

digital

VT125

ReGIS Primer



VT125 ReGIS Primer

EK-VT125-GI-001

Prepared by Educational Services
of
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Introduction

This document contains *ReGIS* (Remote Graphics Instruction Set) command information that can be used as a learning aid for the beginning VT125 graphics terminal user.*

The goal of this primer is to teach the VT125 user how to create and display *pictures* on the VT125 *screen* using the ReGIS command set.

NOTE: Terms that are italicized in text are defined in the glossary, Appendix C.

This primer approaches each command separately, illustrating both the command syntax and function. Command information is presented in an easy-to-follow format. Text describing commands appears on left-hand pages. Corresponding figures, which illustrate commands the user types (shown in blue) and the resulting graphic action or picture, appear on right-hand pages.

Table 1 lists the ReGIS commands with a brief description of each command.

* The VT125 graphics terminal is functionally equivalent to a VT100 equipped with a VT1XX-CB graphics option installed.

Table 1 ReGIS Command Summary

Command Key	ReGIS Command	Description
P	Position	Positions the graphics cursor on the screen without writing on the screen.
V	Vector	Draws vectors (straight lines) between screen locations you specify; for example, you can draw a box on the screen using just the vector command.
C	Curve	Draws curves or circles using screen locations you specify.
T	Text	Controls display of graphics text strings and allows you to specify the characters to be displayed.
W	Write	Specifies writing controls; for example, setting the writing shade.
S	Screen	Specifies screen controls; for example, erasing the screen.
@	Macrograph	Defines a ReGIS command string to be a macrograph, a facility for storing and recalling ReGIS command strings.
L*	Load	Controls definition and loading of alternate characters which can be displayed using the T command.
R*	Report	Reports the current location of the graphics cursor; reports the name of the character set in use; reports the amount of macrograph storage in use.

*These commands are not described in this document. For a description of these commands, see the *VT125 User's Guide*. (EK-VT125-UG-001).

Getting Started

THE SCREEN

The VT125 is a bit map graphics display terminal. This means that you can address any *dot* or *pixel* on the screen. A pixel, or picture element, is the smallest discernible dot on the screen. The VT125 screen contains 768 horizontal by 240 vertical pixels. The VT125 also has two bit planes. This feature allows you to do *shading*. Each pixel on the screen can be off (black) or one of three shades of grey.

The VT125 draws lines, curves and text on the screen by setting (turning on) pixels. That is, when several pixels in a row are set, a line appears on the screen. To allow you to directly specify which pixels are to be set, the VT125 uses an [X,Y] *coordinate* system.

COORDINATE SYSTEM

A coordinate is a number used to specify a *location*. X-coordinates specify horizontal locations; Y-coordinates specify vertical locations. This coordinate system allows you to specify discrete points on the screen. A point is the intersection of a horizontal line and a vertical line. The coordinate system allows you to refer to each point on the screen by using its X-and Y-coordinates. Figure 1 shows a typical coordinate system with [X,Y] coordinate locations specifying a point in the coordinate system.

The VT125 requires that you place square brackets around the screen locations - [X,Y]. You can specify values for X and Y explicitly by entering numbers for X and Y. Always specify a position on the screen by first giving the X-coordinate and then giving the Y-coordinate [X,Y]. Note that a comma separates the X- and Y-coordinates. You can specify one coordinate without specifying the other. If you specify only one number (or no number), the VT125 uses the current value for X or Y. For example, if you want to specify just the X-coordinate you would use [X]. To specify just the Y-coordinate, use [,Y], the Y coordinate preceded by a comma enclosed in square brackets. Note that no comma is necessary when specifying only the X-coordinate.

The VT125 begins counting screen locations at the top left corner of the screen. This location is called the screen origin, location [0,0]. X-coordinates range from 0 (the left edge of the screen) to 767 (the right edge of the screen). Y-coordinates range from 0 (the top of the screen) to 479 (the bottom of the screen). As previously mentioned, the VT125 has 768 pixels horizontally and 240 pixels vertically. Thus, you can see that each horizontal pixel has a unique X-coordinate associated with it. The vertical coordinates range from 0 through 479; however, there are only 240 vertical pixels. This means that each vertical pixel does *not* have a unique Y-coordinate associated with it. The VT125 maps two vertical points, each odd-even numbered pair, to one pixel. For example, points [200,340] and [200,341] correspond to the same pixel at location [200,340].

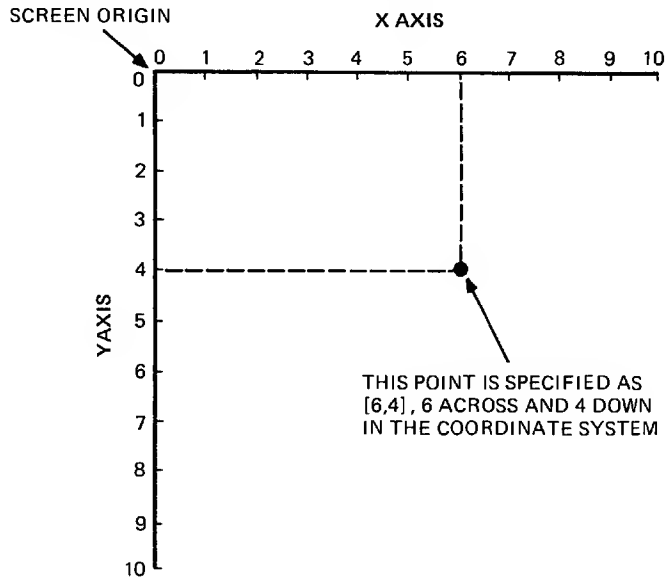


Figure 1 A Typical Coordinate System

SET-UP FEATURES

The VT125 SET-UP features that allow you to configure the terminal are described in detail in the *VT125 User's Guide*.

CURSORS

The VT125 has two cursors: the alphanumeric cursor and the *graphics cursor*. The alphanumeric cursor displays the position where the next alphanumeric character will be placed on the screen (active position). The alphanumeric cursor is displayed as either a blinking underline or a blinking shaded rectangle (-,■). The alphanumeric cursor is visible in both alphanumeric mode and *graphics mode* on the VT125. The graphics cursor indicates the current screen location that the VT125 is referencing. (The current screen location is the point on the screen most recently moved to or drawn to.) The graphics cursor is diamond-shaped with center cross lines (see Figure 2). The graphics cursor is visible only when the VT125 is in graphics mode.

NOTE: When the VT125 is powered on, it is in alphanumeric mode.

You can use the VT125 in local mode, that is, without it being connected to a computer, by plugging a loopback connector (shown in Figure 3) into the communications port in the rear of the VT125 (see Figure 4). Use the VT125 in local mode when performing the exercises in this book.

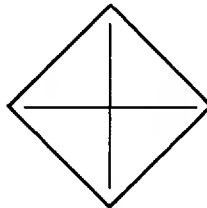


Figure 2 Graphics Cursor

POWER ON YOUR VT125 GRAPHICS TERMINAL

Locate the power switch on the back of the VT125 (see Figure 4). Switch the power on (switch to the up position) and listen for the double bell tone. After a few seconds, the phrase "VT125 OK" will appear on the screen. This signifies that your VT125 has passed the Power-Up Self-Test. If the phrase "VT125 OK" does not appear on your screen, consult the *VT125 User's Guide* for further information.

