are always stored as one. Below are some commonly used control characters:

Decimal	Hex	Code	Ctrl	Meaning
1	0x01	SOH	^A	Start of Header
2	0x02	STX	^B	Start of Text
3	0x03	ETX	^C	End of Text
4	0x04	EOT	^D	End of Transmission
5	0x05	ENQ	^E	Enquiry
6	0x06	ACK	^F	Acknowledged
10	0x0A	LF	^J	Line Feed
12	0x0C	FF	^L	Form Feed
13	0X0D	CR	^M	Carriage Return
21	0x15	NAK	^U	Not Acknowledged
27	0x1B	ESC	^[	Escape

EXAMPLES OF FORMAT USAGE

The **Stream** refers to the incoming data. The **Destination** refers to the data that is stored after the format is applied. The **Format** specifies how the conversion is to be made.

Stream	Format	Destination	Result
"ABCDE"	"*"	"ABCDE"	Use all of the characters.
"ABCDE"	"A*E"	"BCD"	Match, then discard 'A' and 'E'; copy the rest.
"ABCDE"	"*(3)"	"ABC"	Copy three characters.
"ABCDE"	"!!*"	"CDE"	Discard first two characters.
"ABCDE"	"??C??"	"ABDE"	Match, then discard 'C'; copy the rest.
"ABCDE<CR><LF>"	"*^M^J"	"ABCDE"	Copy all up to CRLF.

GETTING A VARIABLE FROM A FILE:

To produce marks from information that exists in an external database, the information needs to be exported to a data file. The data file can contain only the specially formatted strings of data required for the marking application. In addition, the data file must be saved as a text file with a .TXT extension. You can then program a task to retrieve the strings from the data file and use them as marking information.

The file functions are used to either input, or output strings to files. Generally, individual strings in a data file are separated by a predefined delimiter. Some common types of delimiters are a carriage return/line feed, or a simple comma.

When retrieving a data file for use in the marking sequence:

1. Click the **Mark Text** button and "abc" will appear on the screen.

2. Double-click "abc" such that the **Mark Text** dialogue box appears on the screen as shown below.

.

Select **Data File**

Enter the desired format for data transfer using control characters into the **Format** field.
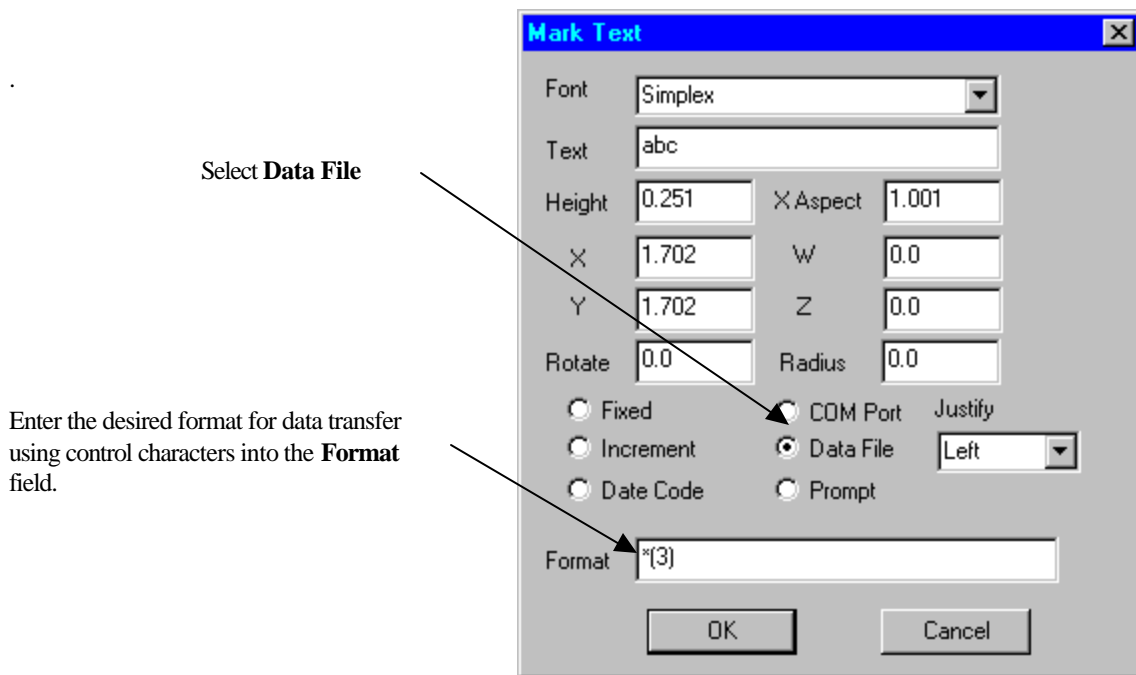
3. Click **Data File**, and enter the control characters for the desired data file transfer into the **Format** field.

4. Click **OK**.

5. Click the **GO** button, and the **Open** dialogue box will appear.

6. Select the desired data file from its directory and click **OK**. The marking sequence will begin transferring the data according to the specified delimiters.

CHAPTER 10

SERIAL DATA STREAM

The serial communication interface provides a means for external devices to communicate directly to the StyleWrite program. The serial interface is treated as a stream device. To understand the data stream and formats, refer to Chapter 9.

For serial communications, the data stream should contain a start of transmission character (^B) and an end of transmission character (^C). The start of transmission character is necessary to eliminate any unwanted characters that may appear on the line between transmissions. The end of transmission character is necessary to signal that the transmission is complete. Formats for ASCII characters are found in Chapter 9.

Data delimiters are special characters that appear between the data. If you are transmitting more than one field at a time, then you should use delimiters to separate the fields. Delimiters are helpful for preventing the data from one field from showing up as data in another field. The delimiters should be different than the start and end of transmission characters.

Within the data stream, the characters must be represented as ASCII text, as they are to be marked. No translations are possible. The different fields may be received in any order, but the characters within a field must be in order.

A protocol is the sequence of events that must occur in order for the data to be transmitted. Because of the programmable nature of the StyleWrite program, there is no standard protocol. It can be programmed for a variety of protocols.

SETTING THE SERIAL PORT

Initializing the serial ports is done by selecting the **COM Port** field from the **Mark Text** dialogue box. This determines which serial port to use, as well as the baud, parity, etc. The communications are interrupt driven and require the standard interrupt levels and address locations to function properly. To setup non-standard serial ports, click **Setup** and select **Aux Port** from the drop down menu. The **Aux Port** dialogue box will appear as shown below. Enter the communications settings into the fields of the **Aux Port** dialogue box. All parameters of the transmitting and receiving devices must be set to the same value to communicate properly.

Aux Port Dialogue Box
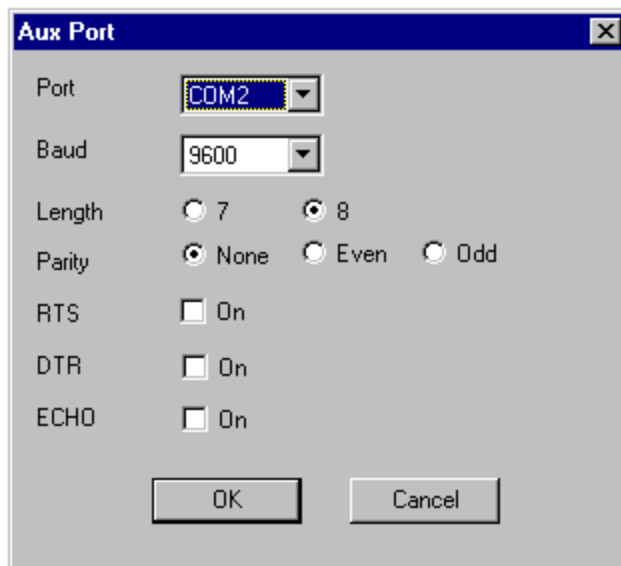
Once all of the parameters have been entered, select **OK**. Communications are now set to the desired parameters.

GETTING A VARIABLE FROM THE SERIAL PORT

For the first example, assume the device is a bar code reader. To implement the application, we will use a simple "Blind" protocol, in which the external device will send the data whenever it becomes available.

When a bar code wand is connected to a serial port, it will usually send the data to the serial port as soon as the bar code is read. Nothing needs to be sent before or after the transmission is sent.
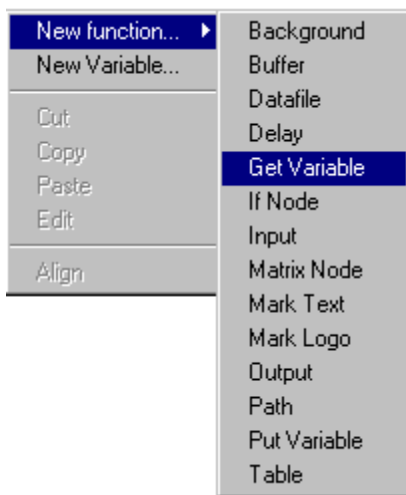
Generally, the data strings on a serial port are both preceded and terminated by one or more characters to signal the start and end of the transmission. A common type of prefix is <STX> (^B), while a common type of end of transmission prefix is <ETX> (^C). A format is then defined to separate the data and the delimiters so that only the valid string data is removed from the serial data. For this example, it would be   ^B*^C   - as shown below in the graphic - where the * is the previously mentioned data string.

To receive strings, double-click the text to where the imported data will be displayed, such that the **Mark Text** dialogue box appears on the screen. Select **COM Port** from the list of field parameters in the dialogue box, enter the desired transmission format, and click **OK**.

Select **COM Port.**

Enter transmission format here

Get Variable

Variable @anyname

○ Fixed   ⊙ COM Port   ○ Variable
○ Increment ○ Data File
○ Date Code ○ Prompt

Source [   ]

Format ^B*^C

[OK]   [Cancel]
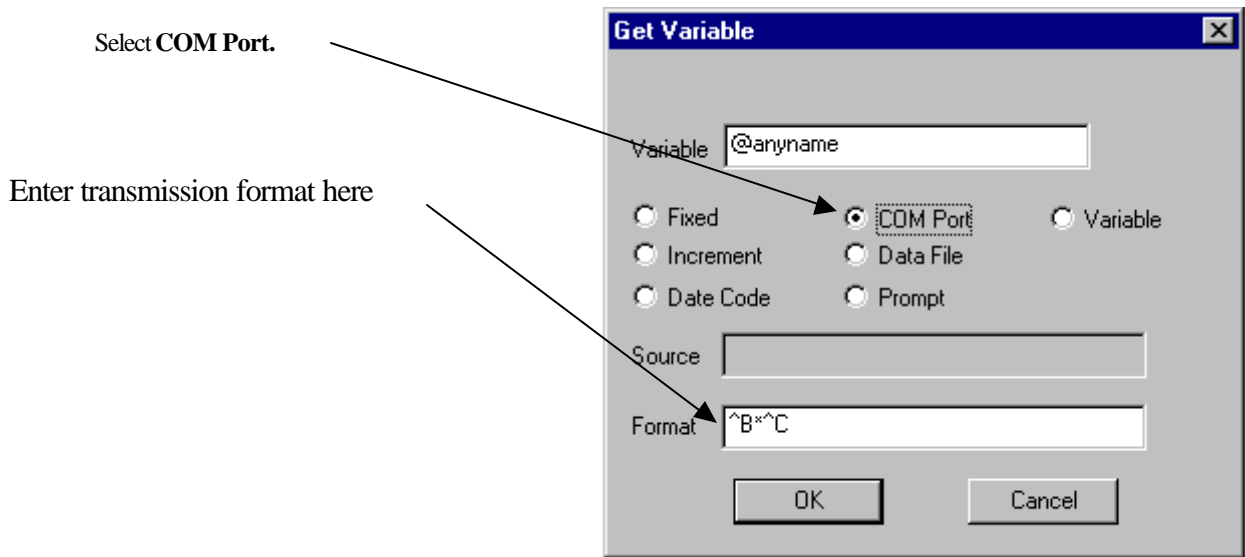
Chapter 11

I/O PORTS

The Input/Output functions are used to integrate external devices into the marking process. The Output functions are used to control external devices such as valves or motors. The input functions are used to sense the state of a switch and allow the program a mark function or change the state of an output at the desired time.

