

WindowIn on DataCAD

The Newsletter for DataCAD Users

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PURPOSE OF "WindowIn on DataCAD"

DataCAD is a flexible tool which can be used in many applications requiring design and/or drafting. The authors have applied DataCAD to architectural design and drafting, subdivision layout, forms design and graphical presentation of systems (and software) design, among other areas. From such diverse applications, extensive knowledge has been gained on the use of the DataCAD commands. **This knowledge and the results of our continued involvement with DataCAD will be shared through "WindowIn on DataCAD".**

In DataCAD there are usually a number of methods available to accomplish a given task -- some more efficient than others. *With the pressures of "getting the job done", many users do not have time to seek more efficient methods or even explore the use of other potentially useful or time-saving commands.* One person recently related the story of a user who was unfamiliar with a certain DataCAD command. Once its capabilities were demonstrated, the user indicated that a number of hours could have been saved in one project alone.

"WindowIn on DataCAD" will provide users with detailed insight into the use of the DataCAD commands. Each issue will highlight the use of a few commands and will present detailed examples of their use, as well as their interrelations with other commands. The examples will be presented in a step-by-step fashion using "real-world" situations.

"WindowIn on DataCAD" will provide a "Forum" in which users will be encouraged to ask questions and to share tips or techniques with others. Comments and suggestions on the content or format of "WindowIn on DataCAD" are welcome.

Articles from other knowledgeable organizations and persons will be solicited to provide as broad a perspective on the use of DataCAD as possible.

To assist in protecting your investment and to enhance the use of your CAD facility, additional articles will be included on the following topics:

- Use of DOS commands and the DOS environment.
- Recommendations for managing a CAD facility.
- Technical advances in hardware and software as appropriate for DataCAD users.

Indexes of "WindowIn on DataCAD" will be published on a periodic basis, thus providing a valuable reference library.

SUBSCRIBING TO "WindowIn on DataCAD"

This issue is a complimentary copy. Please feel free to make copies and pass them on to your fellow DataCAD users. To subscribe to "WindowIn on DataCAD", refer to the last page.

In honor of the "First DataCAD End User Meeting" in Washington, D. C., a ten percent discount will be offered to those who subscribe prior to 1 October 1987.

ABOUT THE AUTHORS

C. L. Davis Consulting Associates, Ltd. is a Vermont corporation located in Middlebury, VT. The principals represent over fifteen years in software design, development and implementation, over ten years in the teaching profession and have backgrounds in civil engineering, surveying, architecture and construction. The Company has been working with Microtecture as a member of their "Beta Test" and "Certified Developers" teams, and have established comprehensive DataCAD training and support programs.

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BACKGROUNDDataCAD VERSION

All discussions presented herein are oriented toward DataCAD version 3.1 or later. If you are operating with an earlier release, certain of the capabilities and/or commands discussed may not be available. To obtain the latest release of DataCAD, Version 3.1b, contact your dealer or Microecture.

FORMAT OF NEWSLETTER

The following format is used in the presentation of DataCAD commands and examples of their use:

- **CAPITALIZED BOLD LETTERS** are used to identify DataCAD commands.
- *Italicized letters* are used to identify user input, DataCAD prompts and the DataCAD shortcuts, which can be used to go directly to a command or menu without searching through the command menus.
- **Sentences highlighted with bold type are important aspects of the command or function which should be carefully noted.**
- *Sentences highlighted in italics are additional general points which should also be noted.*

USE OF MOUSE

The **LEFT BUTTON** on the **MOUSE** is used to define points when not entering data from the keyboard. This button is also used to select items in response to DataCAD prompts. **As a general rule, when a DataCAD prompt begins with either "Point to ..." or "Select ...", the LEFT BUTTON should be used.**

The **MIDDLE BUTTON** is controlled by the **OBJECT SNAP** menu. To use this feature place the cursor (crosshairs) close to the desired point or condition, and press the **MIDDLE BUTTON**. DataCAD will determine the point closest to the cursor *which satisfies the criteria you have established in the OBJECT SNAP menu*, and attaches the cursor to that point. **The MIDDLE BUTTON should be used whenever you are "referencing" existing points in a drawing** If you have a **MOUSE** with only two buttons, the letter "n" duplicates this function.