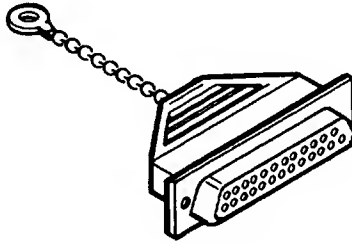


Figure 3 Loopback Connector

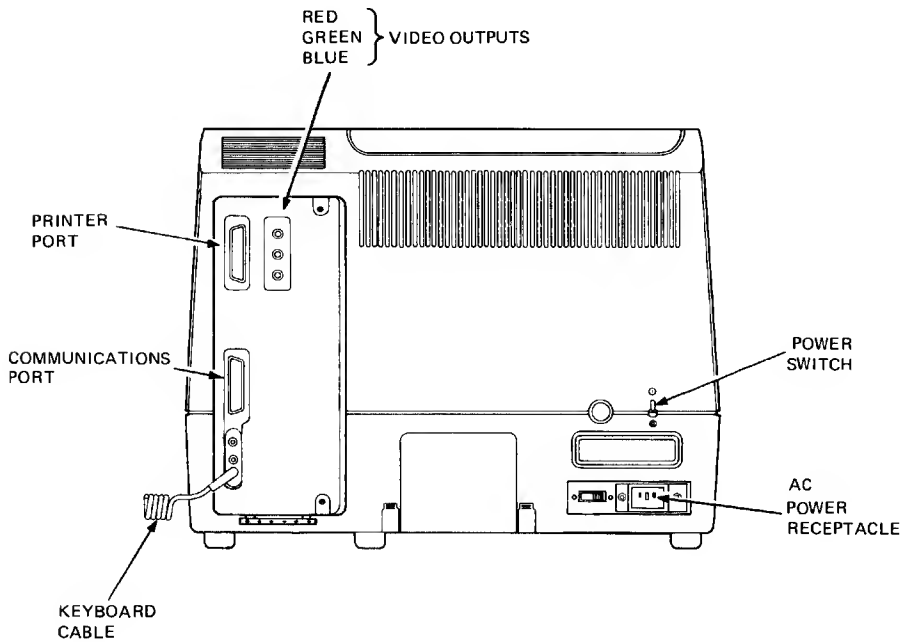


Figure 4 VT125 (Rear View)

ENTERING AND EXITING GRAPHICS MODE

To enter and exit graphics mode, use the following commands:

ESC P2p
to enter graphics mode

**ESC **
to exit graphics mode

ESC in this sequence is the ESCAPE character key, highlighted in Figure 5. ESC P2p is an escape command that places the VT125 in graphics mode. There are other escape sequences that can be used to enter graphics mode, but, for simplicity, this particular escape sequence is used because it displays the commands on the screen as they are typed. Refer to the *VT125 User's Guide* for additional information regarding other escape sequences for entering graphics mode.

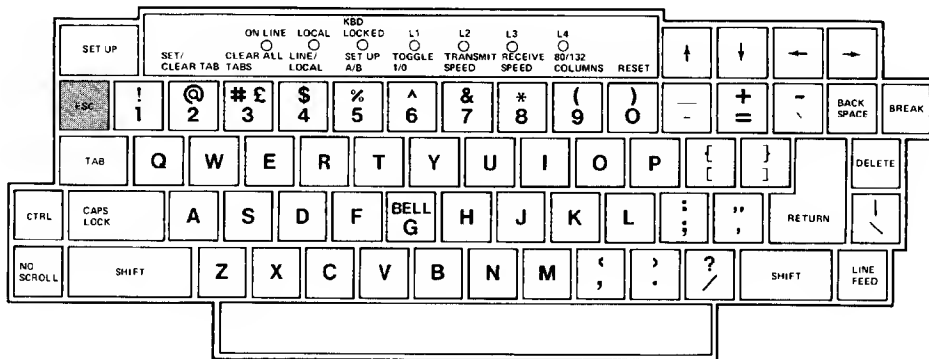


Figure 5 VT125 Keyboard

CURRENT LOCATION OF THE GRAPHICS CURSOR

The *current location* of the cursor is the point on the screen most recently moved to or drawn to. The VT125 graphics cursor shows you the location to which the VT125 is referring. The graphics cursor is at location [0,0] whenever the VT125 is powered on or is *reset*.

NOTE: When entering graphics mode (ESC P2p) after previously exiting graphics mode (ESC \), the last cursor position will be saved by the VT125 and the cursor will reappear at that location.

The following are guidelines that may be helpful before you begin entering ReGIS commands.

1. Once you have entered graphics mode, you may use either upper or lower-case characters.
2. Be sure to close *all bracketed pairs* and *all parentheses*.
3. If the VT125 does not respond to your commands, type a right square bracket and a right parenthesis, then retype the command.
4. To erase all graphic *images* on the screen, type:

S(E)

5. To erase the command strings that you typed, type:

ESC [2J

6. To place the alphanumeric cursor back to the home position (upper left corner), type:

ESC [H

7. If you make a typing error, end the command and retype the command sequence. Remember to close with the right square bracket (]) and/or right parenthesis ()).

Position Command

You can control the graphics cursor and the current location by using the ReGIS P (position) command. The P command positions the graphics cursor on the screen without *writing* on the screen.

There are many ways that you can position the cursor. You can position the cursor to *absolute locations* or *relative locations*. Absolute locations specify points in the coordinate system which are based on the screen origin location [0,0]. They are specified as unsigned [X,Y] values, that is, [150,150] rather than [+150,−150]. The *coordinate pair* [150,150] reference a specific point 150 locations across and 150 locations down from the screen origin [0,0]. Figure 6 illustrates location [150,150].

ESC

PZP

P[150,150]

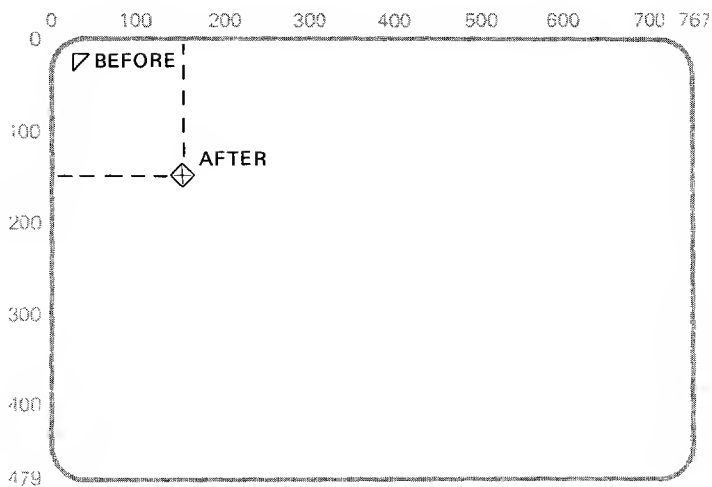


Figure 6

Relative locations specify a distance from the current location. For example, you can use relative positioning to move the cursor 100 locations from the current position. The sign that precedes the X- and Y-coordinates determines which direction the cursor will move.

- +X moves the cursor *right*
- −X moves the cursor *left*
- +Y moves the cursor *down*
- −Y moves the cursor *up*

An easy way to remember the sign of the coordinate and its associated direction is: plus (+) moves the cursor away from the screen origin [0,0]; minus (−) moves the cursor toward the screen origin, [0,0].

Figure 7 shows an example of relative positioning.

By entering the commands listed in Figure 8, you can position the cursor at the locations shown in Figure 8.

NOTE: Once you have typed a command keyletter, you need only enter the X- and Y-coordinate values unless you want to use a different command.

P[+150,+150]

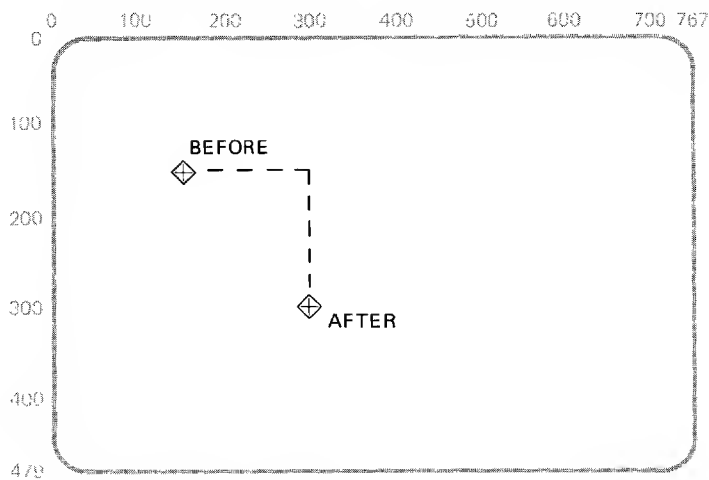


Figure 7

P[300,200]
[300,300]
[500,300]
[500,200]