Bits are the hexadecimal representations of the discrete I/O. The first byte represents the port number, and the last two represent bits to be set. Bits are used for both input and output.

The Input / Output functions are used to integrate external devices in the marking programs process.
An assortment of I/O device configurations is currently available. A typical standard configuration of the controller is 16 points of I/O. Custom electrical control configurations are often made at the request of our customers (i.e. 48 I/O unit is available in a custom enclosure).

Typical on a two axis machine a total of 5 outputs and 3 inputs are used - these are:

Motor outputs	X step = **0x001**	X direction = **0x002**
	Y step = **0x010**	Y direction = **0x020**

Outputs   Stylus Solenoid = **0x201**

Inputs   X home = **0x101**   Y home = **0x102**   Start Trigger = **0x110**

The trigger used for the input is selectable from the following addresses given in the setup area. They are as follows;

0x000=off

0x101   0x102   **0x104**   0x108   0x110   0x120 0x140 0x180 .

The bit values for I/O are shown below:

	Bits							
Motor	X Step	X Dir	W Step	W Dir	Y Step	Y Dir	Z Step	Z Dir
Input	X home	Y home	0x104	0x108	0x110	0x120	0x140	0x180
Output	Stylus	0x202	0x204	0x208	0x210	0x220	0x240	0x280

Output values are used to control certain output bits. A positive value for an output will turn ON the output, and a negative value will turn OFF the output. For example, a +0x201 would turn the output ON, and a –0x201 would turn the output OFF. An output value of zero will have no effect.

The input values are used to test the status of certain bits. A positive value for an input generally means the device is ON, while a negative value typically means the device is OFF. An input value of zero (0x000) will always be true.

Logical operators may be used in an output function to turn more than one output ON, or in an input function to test for more than one input. For example, the following output function will turn the outputs 0x101 and 0x108 ON.

New function... ▶	Background
New Variable...	Buffer
	Datafile
Cut	Delay
Copy	Get Variable
Paste	If Node
Edit	Input
	Matrix Node
Align	Mark Text
	Mark Logo
	Output
	Path
	Put Variable
	Table
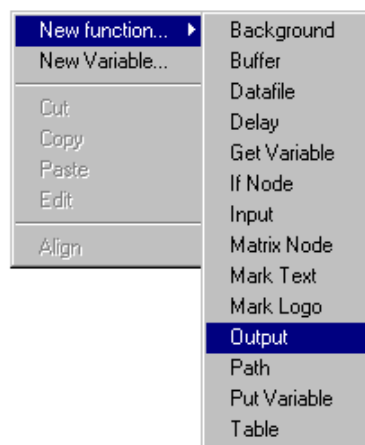
Likewise, the following ouput function will wait for input 0x202 or 0x204, and 0x208.

Output

Output   +0x101 & +0x108

○ Simple
○ Delay
○ Unitl
○ While

[OK]   [Cancel]
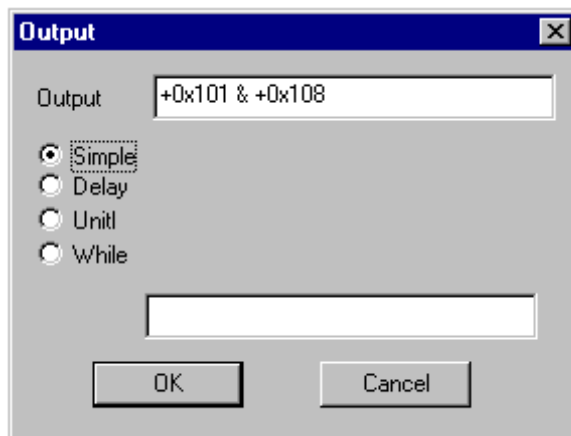
There are three basic types of I/O functions: **Output**, **Input** and **Delay**.

The **Output** function will turn ON or OFF the specified output port. The **Output** function will not wait for any event to occur. It will simply turn on the output and proceed directly to the next function.

When the **Input** function is added to a task, the task will wait indefinitely for the input to become true. For example, the **Input** function with an input of +0x204 will wait for a contact closure on the input of 0x204.

The **Delay** function is used to create a pause between functions. It should be inserted between the two functions you need to separate with a time delay. The **Delay** function will wait for the time period specified and then proceed to the next function.

These three functions can also be used in conjunction with one another for other desired results, such as delaying the output. In this case, the **Delay** function would be selected and set to the desired time, followed by the **Output** function with a designated address.

MOTION CONTROL I/O's

When the I/O's are initialized, they will be used as the default I/O devices. No other functions need to be added. To use the I/O, you only need to connect the devices and add the functions that access the I/O. For instance, to program a clamp to hold a part, add an **Output** function before the mark to activate the clamp, and another **Output** function after the mark to release the clamp.

Output   +0x202
Mark Text
Output   -0x202

Writing an I/O program is quite similar to writing a sequence of operations. Each event starts with some type of action, and ends by waiting for that action to be completed.

Below is an example of a sequence of operations and the resulting I/O program.

1.) Operator places a part in the fixture and presses the cycle start button.
2.) Energize the clamp cylinder.
3.) Wait 0.5 seconds for the clamp to complete its extension.
4.) Mark the part number in the first location.
5.) Energize the motor to rotate the part in the forward direction until the CW prox is made.
6.) Mark and increment the serial number.
7.) Energize the motor in the reverse direction until the CCW prox is made.
8.) De-energize the clamp cylinder.
9.) Operator removes the part and the cycle is complete.

From the left side of the split screen view, the task programming logic to achieve the above sequence would appear as follows:
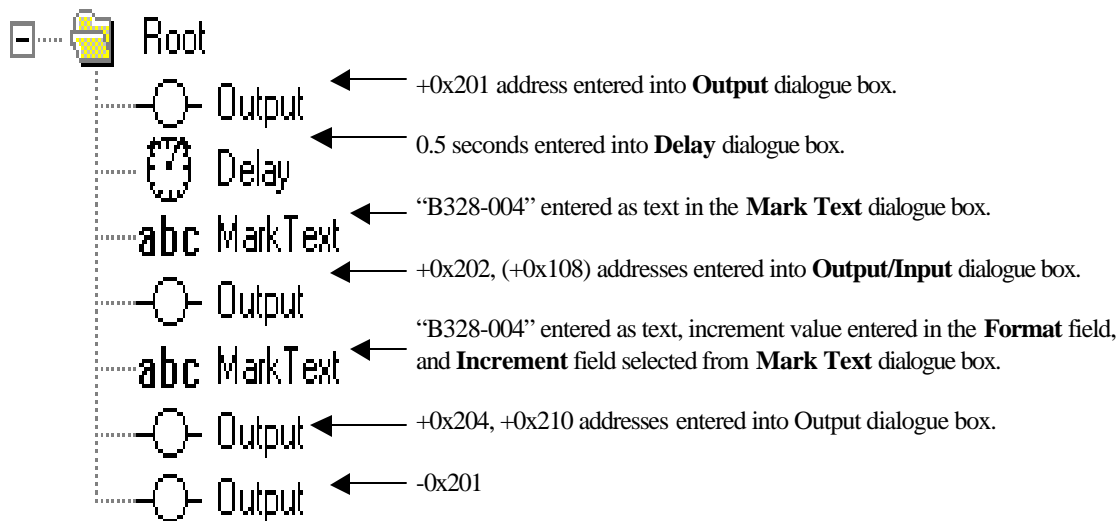
Root
— Output ← +0x201 address entered into **Output** dialogue box.
— Delay ← 0.5 seconds entered into **Delay** dialogue box.
abc MarkText ← "B328-004" entered as text in the **Mark Text** dialogue box.
— Output ← +0x202, (+0x108) addresses entered into **Output/Input** dialogue box.
abc MarkText ← "B328-004" entered as text, increment value entered in the **Format** field, and **Increment** field selected from **Mark Text** dialogue box.
— Output ← +0x204, +0x210 addresses entered into Output dialogue box.
— Output ← -0x201

When inserting or editing from the **New** menu, select the function after which the new function should **follow** first, then click on the new function. If the new function must **precede** that function, start with holding down the **shift key, prior to selection**. If you select the root directory first, the function will be added to **the end.**

CHAPTER 12

PROGRAMMING THE Z AXIS

The Z axis is an option that can be ordered with the controller. Presently, there are two devices that use the optional axis: the motorized column (Z axis) and the outside diameter (W axis) marker. Both of these devices are designed for specific marking applications.

The motorized column is typically used in automated applications in which the size of the part height changes from piece run to piece run. To automatically control the height of each mark, a motorized column and a three-axis controller are required. For most applications, a manual height adjustment is sufficient. If the application requires a mark to be made at different heights, then a motorized column is the most practical method of changing the location of the Z axis.

The OD marker is employed in applications where the outside diameter of a part is selected as the marking location. To perform this, the optional three-axis controller and OD marking fixture are required. The OD marker usually employs a tooling chuck to hold the parts to be marked. The W axis motor is connected to the spindle of this chuck to rotate the part during a marking cycle.

THE PATH FUNCTION

The motorized column can be controlled with the Path function. The Z position can be explicitly set using the Path function. The Path function is used to specify the W,X,Y,Z coordinate locations to which the stylus is to move. The coordinates are specified as a parameter in the Path dialogue box as shown in Figure 12.1 on the following page. When the Path function is executed, the stylus will move from its present location, in a straight line, to its new location. The stylus will remain at the Z coordinate until another path is set or the task completes. Note that the Path is only used for avoiding obstacles.