The **RIGHT BUTTON** is used to terminate drawing a sequence of lines, terminate a command or exit from a menu.

Focus of this Issue: Using the REFERENCE POINT

Proper use of the **REFERENCE POINT** can reduce or eliminate a number of intermediate commands and manual calculations when drawing or editing with DataCAD. Brief examples will be illustrated using the **REFERENCE POINT** command while **DRAWING**, when editing with the **STRETCH** command and when editing with the **MOVE** command. While DataCAD provides a number of ways to accomplish the same task, specific examples have been chosen to highlight the use of the **REFERENCE POINT**.

DESCRIPTION

The purpose of a **REFERENCE POINT** is to establish a point in the drawing relative to which the next point or points will be entered.

To enter a **REFERENCE POINT**, press the "reverse apostrophe" (') key located to the left of the "1" on the keyboard. DataCAD then prompts you to enter the **REFERENCE POINT**. *Since you are "referencing" a point which already exists in the drawing, the REFERENCE POINT should be identified by using the OBJECT SNAP button on the MOUSE.* When using the **REFERENCE POINT**, think of the fact that you are performing some operation "relative to" the point being selected.

A REFERENCE POINT should be established immediately prior to its use. Issuing intervening commands may cause the point selected to be "forgotten".

EXAMPLE 1USING REFERENCE POINT WHEN DRAWING

In this example, we will establish a wall forming the other side of a hall which is required to be four feet wide.

INITIAL CONDITIONS

Keyboard entry must be in the **RELATIVE CARTESIAN** coordinate system. Press the **INS** (or **INSERT**) key in the cursor-pad area of the keyboard until the **RELATIVE CARTESIAN** input mode is shown on the **MES-SAGE LINE**.

ENDPOINT must be "turned on" in the **OBJECT SNAP** menu (which is accessed via the "**SHIFT x**"). Press the **FUNCTION KEY** next to **ENDPOINT** until an asterisk appears prior to the **ENDPOINT** option. Then exit from the **OBJECT SNAP** menu.

"Walls" should be turned on and defined by sides. Go to the **GOODIES** menu (press the "a" key). Turn "Walls" on, set up "Walls" to be defined by "Sides", and set the

"Wall Width" to four (4) inches. (Please note: "Walls" could have been turned on and the "Wall Width" set by pressing the "=" (equals) key. Since "Wall definition by sides" also had to be established, all three were accomplished by going directly to the GOODIES menu.)

FIXEDREF on the Utility menu should be "off", i.e. no asterisk should precede FIXEDREF as it is displayed in the command menu area. If an asterisk does precede FIXEDREF, press the function key associated with the command to turn it off.

The drawing with which we will be working is presented in Figure 1.1. To reach the state of the drawing shown, draw a rectangle of approximately 36' by 24' and then draw an internal wall system of the approximate configuration shown.

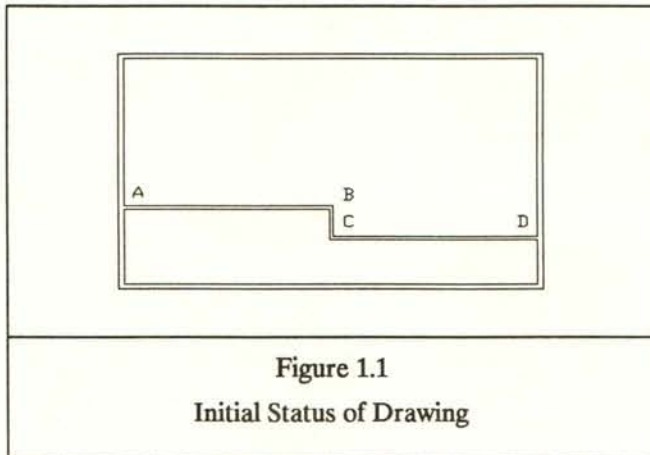


Figure 1.1
Initial Status of Drawing

STEP 1.1

To start, press the REFERENCE POINT key, place the cursor at point A and press the OBJECT SNAP button on the MOUSE. Now press the SPACE BAR and enter $x=0.0$ and $y=4.0$, the required width of the hall. By moving the MOUSE, you will now see a line "rubber-banding" from a point four feet above point A.