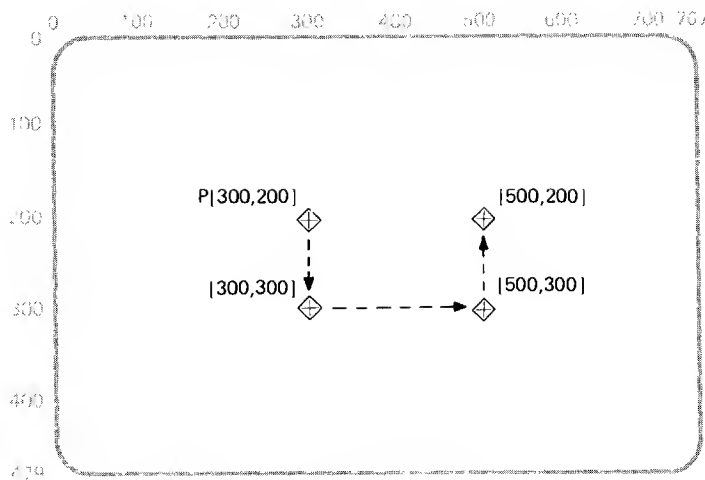


Figure 8

USING ABSOLUTE LOCATIONS

To position the graphics cursor near the center of the screen, type the P command shown in Figure 9 using absolute locations. The dashed line in Figure 9 shows the direction the cursor has moved.

To position the graphics cursor to the upper right corner of the screen, type the P command shown in Figure 10.

P[383,239]

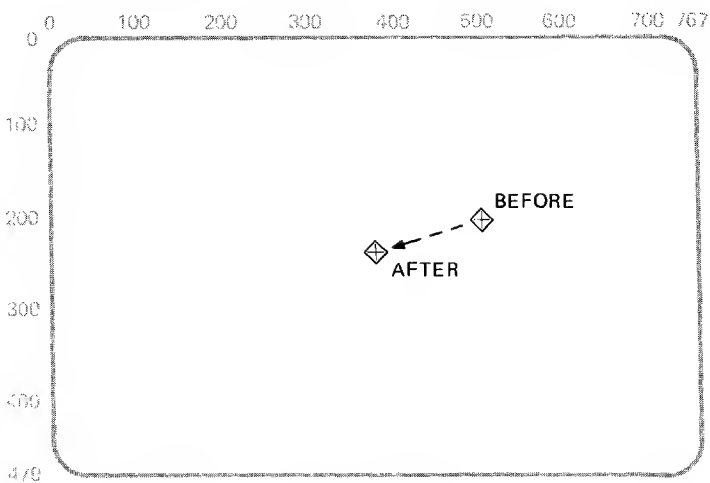


Figure 9

P[767,0]

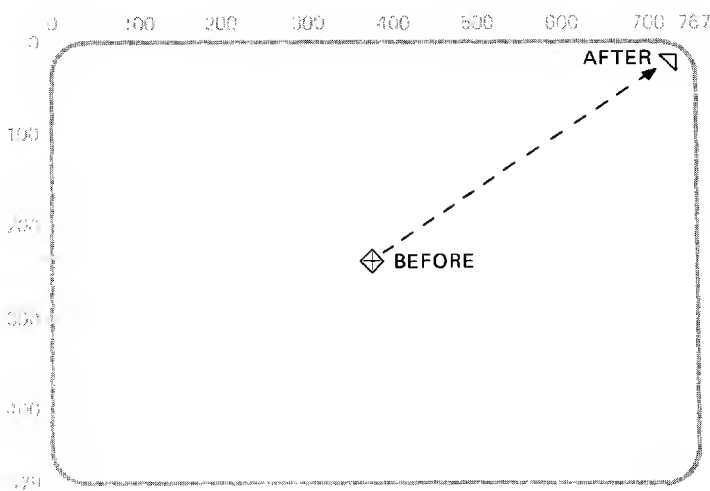


Figure 10

To position the cursor from the top right corner of the screen to the bottom right corner of the screen, type the command shown in Figure 11.

To position the cursor from the bottom right corner of the screen to the bottom left corner of the screen, type the command shown in Figure 12.

P[767,479]

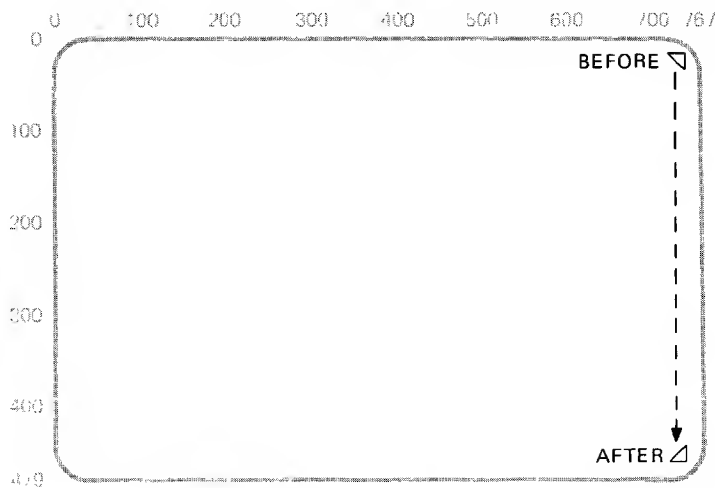


Figure 11

P[0,479]

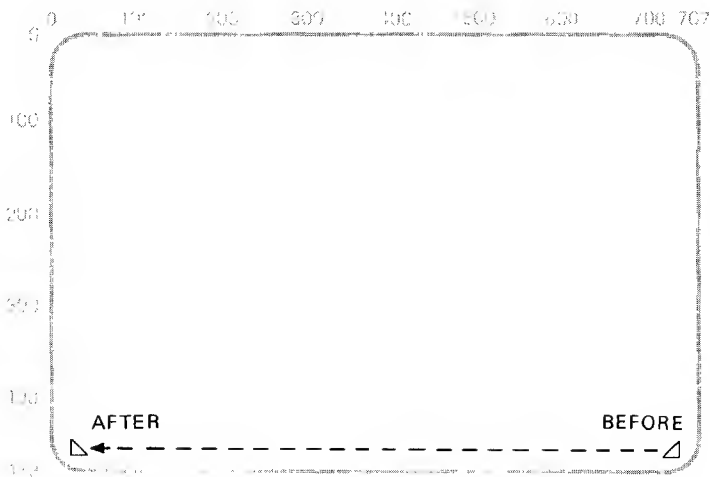


Figure 12

To position the cursor from the bottom left corner of the screen to the top left corner of the screen (screen origin), type the command shown in Figure 13.

USING RELATIVE LOCATIONS

To move the cursor from its current position to a position that is 100 locations to the right and 100 locations down, type the command shown in Figure 14.

P[0,0]

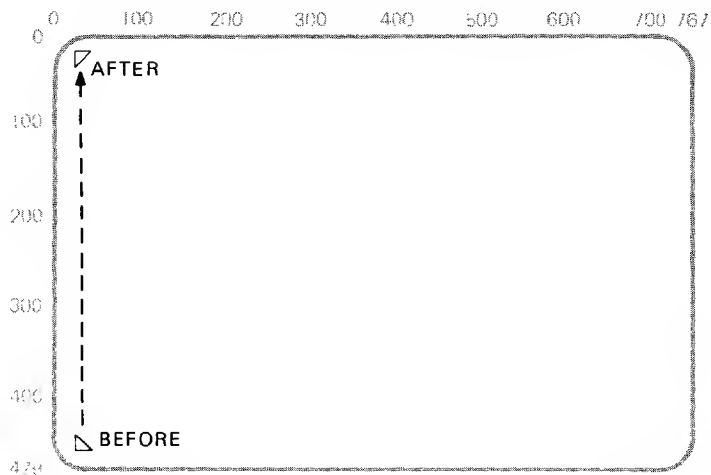


Figure 13

P[+100,+100]

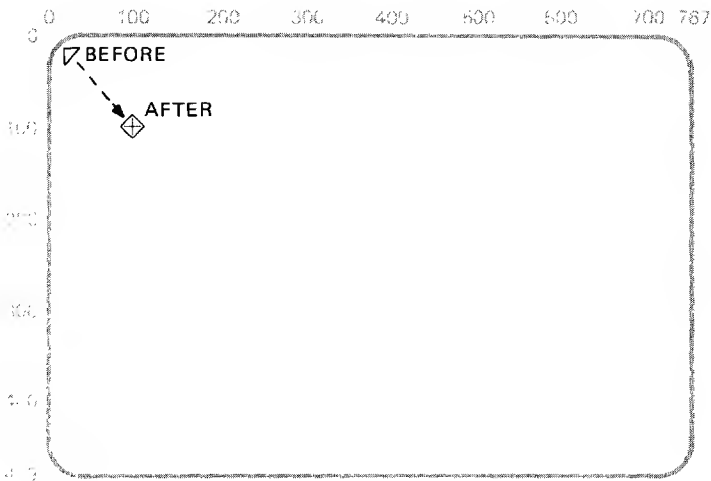


Figure 14

To move the cursor from its current position to a position 100 locations to the right, type the command shown in Figure 15. Note that the Y-coordinate position remains unchanged.