Figure 12.1: Path Thru **Dialogue Box**
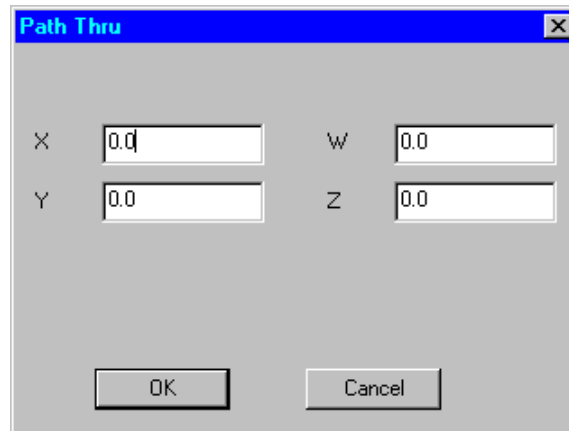
At the beginning of every task, the Z position is set to zero. The Path function is then used to reposition the height by defining a new Z position. At the end of the task, the Z axis will home and reset to the zero position.
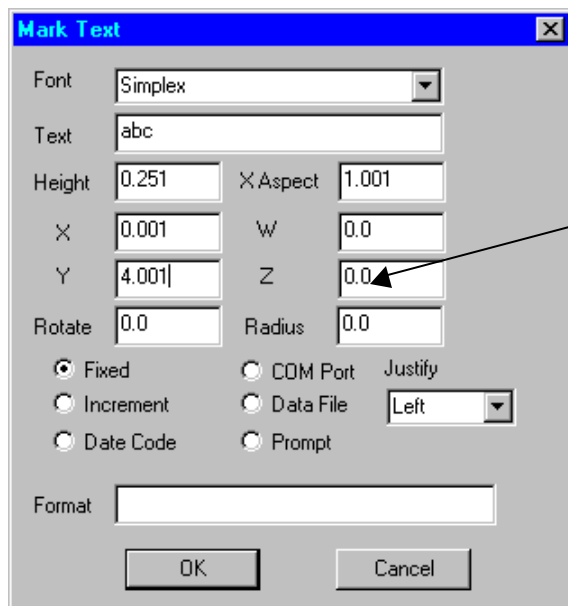
As the stylus wears, the height will need occasional adjustment. This is best achieved by adding an offset value to the Z field. That is, to lower the stylus 1/8 of an inch, set the Z field equal to +0.125.

The Path function can also be used to maneuver the stylus around protrusions on the part. If a part has a high spot that interferes with the stylus, this command can be used to instruct the system which route the stylus should take to avoid hitting the high spot. The Path command can control the X,Y positions and can be used to move the stylus safely around obstacles.

THE Z AXIS

An alternative to the Path function is the Z axis parameter in the marking function dialogue boxes. This value represents the Z axis position for the specific marking function in which it is set. When a marking function is executed within a task that has a value for the Z axis, the Z axis will be moved to the location specified by that value.

Values for the Z axis are entered in the marking function dialogue box when the function is added to a program. Values can be modified at any time by editing the program.

Enter values for the Z axis into the Z field of a marking function dialogue box. Values are in inches.

This is a useful tool when the stylus does not have any obstacles to negotiate in the X,Y plane, but must be positioned in the Z plane. This parameter is not global within the marking sequence, and only affects the marking function in which it is defined.

OUTSIDE DIAMETER (OD) MARKING

Outside diameter marking is accomplished using an "indexing" parameter in marking functions. The OD marker indexing function is set by changing the Justify parameter of the marking function as shown below.
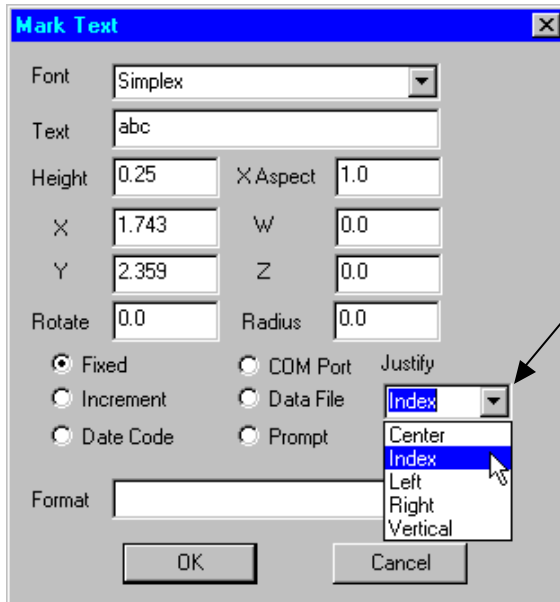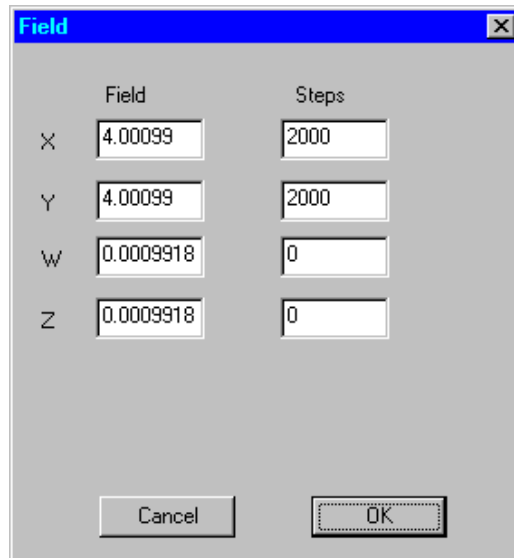
Click the Justify scroll button and select Index.

When the Justify parameter is set to Index, the W axis will rotate the part as it is marked. The W motor rotates the part under the stylus such that each character is marked at the "top-dead-center" of the part. When finished, the W axis is rotated back to the starting position. For OD marking, the X and Y axes are used to generate the mark and the W axis is used to rotate the part.

When performing OD marking, the circumference of the part must be considered. The circumference is calculated and entered into the W Field parameter of the Field dialogue box. To produce a mark with a normal aspect, the field size needs to be properly calculated. The Field dialogue box is shown in Figure 12.2 on the following page.

Figure 12.2: Field Dialogue Box

The number of steps needed to travel the full circumference of the part depends on the gearing of the fixture and the dip switch settings of the stepper motor driver. It is calculated by dividing the number of steps per revolution by Pi (3.14). This value is entered into the W Steps parameter of the Field dialogue box, and is constant for all part circumferences. For a direct coupled stepper motor at 2000 micro-steps per revolution, the value will be 637.

The distance a part travels depends on the circumference of the part. A part with a one inch diameter will travel 3.14 inches in 360 degrees of movement. A part with a two inch diameter will travel 6.28 inches. This comes from the formula for circumference of a circle, Pi d (3.14 * diameter).

MOVEABLE Z AXIS HOME SENSOR ADJUSTMENT.

Some earlier machine Z models have an adjustable Z axis home sensor.
This sensor is identified by a black knob attached to the cover that houses
the vertical shaft, upon which the head assembly travels.

If the Z axis home sensor is moved, then all marking functions which use the
Z axis must be edited to ensure the head does not crash into the part.
Also, if the sensor is adjusted for another part, the system must be initialized
so that the new home location for the Z axis is identified.

Encoder Z Axis

Current machines have a fixed Z home sensor and a special encoder card for
closed loop Z positioning.

ENCODER FEED BACK

0x200
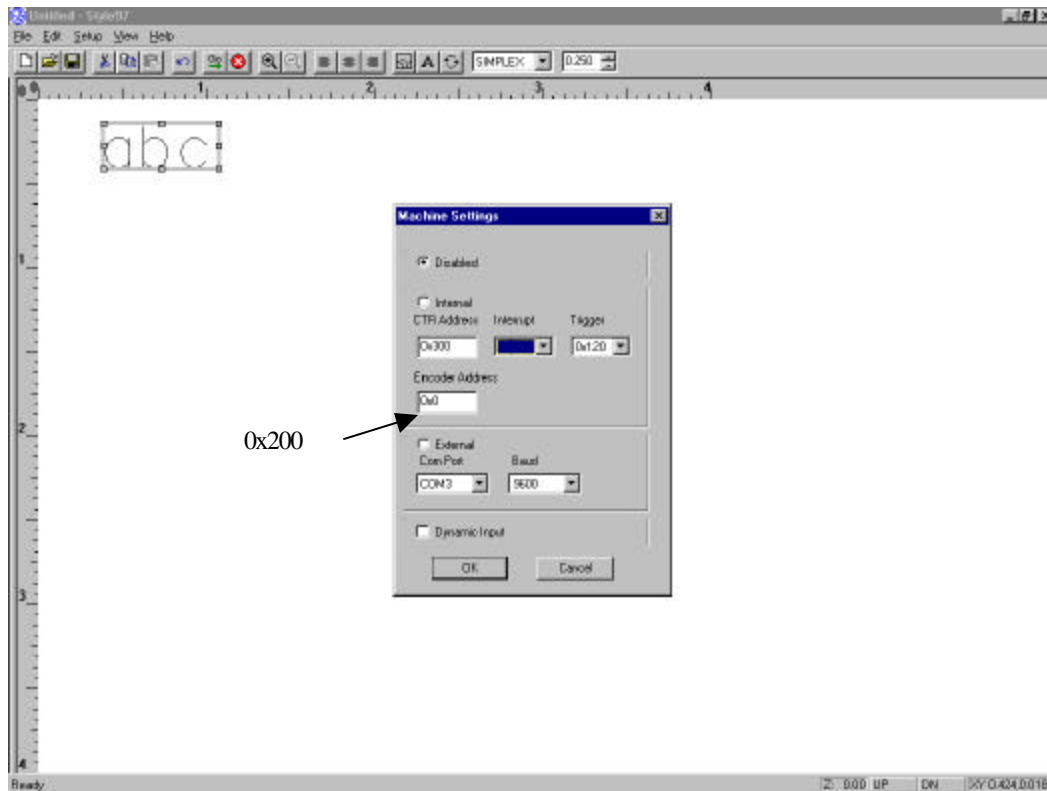
Encoder Option

Encoder Feedback option for Z axis

The machine may be ordered with an encoder to allow for accurate positioning with closed loop control on the Z-axis. This allows the machine to be set to raise and lower between marks and retain a repetitive marking depth.

The setup for the encoder is found under Setup, Machine, as shown above. The address for the encoder may vary but is typically set to 0x200.
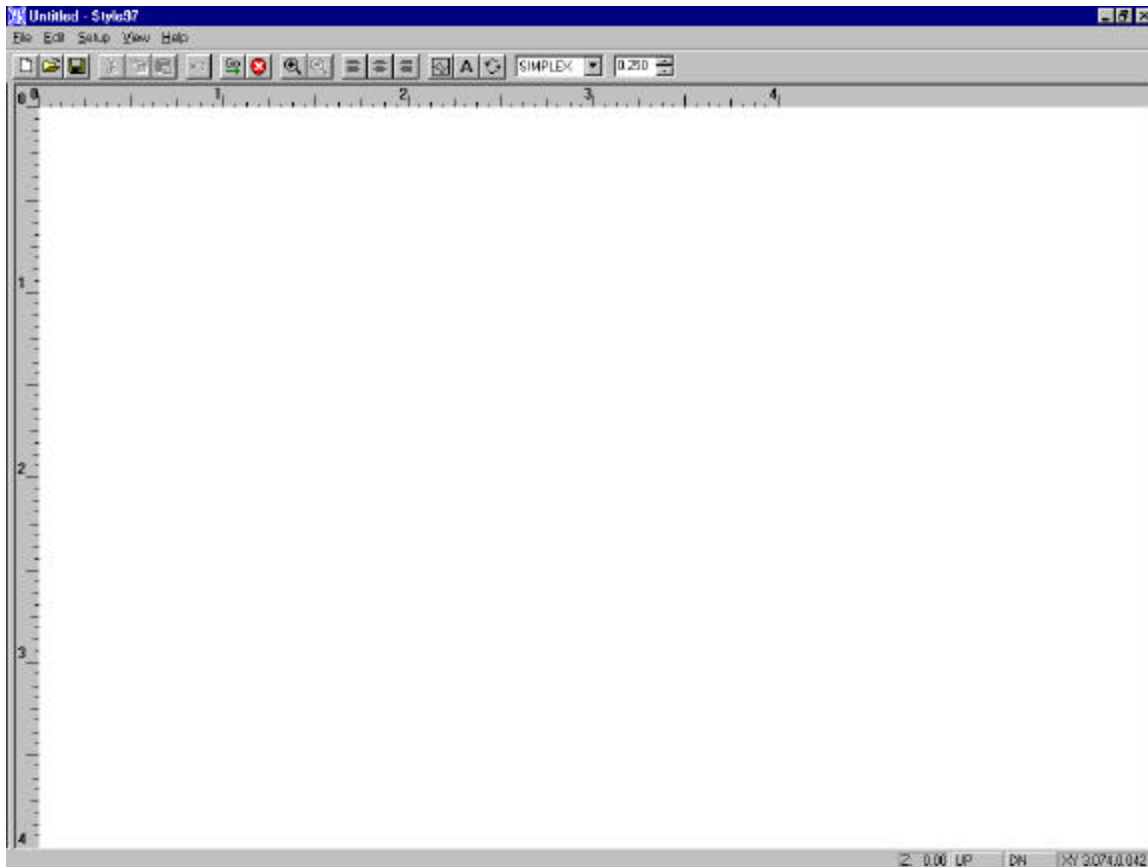
Z axis option