STEP 1.2

Press the REFERENCE POINT key again, and place the cursor at point B and press the OBJECT SNAP button on the MOUSE. Now press the SPACE BAR and enter $x=4.0$ and $y=4.0$, the required width of the hall. To define "The other side of the Wall", move the cursor above the line drawn and press the LEFT button on the MOUSE. You will now see a line "rubber-banding" from a point four feet above and to the right of point B. The drawing should appear as illustrated in Figure 1.2.

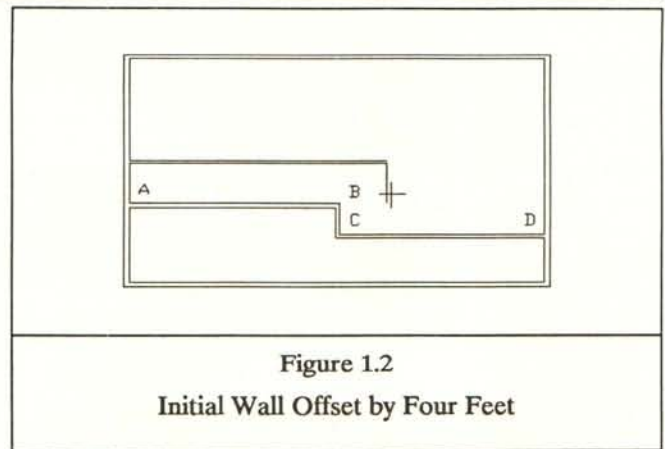


Figure 1.2
Initial Wall Offset by Four Feet

STEP 1.3

Press the REFERENCE POINT key again, and place the cursor at point C and press the OBJECT SNAP button on the MOUSE. Now press the SPACE BAR and enter $x=4.0$ and $y=4.0$. To define "The other side of the Wall", move the cursor to the right of the line drawn and press the LEFT button on the MOUSE. You will now see a line "rubber-banding" from a point four feet above and to the right of point C.

STEP 1.4

Press the REFERENCE POINT key again, and place the cursor at point D and press the OBJECT SNAP button on the MOUSE. Now press the SPACE BAR and enter $x=0.0$ and $y=4.0$. To define "The other side of the Wall", move the cursor above the line drawn and press the LEFT button on the MOUSE. You will now see a line "rubber-banding" from a point four feet above point D.

Press the RIGHT BUTTON on the MOUSE to discontinue drawing lines. The resulting drawing should be as shown in Figure 1.3.

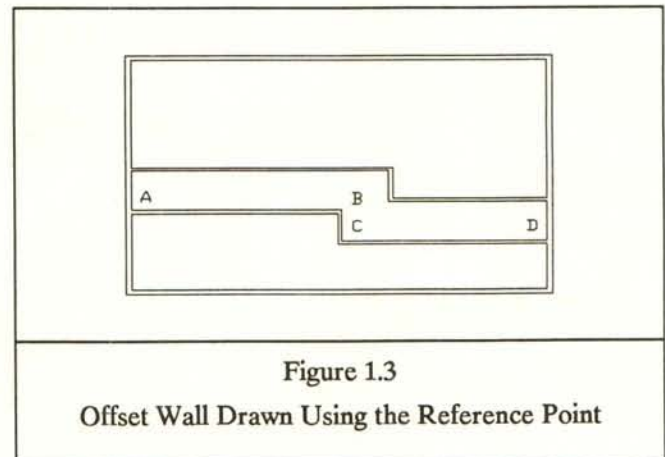


Figure 1.3
Offset Wall Drawn Using the Reference Point

SUMMARY

The advantage of drawing in the manner described above is that at no time did you have to know the length of the existing walls defined by AB, BC and CD. All you were required to know was the desired width of the hall, and DataCAD did the necessary computations