To move the cursor from its current position to a position 100 locations down, type the command shown in Figure 16. (Notice the comma preceding the Y-coordinate. Also notice that the X-coordinate position remains unchanged.)

PC[+100]

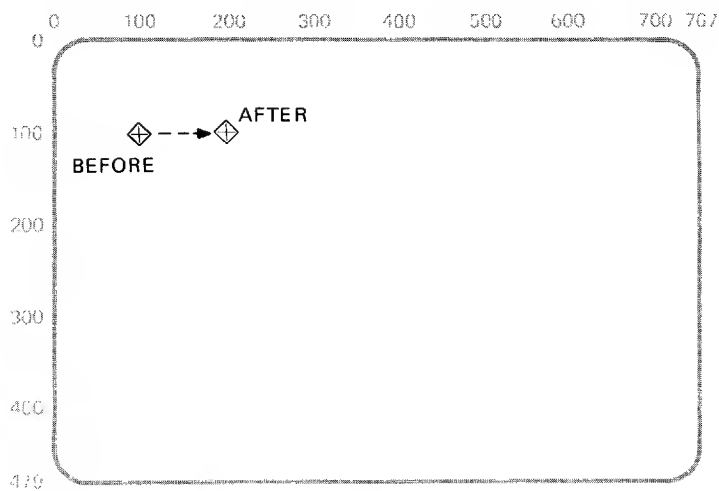


Figure 15

PC[, +100]

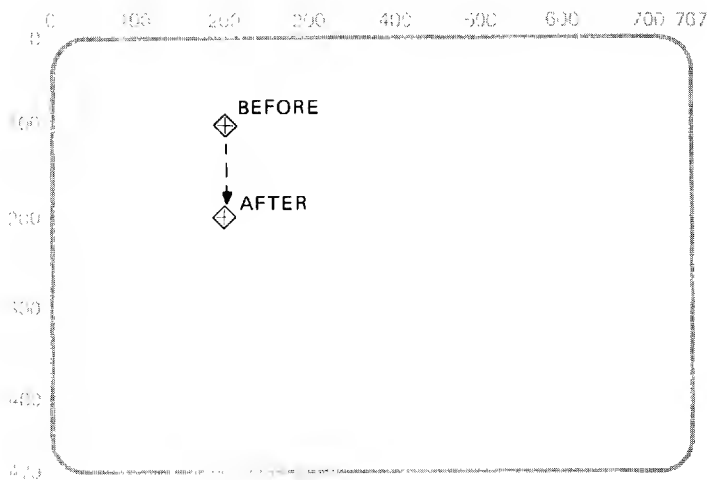


Figure 16

Position

To move the cursor from its current position to a position 200 locations to the left, type the command shown in Figure 17. Note that you can mix the minus (—) and plus (+) signs in one coordinate pair.

To move the cursor from its current position to a position 200 locations up, type the command shown in Figure 18.

PL-200]

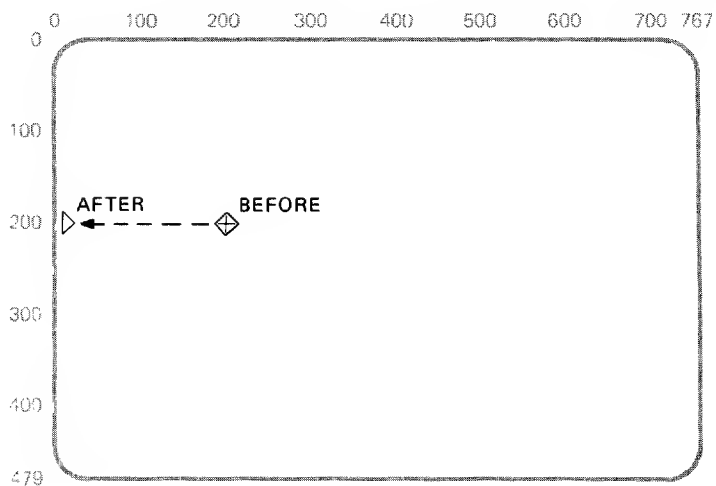


Figure 17

PL, -200]

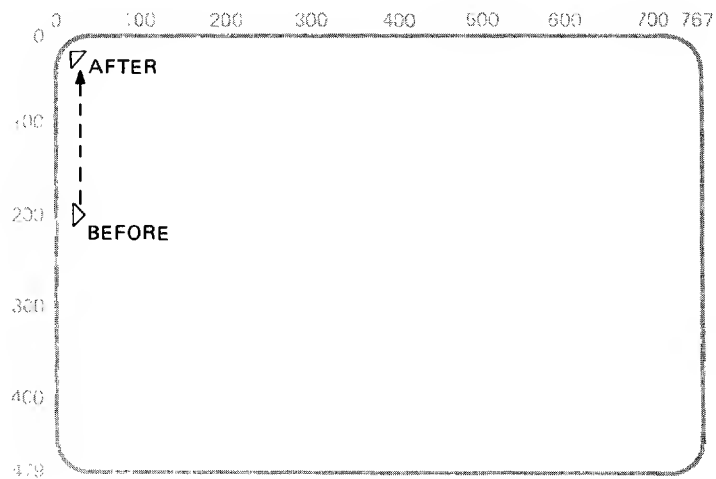


Figure 18

To move the cursor from its current position to a position 250 locations to the right and 250 locations down, type the command shown in Figure 19.

To move the cursor from its current position to a position 100 locations to the left and 200 locations up, type the command shown in Figure 20.

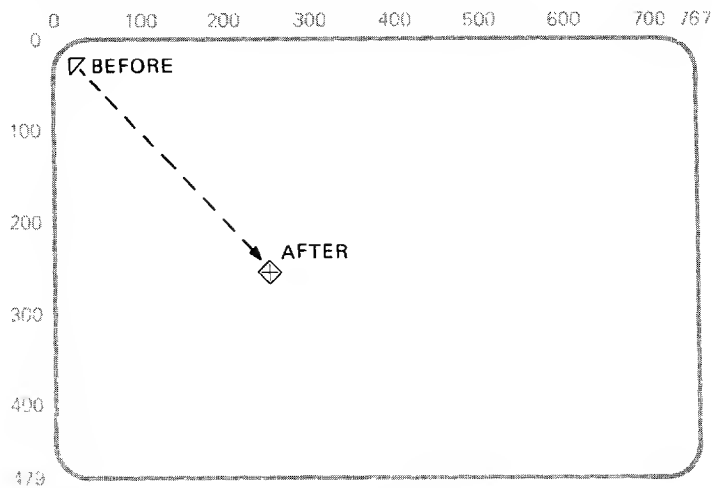
$P[+250, +250]$ 

Figure 19

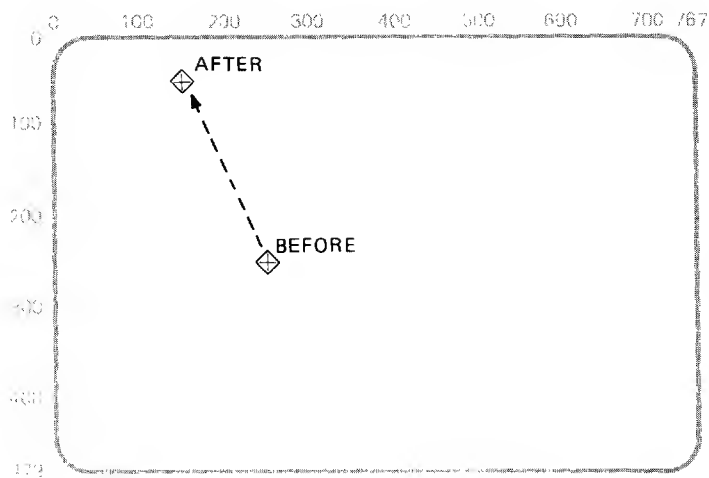
 $P[-100, -200]$ 

Figure 20

To move the cursor from its current position to a position 100 locations to the right and 50 locations up, type the command shown in Figure 21.