Z Axis Manual Operation (optional)

The Z axis may be operated manually by using the left mouse key to pick the
UP or DN button from the lower right corner of the StyleWrite screen. This
will directly move the stylus up and down the column when it is pressed.
The position of the stylus Z axis will be displayed directly to the left of the
UP DN buttons.
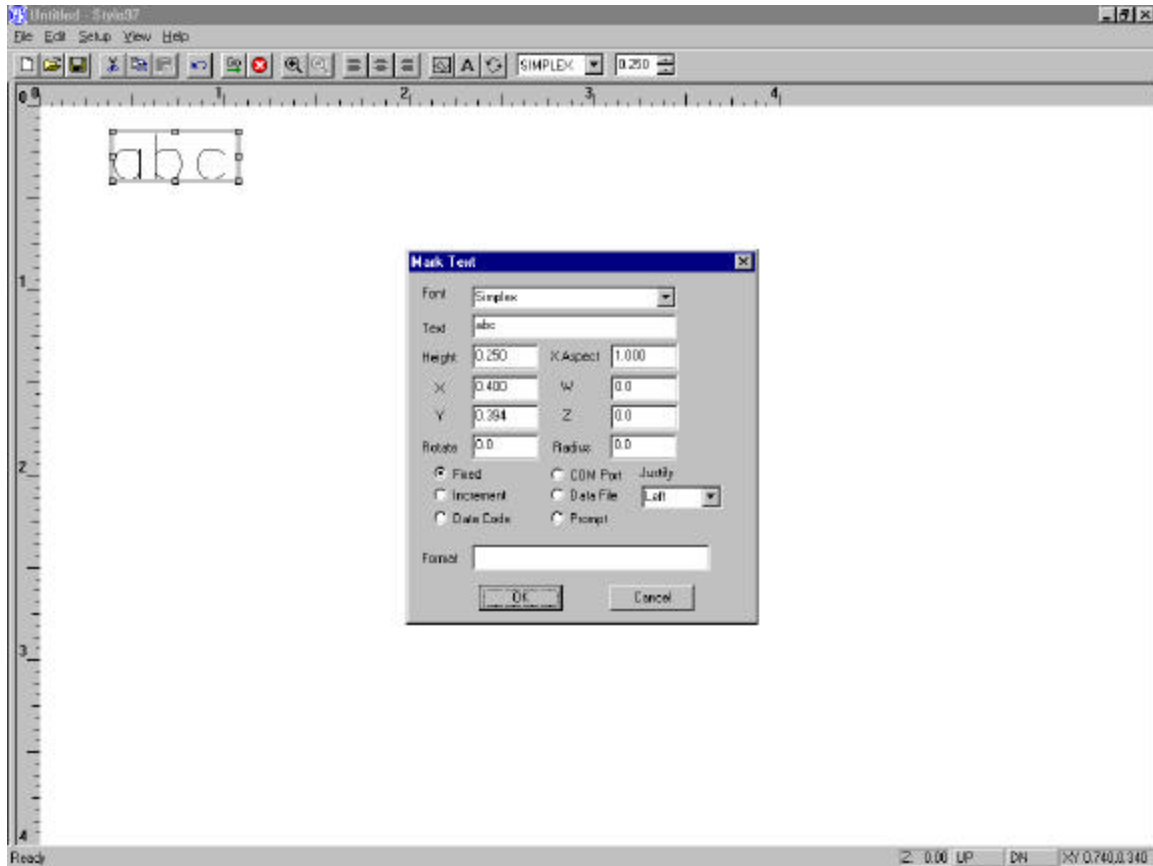
Z-axis Mark Text

Z-axis Mark Text Operations

Text can be marked at different levels using the Z-axis function. Entry for z movement is made in the Z field, and is accepted when ok is pressed.

A radius Z-axis mark is not currently an option, however it can be accomplished using a sequence of multiple mark text commands.
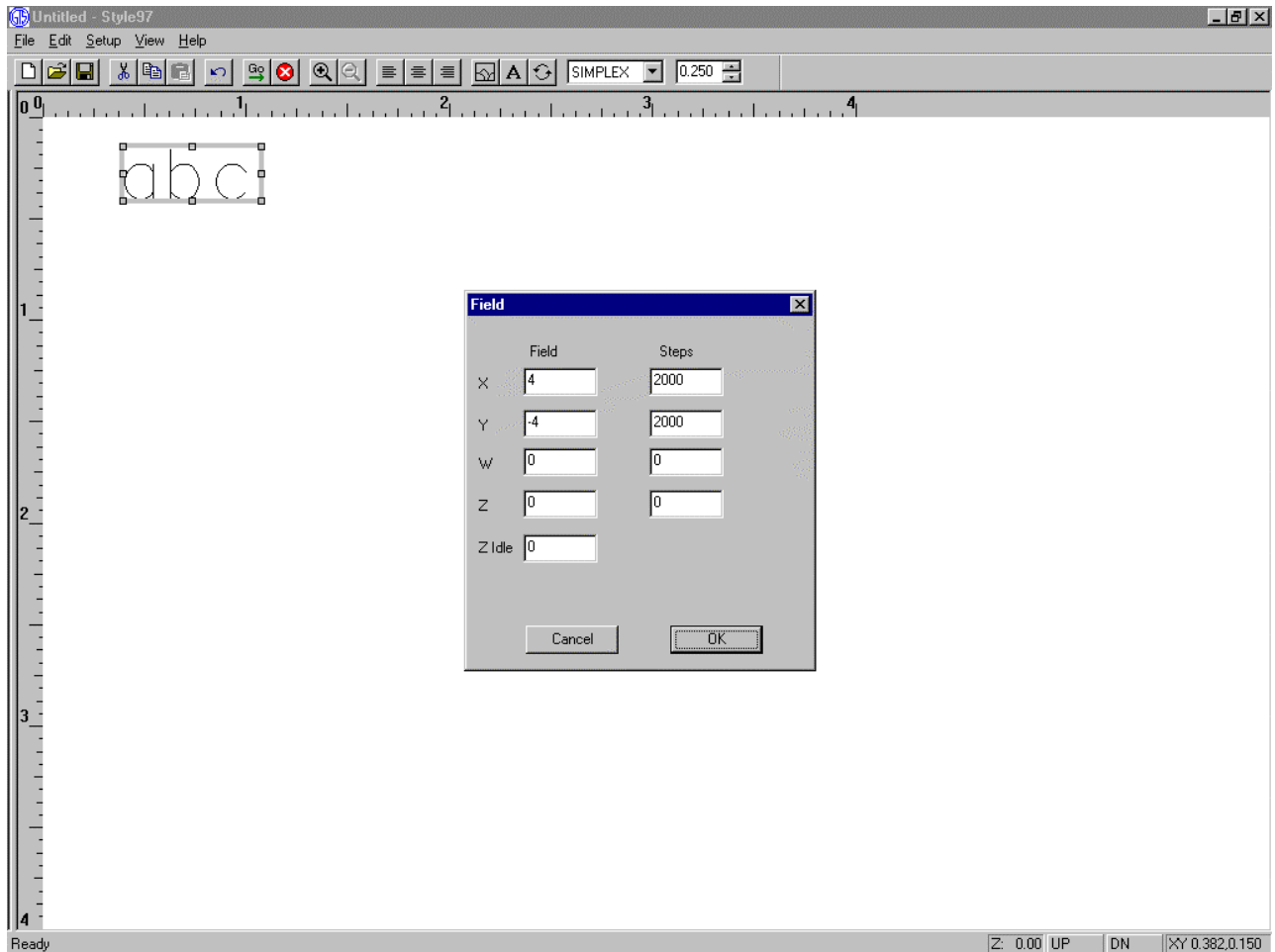
Setup Field for Z-axis Encoder Operation

Z-axis Field Settings

Entry for calibration of the Z-axis is done in the **S**etup, **F**ield, as shown above. The only different item that would be set in a Z-axis machine would be Z idle. Z idle is the normal return height that the z-axis would go to when not in the marking mode.

APPENDIXES

Appendix A

MAIN SCREEN

Minimize screen

Exit

StyleWrite Main Screen

Hide screen

Title Bar

Menu Bar

Toolbar

Reference grid for
positioning shows
entire marking field.

Describes the function of
a toolbar button, and
the status of the stylus.

Indicates position of the
cursor on the grid.