EXAMPLE 2REFERENCE POINT AND STRETCH

This example illustrates the use of the **REFERENCE POINT** with the **STRETCH** command. Our goal is to take a line of "unknown" length and **STRETCH** it to a length of twelve (12) feet. We can determine the length of any line through use of the **MEASURES** or **IDENTIFY** commands in DataCAD, and then manually calculate the distance to **STRETCH**. Use of the **REFERENCE POINT** in DataCAD can eliminate these steps.

INITIAL CONDITIONS

Same as for Example 1, except "Walls" need not be turned on. Figure 2.1 illustrates the condition being addressed. To follow the example, just draw a vertical line of any length, and disconnect using the **RIGHT BUTTON** of the **MOUSE**.

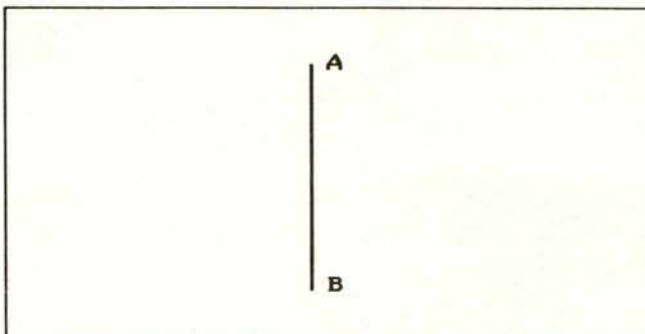


Figure 2.1

Stretching a Line of Unknown Length to a Fixed Length

STEP 2.1

Enter the **STRETCH** command ("*Alt S*" is the shortcut). In response to the prompt "Enter first point of distance to **STRETCH**", place the cursor near point A and press the **OBJECT SNAP** button on the **MOUSE**.

STEP 2.2

The prompt "Enter second point of distance to **STRETCH**" will now be displayed. However, press the **REFERENCE POINT** key. In response to the prompt "Enter **REFERENCE POINT**", place the cursor near point B, and press the **OBJECT SNAP** button on the **MOUSE**.

STEP 2.3

The prompt "Enter second point of distance to **STRETCH**" will reappear. Press the **SPACE BAR**, and enter the **total length** of the line desired via keyboard. (In our example, we entered $x=0.0$ and $y=12.0$.)

STEP 2.4

Use the **LEFT** button of the **MOUSE** to "box in" the end point of the line at point A. The line will now become twelve feet long even though we did not know its initial length.

SUMMARY

The advantage of using the **REFERENCE POINT** in the above manner is again you did not have to know the length of an existing line. All you were required to know was the desired length of the line and DataCAD did the rest.

Practical applications of this technique are (1) to STRETCH wall cuts and windows for exact window measurements, (2) to lengthen (or shorten) floor plans to a predetermined length, and (3) to correct for problems realized after dimensioning.

If you wish to use the above method to **STRETCH** lines other than those which are horizontal or vertical, you will either have to know the angle of the line and be in the **RELATIVE POLAR** coordinate system for the final keyboard entry in **STEP 2.3**. Since this requires you to know about information already entered in the drawing, it is recommended that you explore the **TANGENT** command in the **GOODIES** menu.

The **TANGENT** command will enable you to draw, among other things, lines parallel to those already entered without having to know the angles at which they were entered. When using the **TANGENT** command, you must be in the **RELATIVE POLAR** coordinate system. If you do use the **TANGENT** command, remember to select the **CANCEL** option within the **TANGENT** menu to return your cursor to its previous orientation when you are through drawing "tangent lines".