MIXING ABSOLUTE AND RELATIVE POSITIONING

You can combine both absolute and relative positioning in one coordinate pair. For example, when you type the command shown in Figure 22, you are moving the cursor to absolute X location 100 and down (Y) 150 locations. Type the command shown in Figure 22.

P[+100,-50]

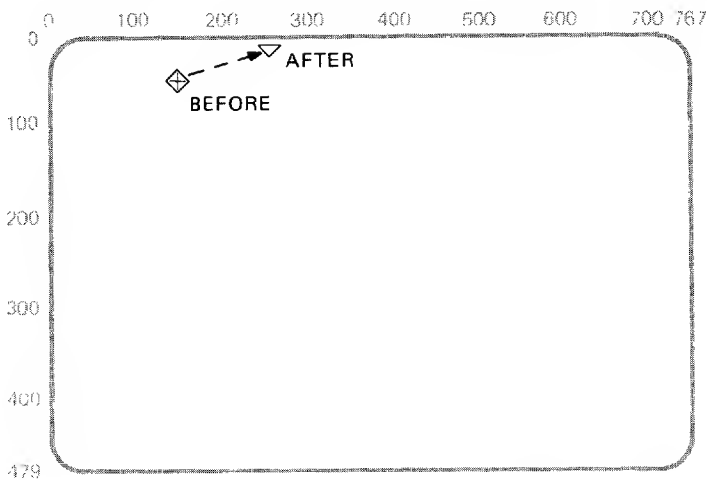


Figure 21

P[100,+150]

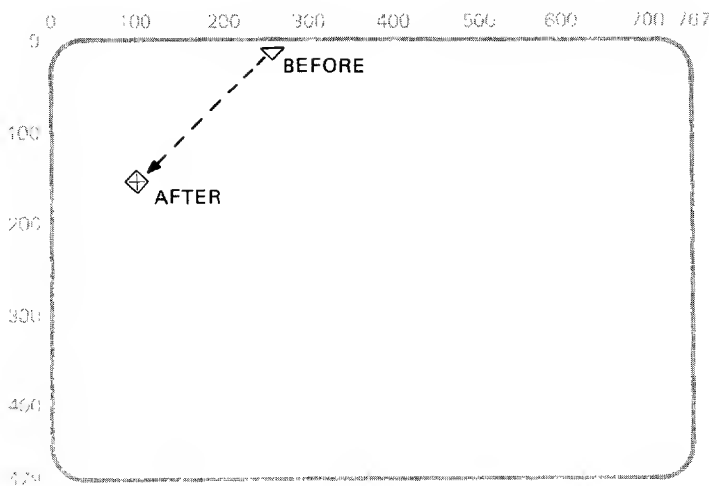


Figure 22

OFFSET DIRECTIONS

You can position the cursor using the `P#` command (where `#` represents any number 0 through 7). This command moves the cursor's current location in a direction without writing on the screen. There are eight *offset directions* that you can specify, at 45 degree intervals starting at 0 degrees in a 360 degree circle. Figure 23 shows the offset directions.

For example, `P666444777777` moves the current location of the cursor three locations using the 6 key (down), three locations using the 4 key (left), and eight locations using the 7 key (diagonally down and to the right).

Try typing `P` followed by any number 0 through 7 and observe the cursor movement.

NOTE: You will need to strike the number key you choose many times to notice a significant cursor movement.

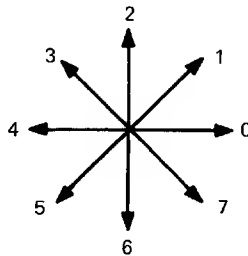


Figure 23 Offset Directions

Vector Command

Before you begin to draw *vectors*, you should know how to erase the screen. To erase the graphics portion of the screen, type S(E). However, S(E) will not erase the command sequences on the screen that appear as you type. To do that, press the ESC key, then type [2J. To move the alphanumeric cursor back to the top of the screen, press the ESC key, then type [H.

The V (vector) command is similar to the P (position) command. The V command, however, draws a straight line between the current cursor location and a specified screen location. There are many ways to draw straight lines using the V command. For example, you can vector to absolute or relative locations. Absolute and relative addressing for vectoring is very similar to the absolute and relative addressing you used with the P (position) command. When you vector to an absolute location, you draw a straight line from the current cursor location to the absolute location you specify in your coordinate pair. (Remember, an absolute location specifies a point on the screen that is based on the screen origin [0,0]. It is specified as an unsigned value, such as [150,150] rather than [+150, -150]). When you vector to a relative location, you draw a straight line from the cursor's current location to a point a specified distance from the cursor's current location. (Relative locations are specified by signed coordinates as [-100, +75].)

In the following exercise, you will use both absolute and relative vectoring to draw a simple bar chart. Also, you will use the P (position) command to position the cursor as needed.

In the first step of this exercise, you will use absolute vectoring to draw the axis for the bar chart. Type the commands listed in Figures 24 and 25 and compare your results with those shown.

P[100,110]
V[400]

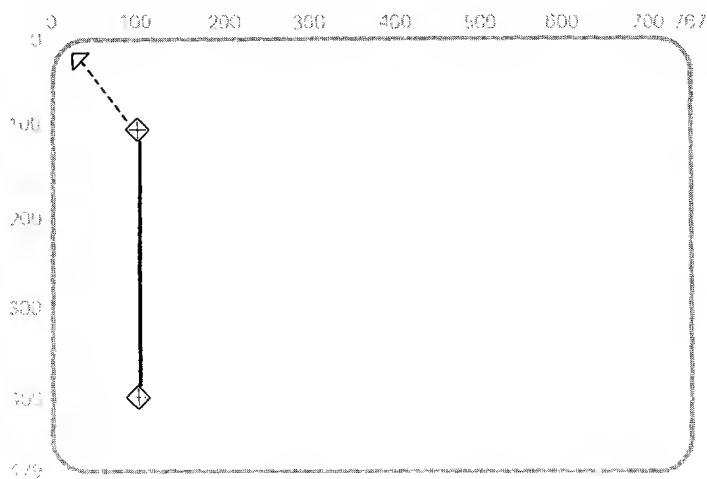


Figure 24

V[500]

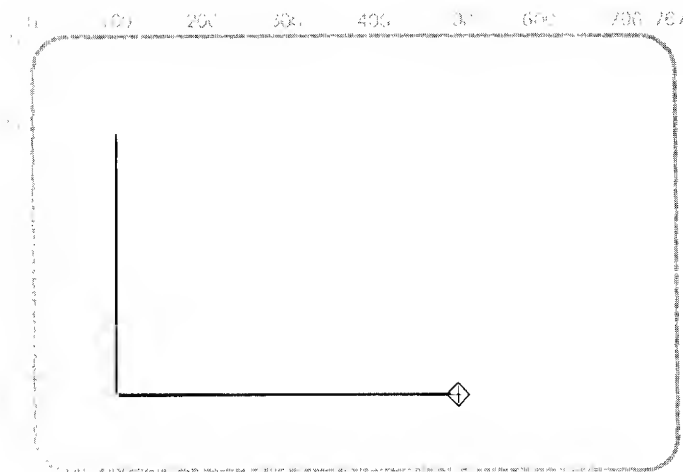


Figure 25

Notice that the commands used to complete the bar chart (Figures 26 through 29) are labeled to correspond with the section of the diagram.