Status Bar
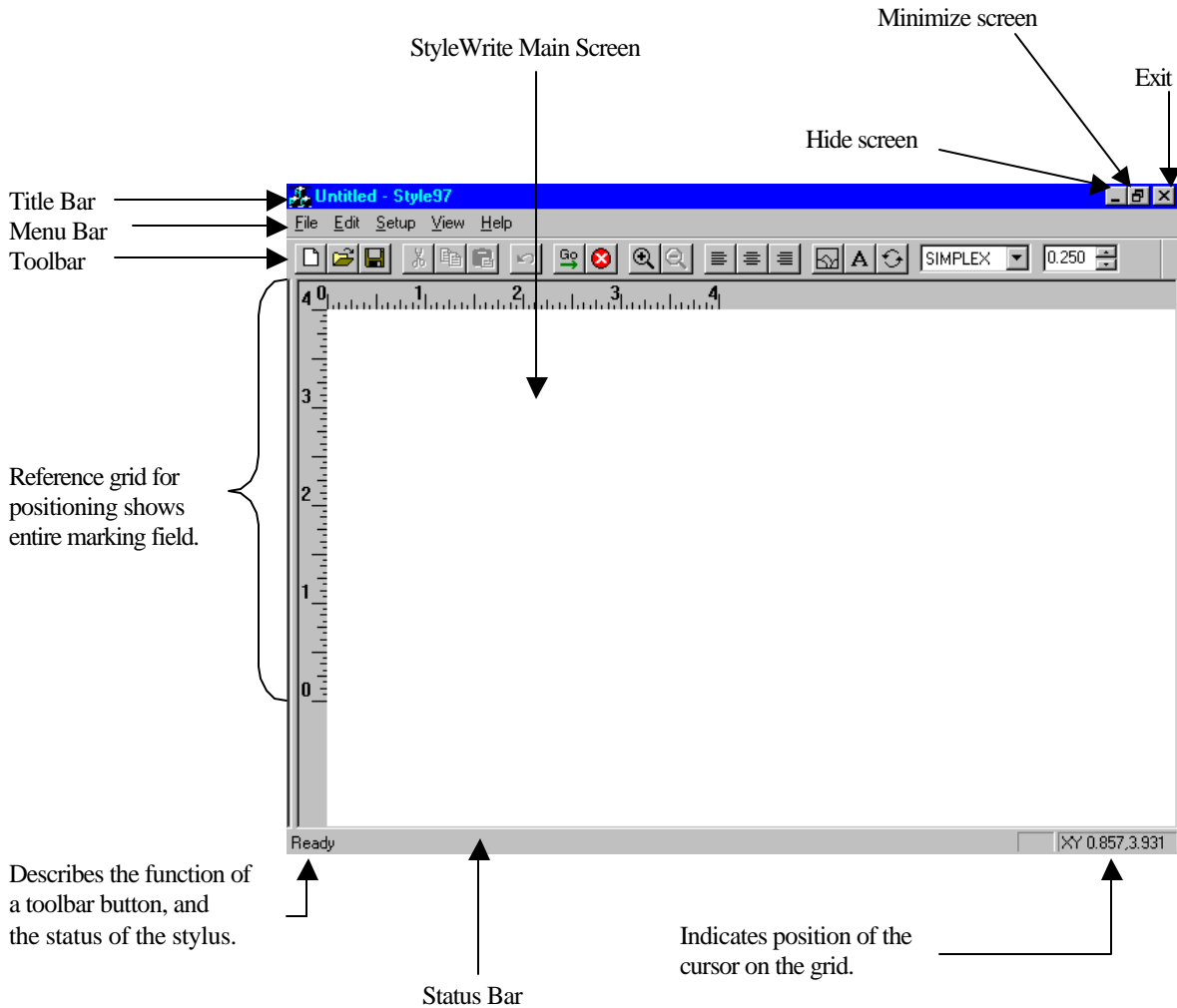
TOOLBAR

You can dock the toolbar to any edge of the StyleWrite main screen by double-clicking
on it, and dragging it to the desired location. To know the function of a particular button
in the toolbar, position the mouse pointer over the button, and its function will be
displayed on the status bar in the lower left hand corner of the screen.

Appendix B

TOOLBAR BUTTONS

File New – Create a new document.

File Open – Open an existing file.

File Save – Save the active document.

Cut – Cut the selection and put it on the clipboard.

Copy – Copy the selection and put it on the clipboard.

Paste – Insert clipboard contents.

Undo – Undo the last function.

Go – Start marking.

Stop – Stop marking.

Zoom In – Zoom in viewing area.

Zoom Out – Zoom out viewing area.

Left Justify – Align text flush left.

Center Justify – Center text between margins.

Right Justify – Align text flush right.

Insert Logo – Insert a logo into the mark.

Insert Text – Insert text into the mark.

Rotate – Rotate the selection.

Appendix C

MARK TEXT DIALOGUE BOX

Mark Text   Marks a series of characters.

Font	Determines the style of text.
Height	The height of the characters.
X,Y	The position of the mark in the field.
Rotate	Allows the characters to be angled by the value in this field.

> **X Aspect**   Affects the dimension of the characters in the X direction. A value of 1.0 produces a normal aspect.

W	Defines the axis for index marking.
Z	Determines the Z axis position for the marking sequence.
Fixed	Anchors the Mark Text sequence to its current location.
Increment	Changes the value of a numerical Mark Text sequence.
Date Code	Retrieves the current date and/or time from the computer clock and assigns it to the Mark Text sequence.
COM Port	Sets the hardware parameters for the non-standard communications ports.
Data File	Imports data from an external source for use in a Mark Text sequence.
Prompt	Allows the operator to set a prompt during a Mark Text marking sequence.
Format	Field for entering the format to define Mark Text parameters such as Increment or Date Code.
Radius	Allows the operator to set a radius dimension.

Appendix D

MARK LOGO DIALOGUE BOX

Mark Logo   Marks a graphic image.
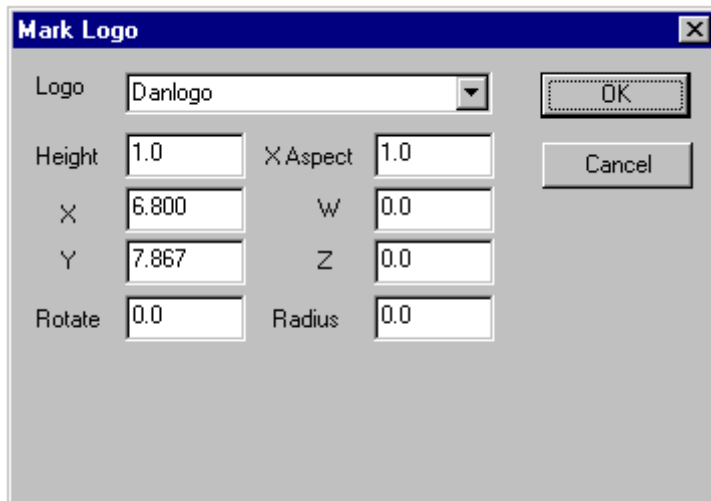
Logo   Allows the user to select the desired logo from a catalogue displayed as a drop down menu.

Height   The height of the characters.

X,Y   The position of the mark in the field.

Rotate   Allows the characters to be angled by the value in this field.

X Aspect   Affects the dimension of the characters in the X direction. A value of 1.0

produces a normal aspect.

W   Defines the W axis position for index marking.

Z   Determines the Z axis position for the marking sequence.
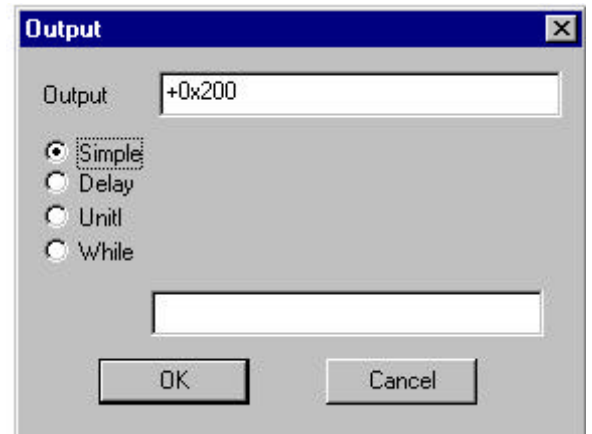
Radius   Determines the radius from the center to allow for proper marking of the part.

Appendix E

INPUT/OUTPUT FUNCTIONS
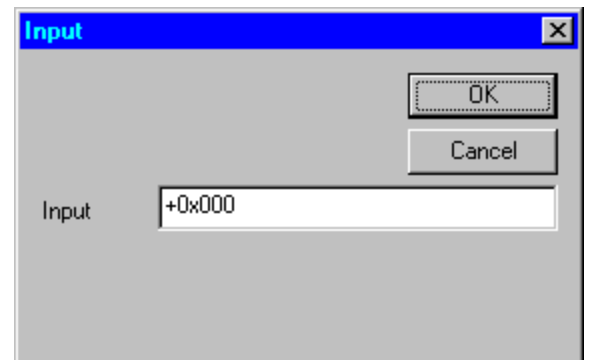
Output   Sets the state of an output bit. An address
Function   preceded with a "+" will turn the bit ON.
                   A "-" will turn the bit OFF.

Output   Output module address.
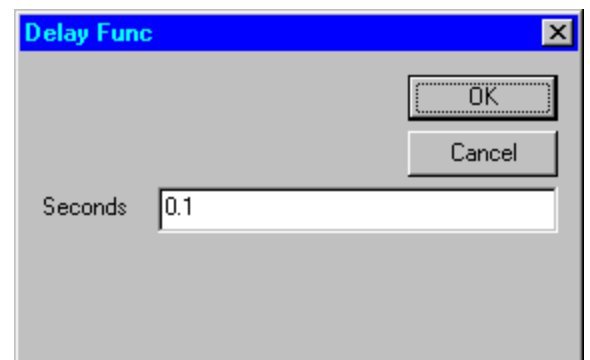
Input Function Waits until the specified output is received.
                   It can wait for either an ON or OFF state.

Input   Input module address.

Delay Function Delays program execution for a specified
                   period of time.

Seconds   Delay period in seconds.

Appendix F

IF NODE FUNCTION

If Node   Performs the marking sequences located within the If Node program logic, if prompted by a defined input, or queued by the operator.

Input   Allows the user to define the input that will start the marking sequence located inside the If Node, when made true.

Parms   Field for defining the address of the desired input(s).
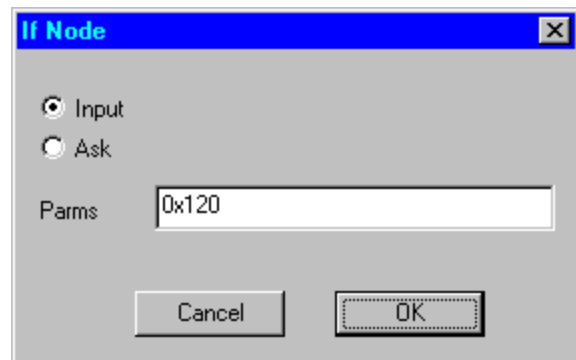
Ask   Allows the user to set a prompt to be displayed during the marking sequence.

Parms   Field for defining the prompt to appear during the marking sequence.
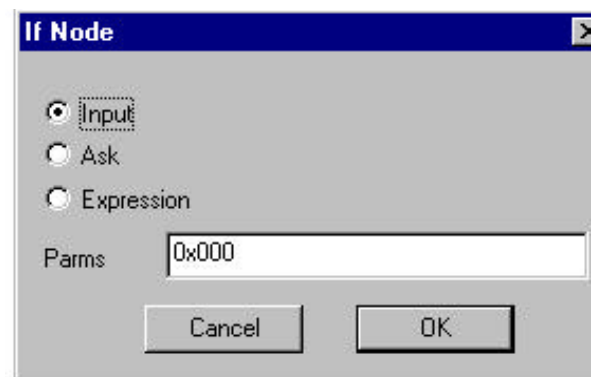
Appendix G

PLOTTER CONFIGURATION TO PLACE Acad13 DRAWINGS INTO StyleWrite or Style97

1. Start **Acad13**.
2. Go to the **Options menu** and select **Configure**.
3. Press **<Enter>**, then select option **2** (Allow detailed configuration).
4. Enter **Y** and press **<Enter>**.
5. …additional questions will be asked…**<Enter>**.
6. From the configuration menu, select **5** and press **<Enter>**.
7. Select **1** (Add a plotter configuration), press **<Enter>**.
8. Select **8** (Hewlett Packard (HPGL) ADI 4.2 – by Autodesk, Inc.) **<Enter>**.
9. Select **1** (Model 7475), press **<Enter>**.
10. Port time-out is **30** (Default, so press **<Enter>**).
11. Select period (**.**) for non, since plotting to a file **<Enter>**.
12. Do you want to change anything? **Y <Enter>**.
13. Change any of the above parameters? **N <Enter>**.
14. Calibrate plotter? **Y <Enter>**.
15. Accept next four defaults **<Enter> <Enter> <Enter> <Enter>**.
16. At optimization request, select **0** (no optimization).
17. Write the plot to a file? **Y <Enter>**.
18. Size units: **I <Enter>**.
19. Plot origin: **0.00, 0.00 <Enter>**.
20. Drawing size: **A <Enter>**.
21. Rotate plot: **0 <Enter>**.
22. Adjust area fill: **N <Enter>**.
23. Remove hidden lines: **N <Enter>**.
24. Plotted Inches = Drawing Units? **1=1 <Enter>**.
25. Enter a description for this plotter: **Styliner <Enter>**.
26. At exit to configuration menu, select **0 <Enter>**.
27. At exit to drawing editor, select **0 <Enter>**.
28. Keep conf. changes? **Y <Enter>**.