EXAMPLE 3**REFERENCE POINT AND MOVE**

This example illustrates the use of the **REFERENCE POINT** with the **MOVE** command. (While the **MOVE** command is used for the example, the concepts are valid for other commands, e.g. **COPY**, as well as *placing symbols from a template*.) Our goal is to take a commode and place the center of the tank two (2) feet from the corner of a bathroom and one (1) inch out from the wall. The **MOVE** command with an intervening **REFERENCE POINT** can readily perform this operation.

INITIAL CONDITIONS

Same as for Example 1, except that "Walls" need not be turned on, and that **MID PNT** should be turned on in the **OBJECT SNAP** menu. Figure 3.1 illustrates the current status of our drawing. In order to follow along in the example, simply create a rectangle approximately 8' by 6' to represent the room, and a small rectangle approximately 2' by 2' to represent the commode.

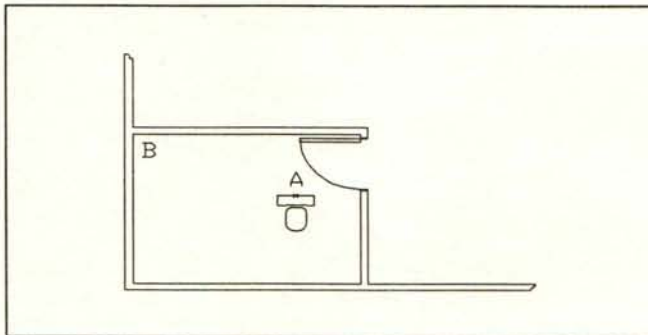


Figure 3.1

Use of Reference Point While MOVING

STEP 3.1

Enter the **MOVE** command ("m" is the shortcut). In response to the prompt "Enter first point of distance to **MOVE**", place the cursor near point A (the middle of the tank on the commode) and press the **OBJECT SNAP** button on the **MOUSE**.

STEP 3.2

The prompt "Enter second point of distance to **MOVE**" will now be displayed. However, press the **REFERENCE POINT** key. In response to the prompt "Enter **REFERENCE POINT**", place the cursor near point B, and press the **OBJECT SNAP** button on the **MOUSE**.

STEP 3.3

The prompt "Enter second point of distance to **MOVE**" will reappear. Press the **SPACE BAR**, and enter the correct distance via keyboard. (In our example, we entered $x=2.0$ and $y=-0.1$.)

STEP 3.4

Use the **LEFT** button on the **MOUSE** to "box in" the commode. The center of the tank of the commode will now be located exactly two feet from the wall corner, and one inch out from the wall, as shown in Figure 3.2.

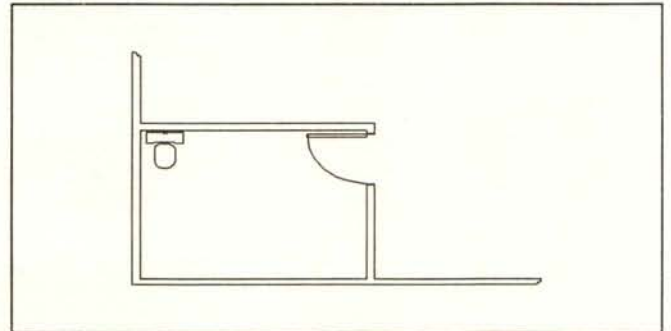


Figure 3.2

Result of Moving Commode Using Reference Point

SUMMARY

The advantage of using the **REFERENCE POINT** in the above manner is again you did not have to know the existing location of the commode, but only had to know where you wanted it placed relative to the corner of the bathroom.

OTHER COMMANDS RELATED TO REFERENCE POINT

A **REFERENCE POINT** is affected by two other "settings": The **COORDINATE SYSTEM** in which points are entered and the "**FIXEDREF**" command on the **Utility** menu.

COORDINATE SYSTEMS

DataCAD allows entry of points in *two forms and two types of coordinate systems*. The forms are **RELATIVE** or **ABSOLUTE**, and the types are **POLAR** or **CARTESIAN (RECTANGULAR)**.

The **POLAR** type of coordinate system enables one to enter coordinates of a point by defining a *distance* and an *angle* from some other point. This is useful when entering survey data or performing radial layouts. The **CARTESIAN** type enables one to enter coordinates via "x" and "y" distances from some other point.