Add the first bar to the bar chart by typing in the commands listed in Figure 26. Note that you are still using absolute vectoring.

To complete the bar chart, use relative vectoring. Type the commands listed in Figure 27 and compare your result with that shown.

P[100,200]
 V[200]
 [,400]

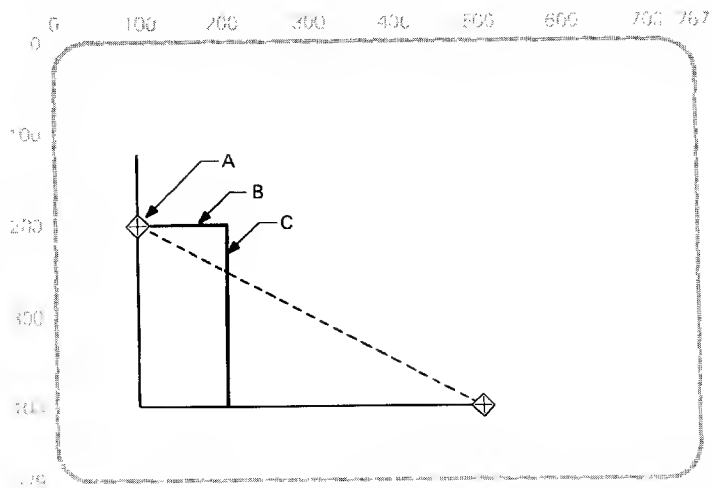


Figure 26

V[, -98]
 [+100]
 [, +98]

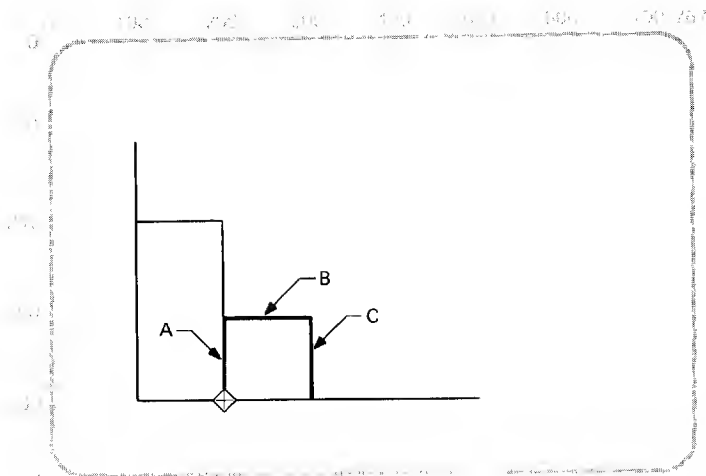


Figure 27

Add a third bar to the bar chart by typing the commands shown in Figure 28.

Complete the bar chart by typing the commands listed in Figure 29. Compare your result with that shown.

V[-150]
[+100]
[,+150]

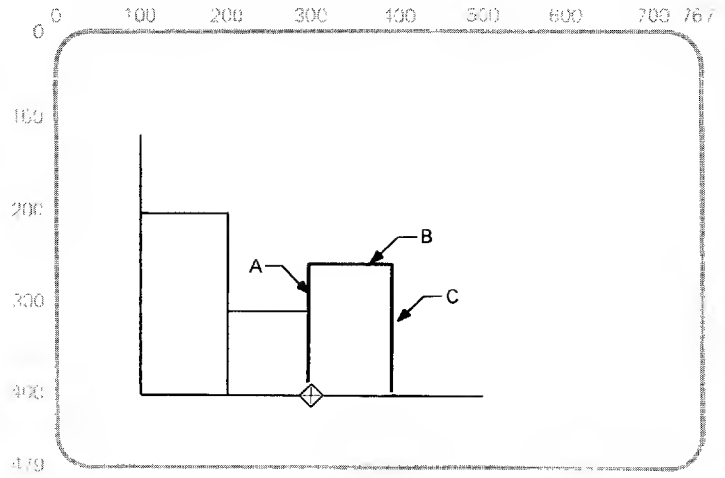


Figure 28

V[-20]
[+100]
[,+20]

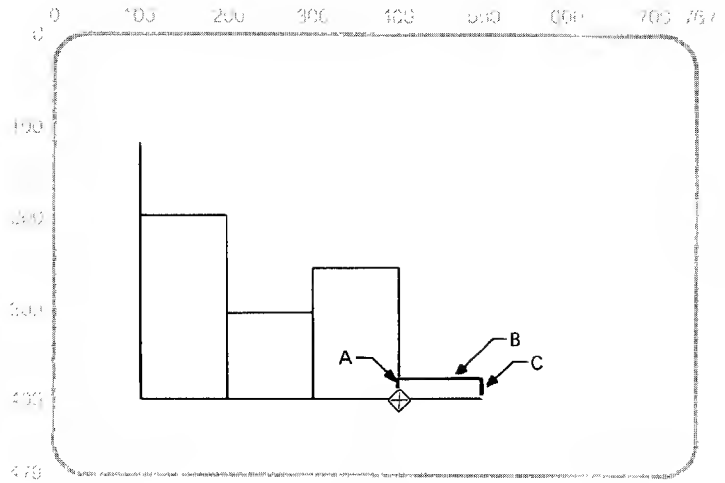


Figure 29

OFFSET DIRECTIONS

You can vector in one of eight directions by using the `V#` command, where `#` represents any number 0 through 7. This command is very similar to the `P#` command. There are eight offset directions that you can specify, at 45 degree intervals, beginning at 0 degrees in a 360 degree circle. Figure 30 shows the offset directions.

Type a `V` followed by any number 0 through 7 and observe the display.

NOTE: You will need to strike one of these number keys many times to notice a significant line drawn.

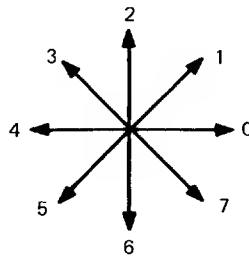


Figure 30 Offset Directions

DRAWING CLOSED FIGURES WITH THE V COMMAND

The `V(B) . . (E)` command allows you to easily connect the last vector location to the beginning location. For example, if you want to draw a square, you would type `V(B) [+ 100][, + 100][- 100] (E)`. This command draws three (3) sides of a square and then connects the last location drawn to the beginning location.

Type the commands listed in Figures 31 and 32 and compare your results with each illustration.

```

S(E)
P[100,100]
V(B) [+100]
    [,+100]
    [-100] (E)

```

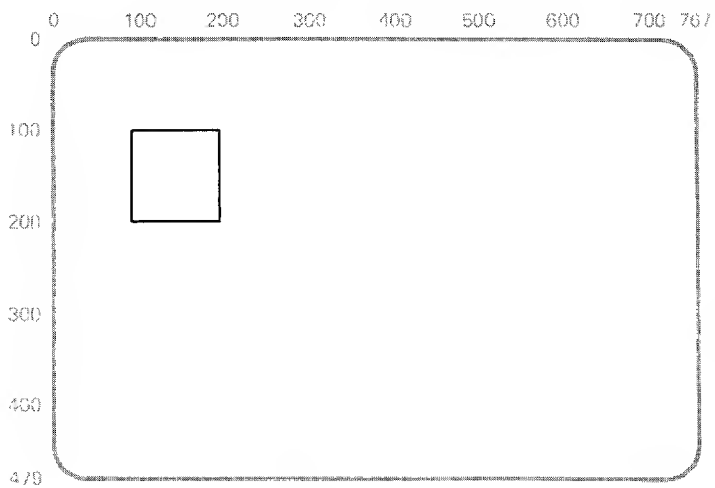


Figure 31

```

S(E)
P[300,300]
V(B) [+200]
    [,+150] (E)