This will now add the "Styliner" device option to the Device Selection in the print menu. It will automatically save the plot as a file.

When plotting (printing) the drawing, select the **Styliner** device as the printer, and save the *.PLT plot in the StyleWrite directory for future conversion by the StyleWrite program to a *.BIL file. Remember the name of the *.PLT file, since you will select that in StyleWrite to convert it to a *.BIL file.

Appendix H

PLOTTER CONFIGURATION TO PLACE Acad14 DRAWINGS INTO StyleWrite or Style97

1. Start **Acad14**.
2. Go to the **File Menu** and select **Printer Setup**, then **Printer Tab**.
3. Select **New**.
4. Select the **Hewlett Packard (HPGL) ADI 4.2 – by Autodesk, Inc.** from that list.
5. Select **OK**, and select **1** (for the 7475).
6. At **"What is your plotter connected to?"**, accept the default of **<S>**.
7. Port time-out is **30** (this is the default, so press **<Enter>**).
8. Select period (**.**) for non, since plotting to a file **<Enter>**.
9. Do you want to change anything? **Y <Enter>**.
10. Change any of the above parameters? **N <Enter>**.
11. Calibrate Plotter? **Y <Enter>**.
12. Accept the next four default relocations: **<Enter> <Enter> <Enter> <Enter>**.
13. At optimization request, select **0** (no optimization).
14. Write the plot to a file? **Y <Enter>**.
15. Size units (inches or millimeters) default **<I>: <Enter>**.
16. Plot origin: **0.00, 0.00 < Enter>**.
17. Drawing size: **A <Enter>**.
18. Rotate plot: **0 <Enter>**.
19. Adjust area fill: **N <Enter>**.
20. Remove hidden lines: **N <Enter>**.
21. Plotted Inches = Drawing Units? **1=1 <Enter>**.
22. Select the **7475** description (or **M**odify to rename it to, e.g. Styliner Plotter). The highlighted device is automatically selected as the default for this session.
23. Select **OK**, to use the plotter for this session. You need to change back to your other (system default) printer/plotter, to plot an actual drawing.

This will now add a "7475" or "Styliner Plotter" option to the Device Selection in the print menu. It will automatically save the plot as a file.

When plotting (printing) the drawing, select the **7475** or **Styliner Plotter** device as the printer, and place the *.PLT plot in a selected directory for future conversion by the StyleWrite program to a *.BIL file.

Remember the name of the *.PLT file, since you will select that in StyleWrite to convert it to a *.BIL file.

Appendix I

PLOTTER CONFIGURATION TO PLACE **AutoSketch** DRAWINGS INTO **StyleWrite/ Style97**

1. From the **Printers** menu in Windows 98, (Start -> Settings -> Printers) select **Add a New Printer** Icon.
2. Select **Local Printer** in the Printer Wizard window, press next
3. **Select HP** from the manufactures list, and
4. Select **HP 7475A** from the Printers list
5. Click OK
6. Follow the **Windows instructions** to load the HP 7475 A driver (from Windows 98 CD)
7. At the plot configuration screen, select **File: Creates a file on disk.**
8. **Provide a name** for this Printer in the Wizard screen (e.g. HP 7475A) and
9. **Select NO** at the question if you want this as a default printer, go next
10. **Select NO** for testing a print page**.**
11. If asked, you may have to provide the **Windows 98 CD** to retrieve the driver.
12. Select **Finish**

This will now add a "HP 7475A" option to the Device Selection in the print menu.

13. In AutoSketch, draw the appropriate design. Note that text is **not** converted. It is only for **geometric shapes**! If required, Alpha Numeric characters need to be drawn from individual lines and curves (i.e. Logo Style).
14. When completed, select **Print** from the **File Menu**, and select the Plotter (or HP 7475A.) Also, check off the **Print to File** and **Print all Black** boxes on this screen.
15. Select OK
16. Give the file a name in the print file window, and **save it in the C:\Style97\bi directory.**

Remember the name and location of the *.PLT file, since you will select that in StyleWrite to automatically convert it to a *.BIL file.

17. Open **StyleWrite.**
18. Select the **Logo Icon** (left of A) and navigate to the **C:\Style97\bi** directory to select your file.
19. When loaded into StyleWrite, drag that logo down into the screen and operate the **Rotate Icon** (first Icon on the right,) until the logo is in the correct orientation/ - location, and the whole logo is visible.
20. Size and locate the drawing in the window, as required for placing the mark on the part.

Appendix J

PLOTTING

PLACING THE PLOT FILE INTO THE StyleWrite PROGRAM

If not already saved, save or transfer the *.PLT file to the
StyleWrite BI directory. (C:\Style97\bi)

1. Run the StyleWrite program.

2. Follow the instructions in the StyleWrite manual concerning opening a file and
   marking a logo.

Appendix K

THE ET (EXTENDED-THROW) STYLUS

1.   General

The ET Stylus has a greater work range where it can apply a mark, and is typically used on automated systems where uneven material is marked, or where the marking surface has a slight radius. The air pressure can be adjusted from approx. 40 PSI to 90 PSI, to provide an increasingly deeper mark. However, too much pressure may stall the Stylus, depending on material and height settings. A higher marking depth is at the expense of the life cycle of the equipment, and using the ET Stylus requires special considerations.

The ET acts like a specially triggered, single acting air cylinder, with a stroke of approx. 1/2". The effective marking range depth is approx. 1/4" when the tip of the stylus is placed 1/4" away from the work. Thus, a variation of approximately 1/4″ in material height to be marked can be easily accepted.

2.   Safety

Because of the greater clearance between the tip of the Stylus and the material to be marked, special guarding considerations are required to ensure that an operator will not have access to the marking area when the Stylus is operating. In automated or mounted Systems where there is no operator involved this is taken care of by either guarding or light curtain use.

In applications where the parts are manually placed, guarding or light curtains are mandatory.

3.   Software Parameters

When using the ET Stylus, there are a number of settings in the StyleWrite Software Program, which affect the operation of the ET Stylus. Changing one parameter may require changing one or more other parameters. Chapter 7, the SETUP menu in the software manual defines these parameters under SPEED, page 4.

An important parameter is shown in the DUTY CYCLE paragraph, which shows that this duty cycle should be somewhere between 55 and 75, which is to be pragmatically established. This is generally done at the factory during "burn in," but can be adjusted in the field. Note that for the **Standard Stylus**, the duty cycle **is set at 1.**

4.   Setup

When setting up the working distance, start by placing the Stylus tip approx. 1/4" away from the part to be marked. Decrease or increase this distance as needed to get the optimal mark over the whole range to be marked.

THE ET STYLUS

The ET stylus is a stylus assembly, which has a greater marking range. The "throw", or stroke, of the ET stylus is approximately 1/2". This allows for parts that have up to ¼" surface variation.

The ET stylus functions like a single-acting air cylinder actuated by a specially triggered solenoid valve. Unlike the standard stylus, which oscillates by exhausting the airflow on the down-stroke, the ET stylus is energized and de-energized at the rate established in the software parameters.

SOFTWARE REQUIREMENTS

STYLEWRITE includes the settings for using the ET, under SPEED, in the SETTINGS - Menu, see Chapter 7. The DOS program "Style4O" is required for DOS based systems.

SAFETY CONSIDERATIONS

The increased open distance between the stylus tip and the marking surface requires special machine guarding consideration when the operator has access to the marking area. Typically, this is required in manual operations where the parts are placed in the marking area by an operator. In these instances, Dual Palm Buttons, special guards or light curtains are mandatory.

In automated Systems, or mounted operations, where there is no operator intervention to place and/or remove parts, guarding is generally performed by the safety guards of the parent system.

OPERATIONAL PARAMETERS

Chapter 7 shows the various components, which affect the appearance of the mark and the performance of the ET stylus. These factors are interrelated. This means that a change to one component may necessitate a change in one of the other factors. In some cases a change to one component may be small enough so that a change to the other components is not required.

The quality and appearance of a mark is subjective to the user of the equipment. Each individual user must experiment with the settings of the various components to determine the value for each component that produces a mark which best satisfies the requirements of the user. In the following sections starting values for the components are provided. From these values, testing can begin to find the optimal settings for the specific application.

AIR PRESSURE

For the standard-stroke (non-ET) stylus set the pressure to 80-90 PSI.

The air supply to the stylus should be clean and dry. The nominal setting for the pressure is 70 PSI. Stylus size dependent, the range of air pressure is 40-90 PSI. The stylus may function at settings outside this range, depending on the settings of the other components. Changing the pressure will affect the depth of the mark. The stroke of the stylus is not perceptibly changed. The force behind the stylus determines the depth that the stylus contacts the work. Increasing the pressure will produce a deeper, wider mark. Decreasing the pressure produces a shallower, more defined mark.

DISTANCE FROM MARKING SURFACE

For the standard-stroke (non-ET) stylus, start by setting this distance to approx. 1/8"

The distance from the marking surface affects the appearance of the mark in much the same way as changes to the air pressure but not to as great an extent. The nominal setting is approximately 1/4 from the tip of the stylus to the marking surface. If the marking surface is uneven or curved, choose a point that represents the mid-point of the marking surface extremes.

FREQUENCY SETTING

For the standard-stroke (non-ET) stylus, set this value to 0.

The frequency setting determines how quickly the stylus solenoid is energized and de-energized. Changes to this setting allow the user to control the appearance of the mark. A lower setting will produce a mark with fewer impact points per character. The setting can be set so low that the mark almost appears to be a dot matrix font. Too high a frequency setting causes the solenoid to stay on without oscillating. The nominal setting is 55. The range is between 40-70.

The frequency is set in dialogue menu, as shown in Chapter 7. This menu can be edited via the drop down menu on the main editing screen. Select the SETUP option on the menu bar on top of the screen, then SPEED from the sub-menu that appears.

DUTY CYCLE SETTING

For the standard-stroke (non-ET) stylus set this value to 0.

The duty cycle is set in the SPEED menu. Select the SETUP option at the menu bar at the top of the screen, then SPEED from the sub-menu. The duty cycle setting determines the percentage of time between the energized state and the de-energized state of the stylus solenoid. This setting is used in conjunction with the frequency to produce the desired depth and quality of mark. The nominal setting is 50%. The range is between 40-80%.

APPENDIX L

The High-Speed (HS) and High-Speed-Heavy-Duty (HS-HD) Stylus Assemblies

1.   General

Depending on the particular design, the High-Speed Stylus has a total working range of approximately 5/16". The start height, or gap between part and Stylus tip, varies slightly depending on the design and air pressure setting. But, in general, the start height will be approximately 3/16" from the marking surface.