The **ABSOLUTE** form of a coordinate systems enables one to define points in relation to a fixed point or origin. (The fixed point or origin can be changed through use of either the **FIXEDREF** or **REFERENCE POINT** commands.) The **RELATIVE** form enables one to define points relative to a "floating" point (*specifically the last point entered*).

The resulting combinations of the forms and types of coordinate systems are **ABSOLUTE POLAR**, **RELATIVE POLAR**, **ABSOLUTE CARTESIAN** and **RELATIVE CARTESIAN**. One can "scroll" through these systems by pressing the **INS** (**INSERT**) key on the cursor pad of the keyboard. The name of the system selected will be displayed on the message line (second line from the bottom of the display). Continue pressing the **INS** key until you reach the one which you wish to use. The coordinate system can be changed at any point, except when you are in the middle of entering the coordinates of a point from the keyboard.

FIXEDREF COMMAND ON THE UTILITY MENU

The **FIXEDREF** command is a toggle (**ON/OFF**) switch which basically dictates the method in which the values of the **STATUS LINE** will be displayed. Selection of **FIXEDREF** (an asterisk will be shown preceding **FIXEDREF** on the menu) will result in all values on the **STATUS LINE** to be displayed relative to a **single** (fixed) point, or origin.

A floating **REFERENCE POINT** (asterisk not displayed preceding **FIXEDREF**) will result in all values on the **STATUS LINE** to be displayed "relative" to the last point entered.

NOTES

If you press the **LEFT** button of the **MOUSE** and do not get the coordinates "to zero out" on the **STATUS LINE** (the line showing the values for "x", "y", "a", and "d"), it is generally due to one of the following:

- **FIXEDREF** is turned on. Go to the Utility menu. If an asterisk appears next to the **FIXEDREF** command, select **FIXEDREF** to turn it off.
- An absolute coordinate system has been selected. Press the **INS** key until the appropriate **RELATIVE** coordinate system is shown on the message line.

RELATIONSHIP OF REFERENCE POINT, FIXEDREF AND COORDINATE SYSTEMS

The table presented below lists all possible combinations of the **COORDINATE SYSTEMS** and the settings for **FIXEDREF** with the subsequent impact on the following:

- Effect of next point entered via keyboard
- Effect of the values which will be displayed on the **STATUS LINE**
- Effect of setting a **REFERENCE POINT**

Generally, *if one is to use an **ABSOLUTE COORDINATE** system, then **FIXEDREF** should be turned on.* This permits viewing the distances from the origin of the **ABSOLUTE COORDINATE** system on the **STATUS LINE**. Conversely, *if one is to use a **RELATIVE COORDINATE** system, then **FIXEDREF** should be turned off.* This will permit viewing the distances from the last point entered on the **STATUS LINE**.

Coordinate System Form	Coordinate System Type	FIXEDREF Setting	Effect on Next Point(s) Entered via Keyboard	Effect on Values Displayed on Status Line	Effect of Setting a REFERENCE POINT
RELATIVE	CARTESIAN	OFF	Relative to Last Point	Relative to Last Point	Valid for Next Point Entered
RELATIVE	CARTESIAN	ON	Relative to Last Point	Relative to Fixed Origin	Valid for Next Point Entered AND Establishes Fixed Origin
ABSOLUTE	CARTESIAN	ON	Relative to Fixed Origin	Relative to Fixed Origin	Establishes Fixed Origin
ABSOLUTE	CARTESIAN	OFF	Relative to Fixed Origin	Relative to Last Point Entered	No Impact
RELATIVE	POLAR	OFF	Relative to Last Point	Relative to Last Point	Valid for Next Point Entered
RELATIVE	POLAR	ON	Relative to Last Point	Relative to Fixed Origin	Valid for Next Point Entered AND Establishes Fixed Origin
ABSOLUTE	POLAR	ON	Relative to Fixed Origin	Relative to Fixed Origin	Establishes Fixed Origin
ABSOLUTE	POLAR	OFF	Relative to Fixed Origin	Relative to Last Point Entered	No Impact

CENTERING TEXT

Centering text within DataCAD does not occur about the point selected. Instead *subsequent lines of text are "centered" about the first line of text entered.* If text is to be centered about a selected point, identify that point as requested by DataCAD in its prompt "Position text using cursor, enter point". Then enter a single character, e.g. the letter "A" followed by ENTER. Now type in the text; this text will be centered about the single character line entered first. (Remember to erase the first character as a line from the ERASE menu when you have completed entering the text.)