```

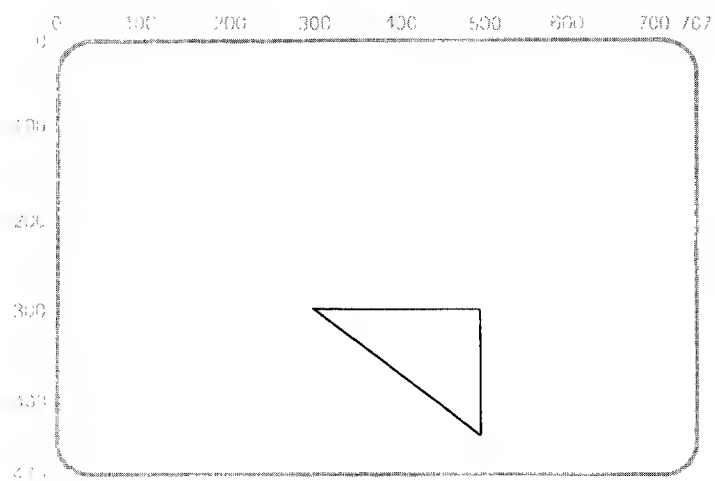


Figure 32

DRAWING A DOT AT THE CURRENT POSITION

The command used to *draw* a dot at the cursor's current position is `V []`. This command is useful because many vector commands do not draw the pixel (or dot) at the current location before drawing a line.

Type `V []`, then move the cursor using the `P` command to `P[0,0]` and observe the dot drawn.

Curve Command

The C (curve) command allows you to draw circles, arcs, closed curves, and open curves. A circle is a group of pixels that are the same distance away from the center position. An arc is part of a circle. A closed curve is a bounded shape like a circle (which is a special case of a closed curve) or an ellipse. An open curve is a curve with end points that do not meet.

CIRCLES

To draw circles and arcs, the VT125 uses the locations you specify to calculate the radius of the circle. Depending on the form of the command you use, the current location remains either at the center of the circle or on the circumference of the circle. Figure 33 illustrates a form of the C command that draws a circle around the cursor's current position. Figure 34 illustrates a form of the C command that draws a circle around the specified position and leaves the cursor located on the circumference.

Type the commands listed in Figures 33 and 34 and observe your results.

S(E)
P[300,300]
C[+100]

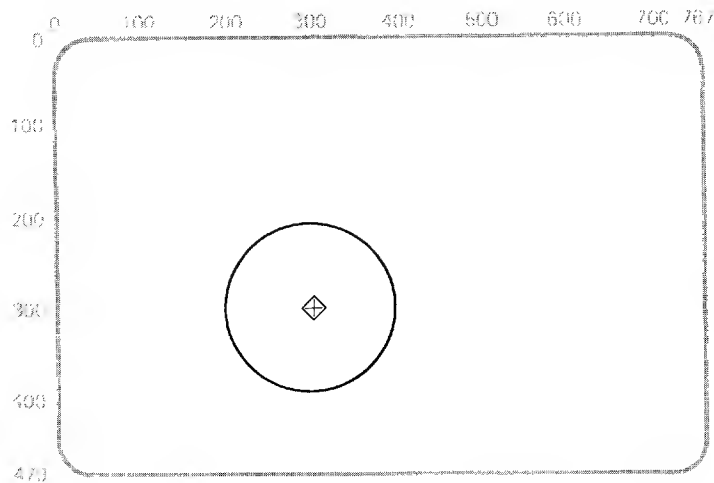


Figure 33

S(E)
P[300,300]
C(C) [+100]

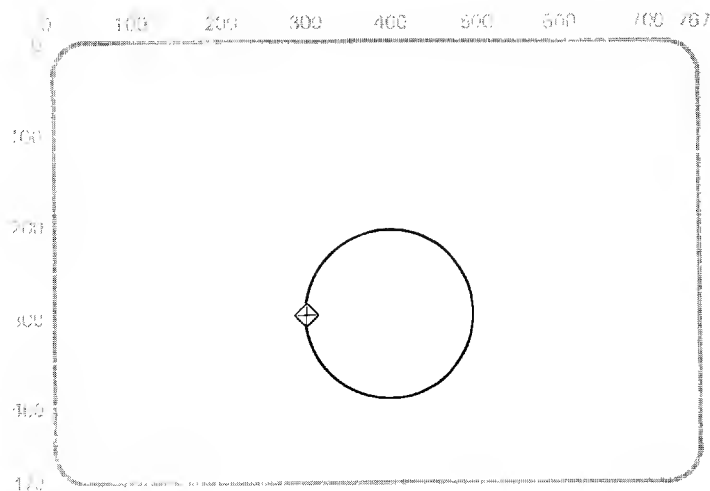


Figure 34

ARCS

An arc is a part of a circle. It is specified by the location of the center of the circle, the radius of the circle, the starting position of the arc, and the amount of the circle to be drawn (measured in degrees).

When drawing an arc, you may choose to have the cursor's current location remain at the center of the arc or on the arc's perimeter. Figure 35 illustrates a form of the C(A) (arc) command that draws an arc of 180 degrees (one half of a circle) around the current location starting at position [250,250]. Figure 36 illustrates a form of the arc command that draws an arc 180 degrees around position [250,250] with the beginning location being the current location.

Type the commands listed in Figures 35 and 36 and compare your results with those shown.

S(E)
P[250,250]
C(A+180)[+100]

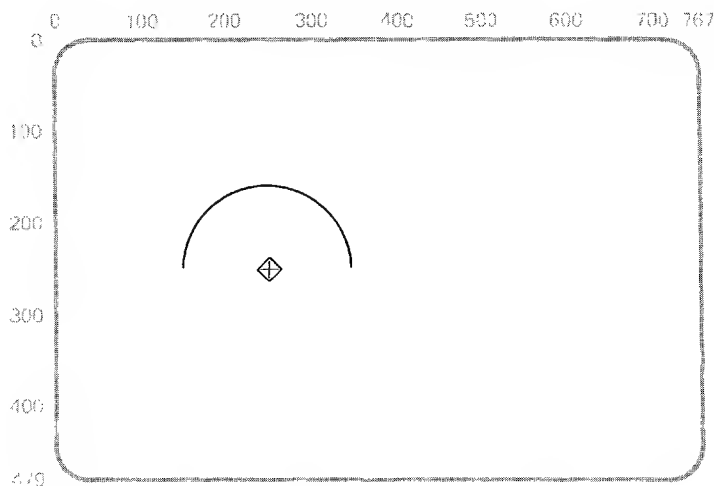


Figure 35

S(E)
P[250,250]
C(C,A+180)
[+100]

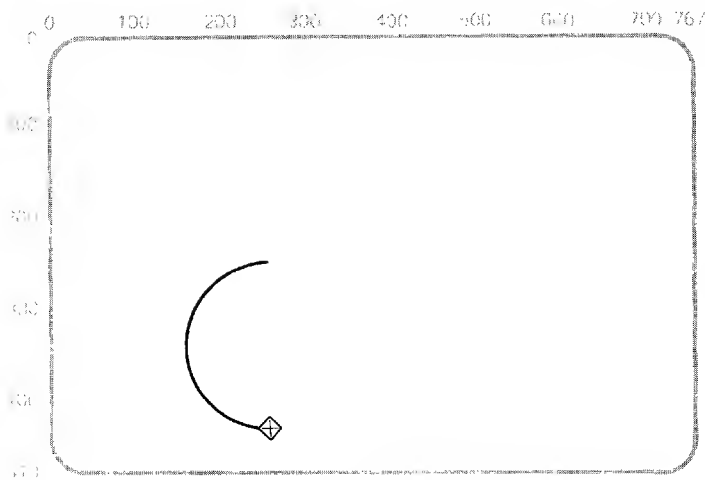


Figure 36

There are many variations of the C(A) arc command. Figures 37 and 38 illustrate the different results of similar commands. The C(A) (arc) command can be better understood if each component is explained separately.