The air pressure can be adjusted from approximately 20-100 PSI for the standard High-Speed Stylus, and between 45-100 PSI for the Heavy-Duty-High-Speed Stylus, to provide an increasingly deeper mark. A deeper marking depth is at the expense of the life of the Stylus carbide, and replacement of the Stylus pin will be more frequent.

The High-Speed Stylus acts like a specially triggered, spring returned, air cylinder which oscillates by exhausting the air flow on the down-stroke. A solenoid valve supplies air pressure to the Stylus while marking and then shuts off the supply between characters and mark string.

2.   Safety

Because of the variable start gap between the Stylus and the marking surface, operators should be educated to the possible pinch point between the Stylus and the marking surface. In automated or mounted systems, where there is no operator involved, this is addressed by either guarding, or the use of a light curtain.

3.   Software Parameters

When using the High-Speed and High-Speed-Heavy-Duty Stylus Assemblies there are a number of settings in the StyleWrite Program, which affect the mark appearance. Chapter 7, the "Set Up" menu in this software manual, defines these parameters under; Speed, at page 4.

HIGH-SPEED AND HIGH-SPEED-HEAVY-DUTY STYLUS ASSEMBLIES AND STOCK NUMBERS

|	HIGH-SPEED STYLUS	HIGH-SPEED-SHORT STYLUS	HIGH-SPEED-HEAVY-DUTY STYLUS	HIGH-SPEED-HEAVY-DUTY SHORT STYLUS
COMPLETE ASS'Y	010376	010377	010378	010379
STYLUS BODY	010354	010357	010367	010370
STYLUS PIN ASS'Y	010353	010356	010366	010369
SPRING	010187	010187	010337	010337

APPENDIX: M

Table Implementation:

A lookup table can be created in StyleWrite. To do this pick Edit then Table from the drop down menu. At this point a window called Open will appear. The look in folder used for loading tables should be table. You can select a table (like example.txt) or create your own custom table.
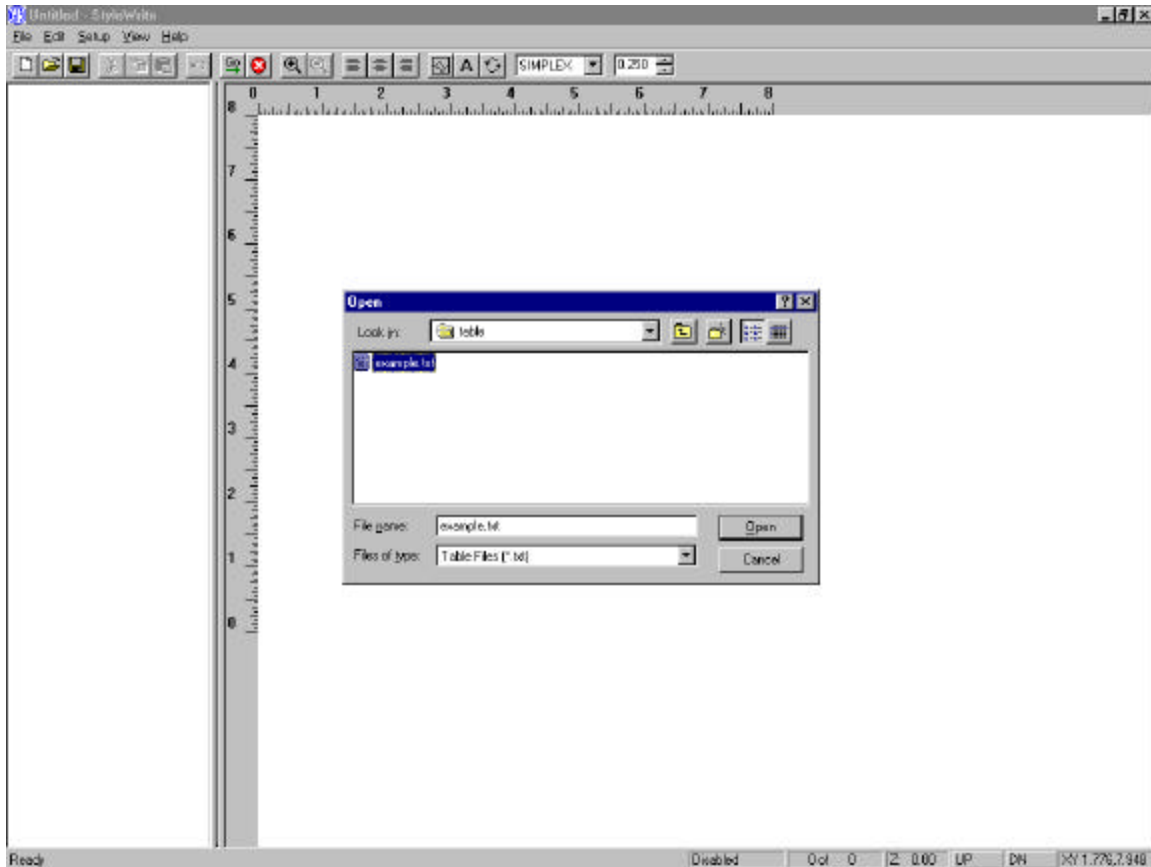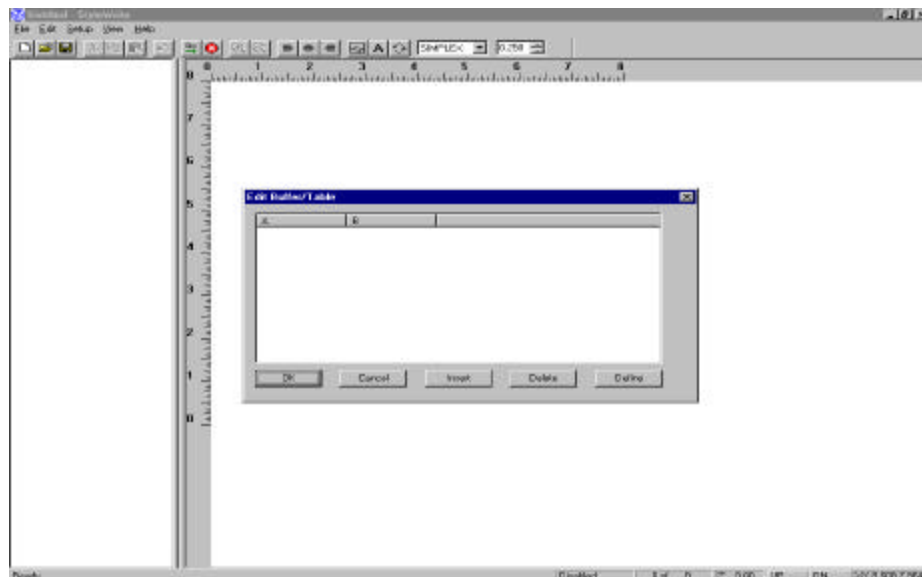

It can be assumed that if a table will be required, it will be custom designed for the project.

To create your own table:

Type in a name describing the table that you want to create, and then click the enter button. For example we will open a table called "lookup table".
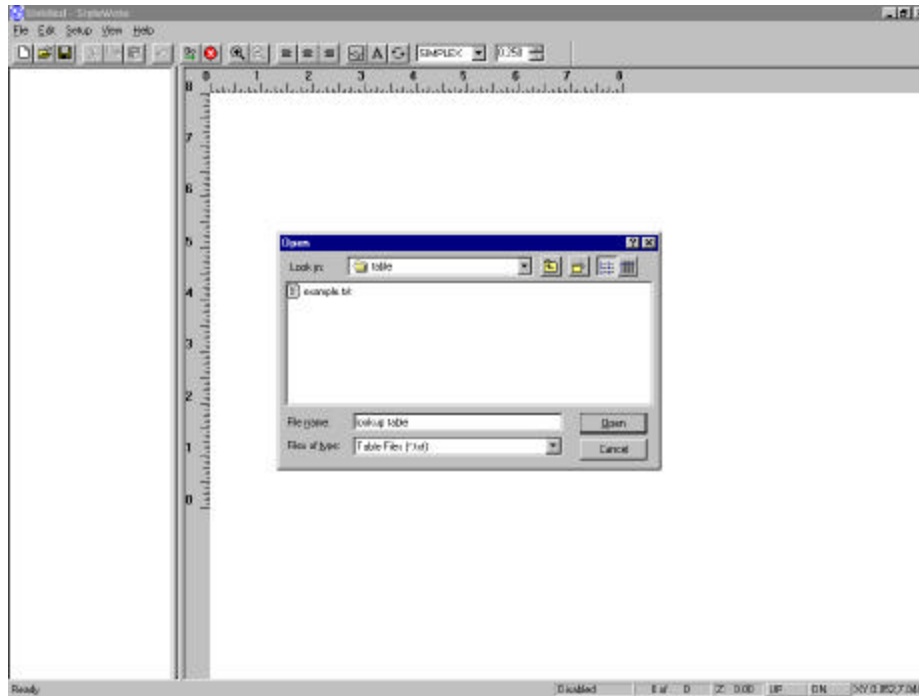
The next screen to appear is Edit Buffer / Table after pressing the <u>O</u>pen button.

The default is for two fields in the new table. To increase the fields click the Define button and a Define Field appears. This is where the number of fields and the names for the fields can be entered. Click the up arrow to increase the number of fields that you need in the data table.
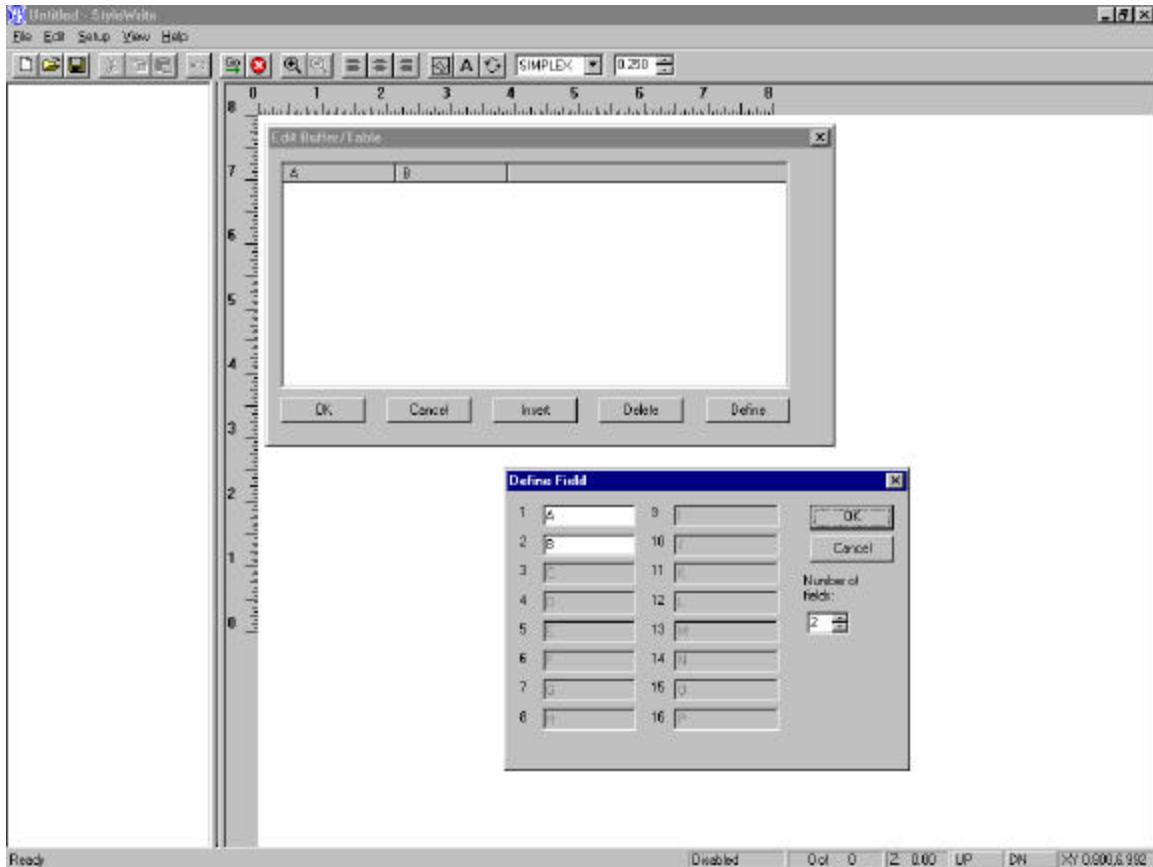

When the correct quantity is selected press OK. This will change the screen to allow for entry of variable names in the selected number of fields in the table.