Judicious use of the OBJECT SNAP function, the REFERENCE POINT and keyboard entry can allow you to place text exactly where desired. For example, if text was to be centered about the midpoint of a line, set up the OBJECT SNAP menu for "MID PNT". Then enter the TEXT menu ("alt t" is the shortcut). Instead of responding to the prompt "Position text...", press the REFERENCE POINT key. In response to the prompt "Please enter REFERENCE point", locate the cursor near the midpoint of the line desired and press the MIDDLE button of the MOUSE. The prompt "Position text..." will reappear. Then press the SPACE BAR and enter via the

keyboard the coordinates for a single character line. (The actual coordinates will depend upon the number of lines and the size of the text being entered.) Type one character followed by ENTER; and then type in the rest of the text.

TEXT SIZE

The size of the text on plotted output is related to TEXTSIZE entered in the TEXT menu and the SCALE selected on the PLOT menu. For example, if one were to enter text at a TEXTSIZE of 1' and plot it at a SCALE of 1/4" (=1'), one would assume that the resulting text would be 1/4" high. This may not be the case, as tests run using the ROMAN character set resulted in actual plotted text of 3/16". For quality production of plots, experiment with the actual character set being used. Plot several different TEXTSIZES at different plotting SCALES to determine the actual TEXTSIZE to use

Digression: The actual "character set" being utilized (as established via the CONFIG program outside of DataCAD) and the ASPECT ratio established within the TEXT menu will affect the final size (or height) of text plotted.

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PROTECT YOUR INVESTMENT

When a a CAD system is purchased, it is usually installed by someone other than the user. The user just has to turn it on and "start drawing". This eliminates the need for the user to read "all that technical mumbo-jumbo" in the manuals provided with the equipment.

While the installation service is invaluable, one should review the operations manuals for the equipment purchased -- especially for any "power-up" or "power-down" procedures which might be present. Manuals for certain monitors indicate that they should be turned on prior to the system unit (or computer). The reasons for this procedure are not stated; however, one could surmise that potential damage could be done to the computer if the procedure is not followed.

NEXT ISSUE

The next issue of "WindowIn on DataCAD" will be published for September 1987. In that issue we will initiate the "Question & Answer" and "Tips & Techniques" columns. Certain of the commands in the CLEANUP menu will be presented and a look at the DOS environment will commence.

SUBSCRIPTION RATE

A subscription to "WindowIn on DataCAD" is Seventy-Two Dollars (\$72.00) per year, for twelve issues plus the annual cross-reference index. Individual or back issues will be Eight Dollars (\$8.00) each.

In honor of the "First National DataCAD End User Meeting" being held in Washington, D. C. in June 1987, a ten percent discount will be offered to those who subscribe prior to October 1, 1987.

Your subscription will be initiated upon receipt of the subscription form included on Page 7 and payment of the amount due. Please make all checks payable to C. L. Davis Consulting Associates, Ltd., and forward to P. O. Box 502, Middlebury, VT 05753.

Please take the time to include on the back of the subscription form questions you may have on the use of DataCAD, tips/or techniques that you find useful or time-saving, and comments on the format or content of "WindowIn on DataCAD".

We look forward to hearing from you.

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PLEASE ENTER ANY COMMENTS, QUESTIONS AND/OR TIPS THAT YOU WOULD LIKE TO SHARE IN THE SPACE PROVIDED BELOW. THANK YOU FOR YOUR INTEREST.