Enter the descriptive names in the fields. This is done by left clicking the white areas next to the numbers (1 to 16 max).
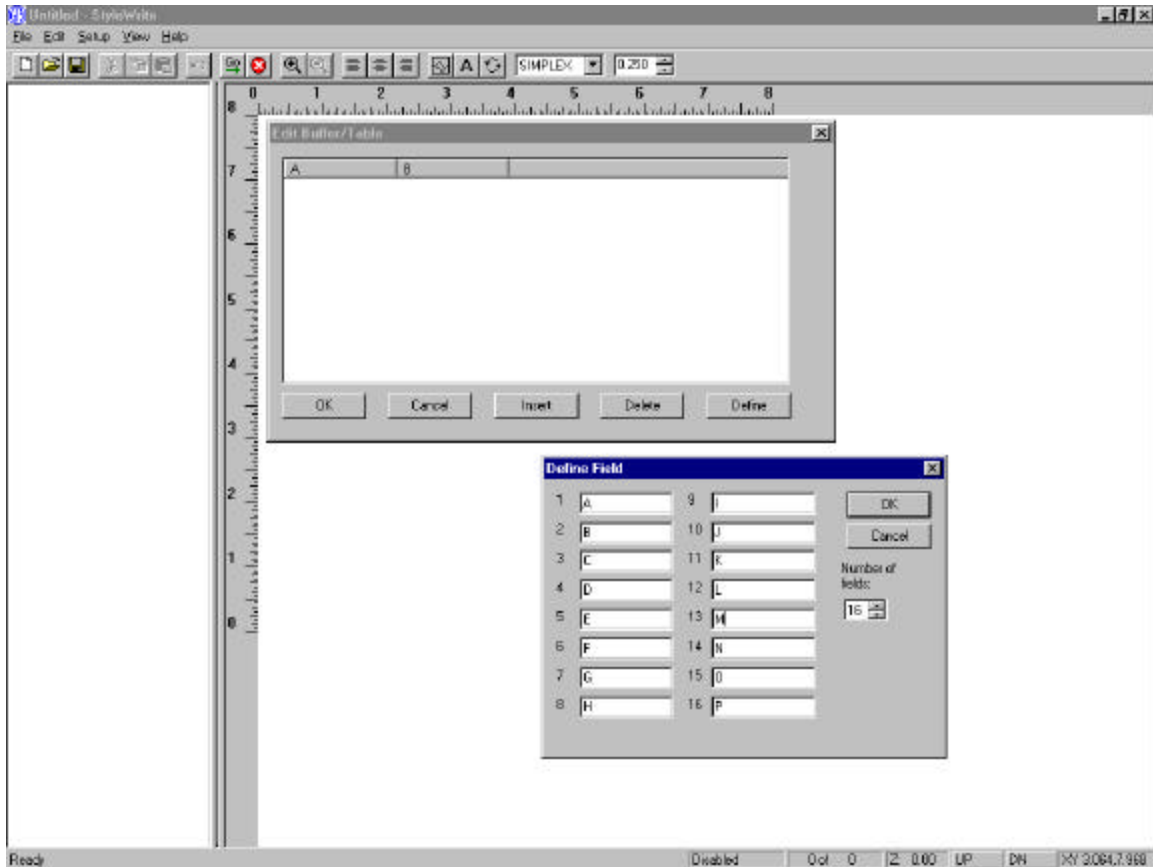
Take care to remember that field #1 (default name A) is the index field for lookup. When finished entering the field names click OK to close the Define Field window.

The Edit Buffer /Table window will appear with the new names for the fields across the top.
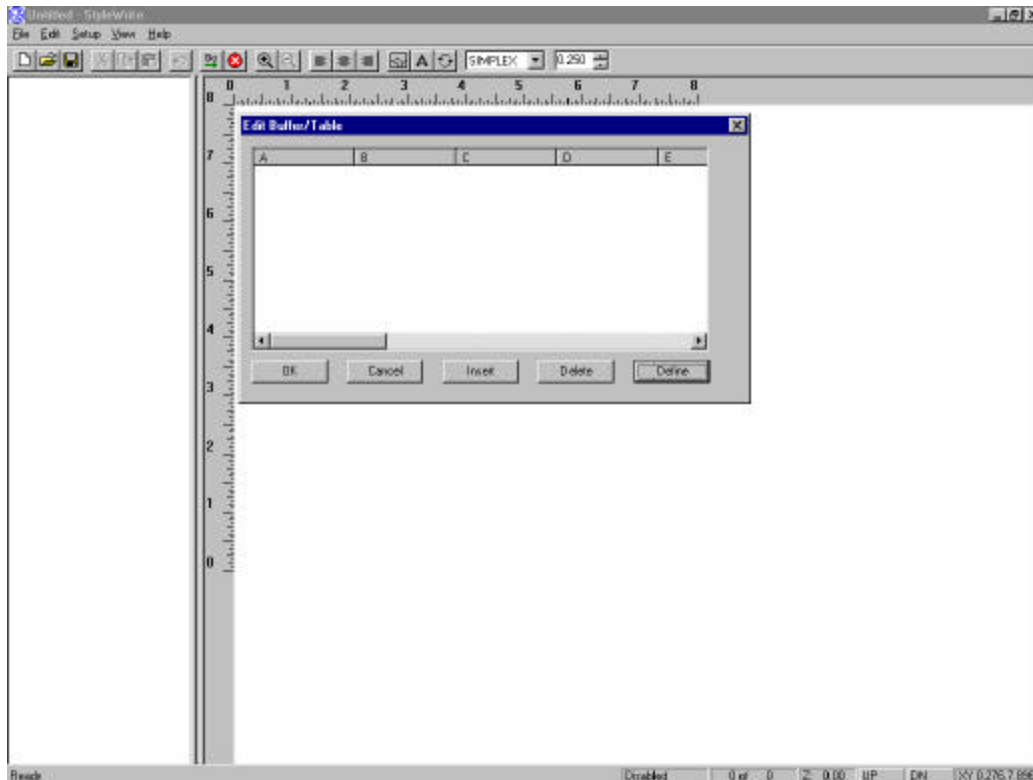

Data may be entered manually at this point. Or the data may be loaded from the from the program using the serial Com port or data files. Examples of these operations follow.

Manual data entry in a table

After following the proceeding steps (Edit, Table, select file then Open) left click Insert, at this point a blue field New Item will appear. Double click this New Item and type in the data to enter in the table. Whatever is typed will appear red until enter is pressed. Select additional fields to enter data by double clicking available areas each column desired. If additional records (rows) are desired insert must be pressed again. Continue to edit the table until finished.
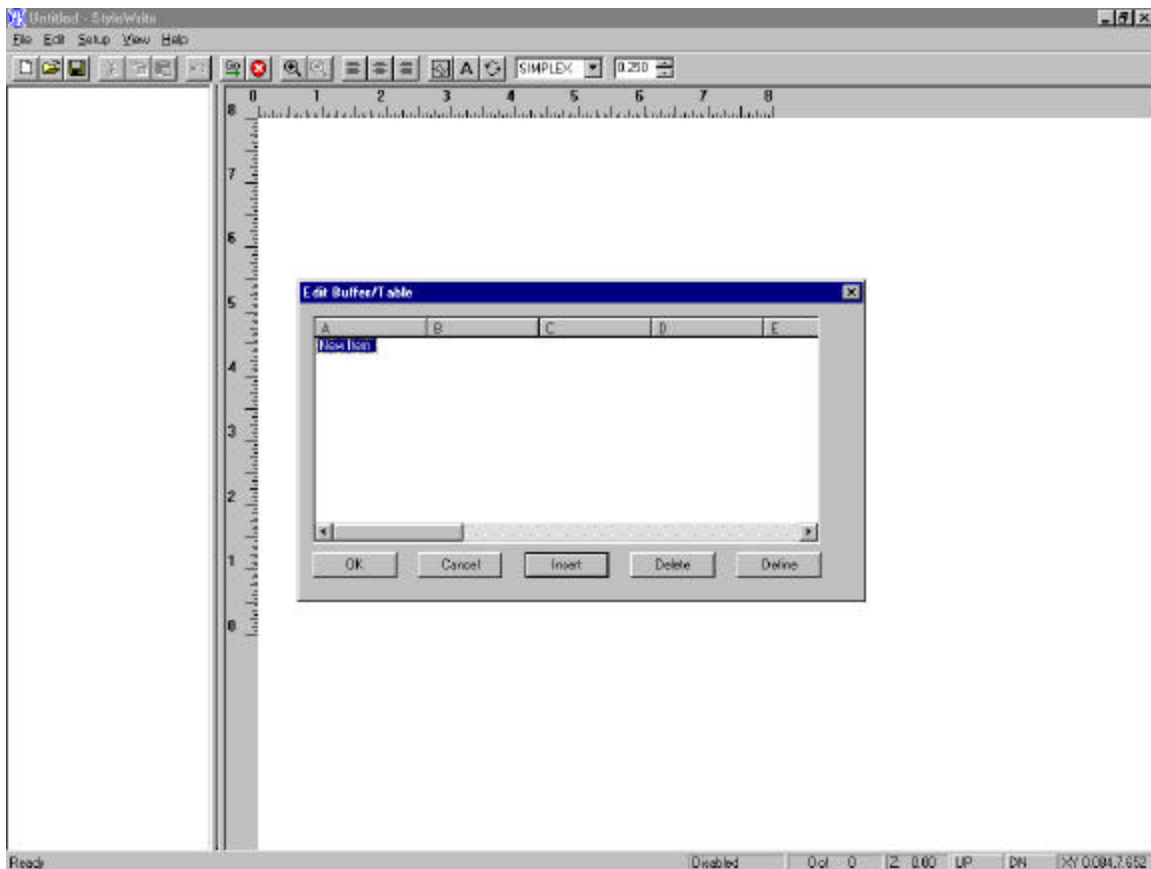
Now that the table has been created and is loaded, it is ready to be used for lookup in a program. Press OK to finish.