- The C preceding the parenthesis is the command keyletter that selects the curve command.
- The C in the parentheses, that is, (C,A—180), determines what the cursor's current location is on the perimeter of the arc. The radius of the arc will be determined when the position of the center of the circle is given. If there is no C in parentheses, the cursor's current location will be the center of the circle and the position given will be a point on the perimeter of the arc.
- The A, followed by a signed integer, determines that an arc will be drawn instead of a full circle. The signed integer is the length of the arc in degrees. Since a full circle is 360 degrees, then a semicircle is 180 degrees, and one quarter of a circle is 90 degrees. A plus (+) sign preceding the integer causes the arc to be drawn in a *counterclockwise* direction. A minus (—) sign preceding the integer causes the arc to be drawn in a *clockwise* direction.
- The coordinate enclosed in square brackets, such as [+50], is the given position. If there is a C in the parentheses, the position given is the center of the circle. If there is no C in the parentheses, then the position given is the beginning position of the arc. The given position may be either a relative or an absolute position.

Type the commands listed in Figures 37 and 38 and compare your results with those shown.

```
S(E)  
P[300,200]  
C(C,A-180)  
[+50]
```

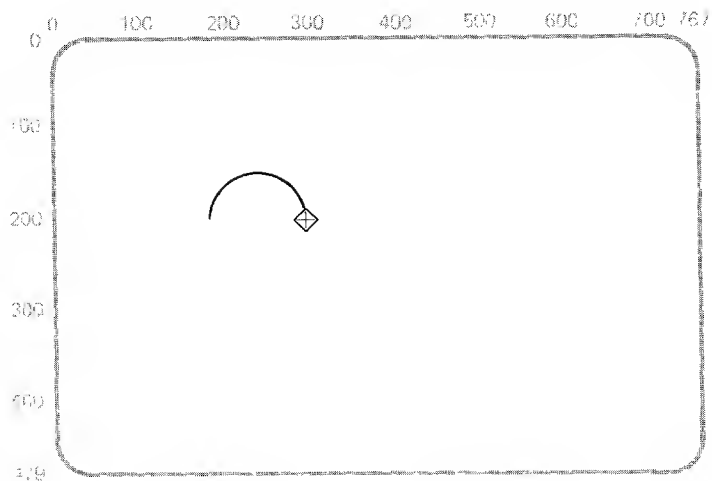


Figure 37

```
S(E)  
P[300,200]  
C(C,A+180)  
[-50]
```

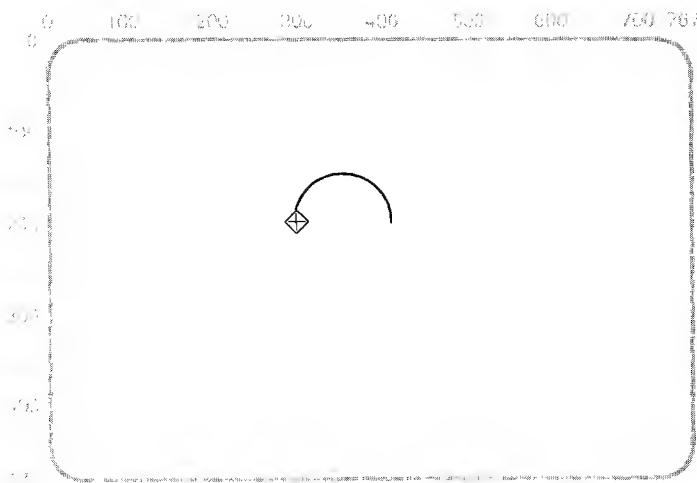


Figure 38

Figures 39 and 40 contain additional examples of the arc command. Type the commands listed in Figures 39 and 40 and compare your results with those shown.

S(E)
P[300,200]
C(A-270)
[+100]

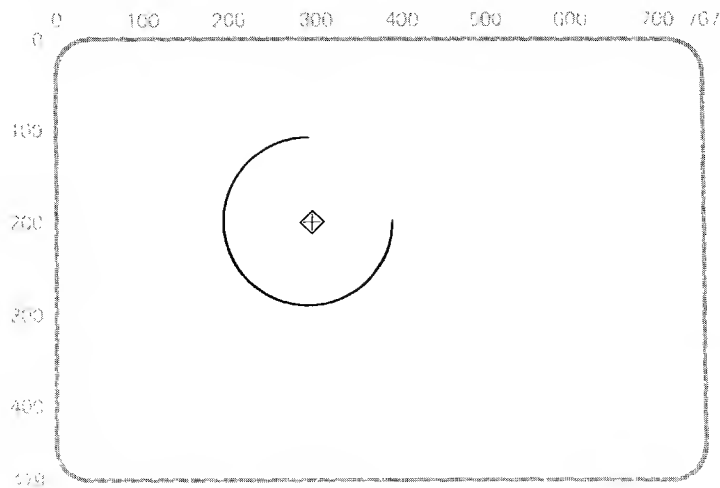


Figure 39

S(E)
P[300,200]
C(A+90)
[+100]

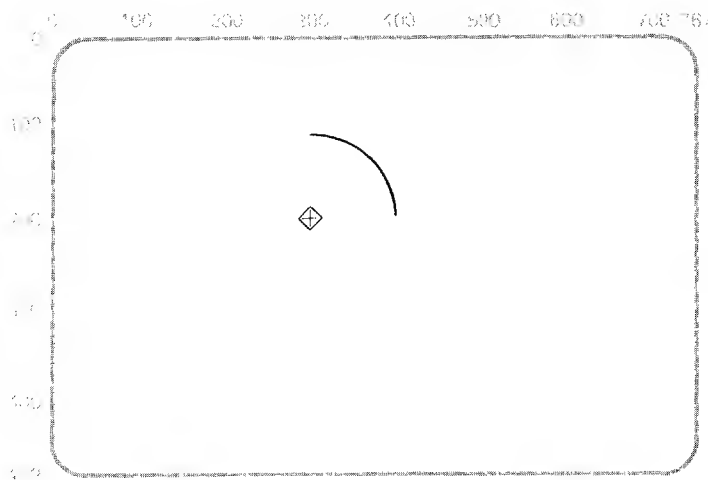


Figure 40

OPEN CURVES

An open curve is a curve whose end points do not meet. The general form of the open curve command is `C(S) [X1,Y1] [X2,X2] [X3,Y3] . . . (E)`. The open curve command allows you to draw a curve segment with as few as four positions (including the cursor's current location). To ensure that all segments of the curve are drawn, use the *null position specifiers* `([])` at the beginning and end of the list of positions. If you do not include the null position specifiers, only the segments of the curve from the second position to the next to the last position will be drawn.

Type the commands listed in Figure 41. Notice the difference between the curves in Figures 41 and 42. The curve in Figure 42 is generated by the commands listed in Figure 41 with the null position specifiers omitted.

```

S(E)
P[75,125]
C(S) [ ]
  [150,200]
  [225,125]
  [300,200]
  [375,125]
  [450,200]
  [525,125]
  [ ] (E)

```

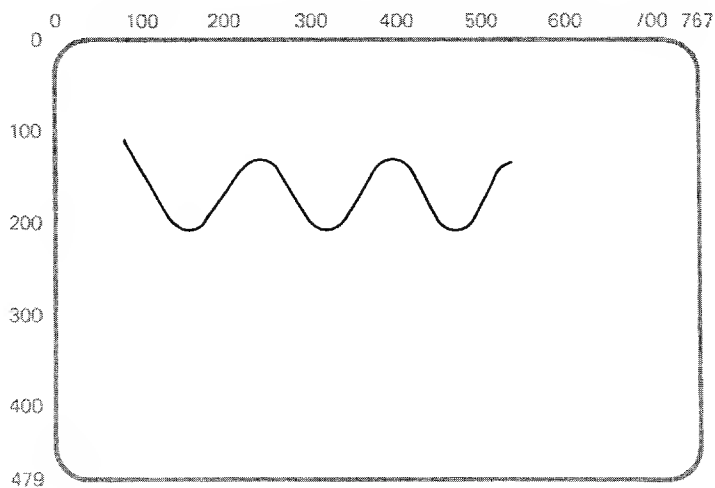


Figure 41

```

S(E)
P[100,100]
C(S) [75,125]
  [150,200]
  [225,125]
  [300,200]
  [375,125]
  [450,200]
  [525,125] (E)

```

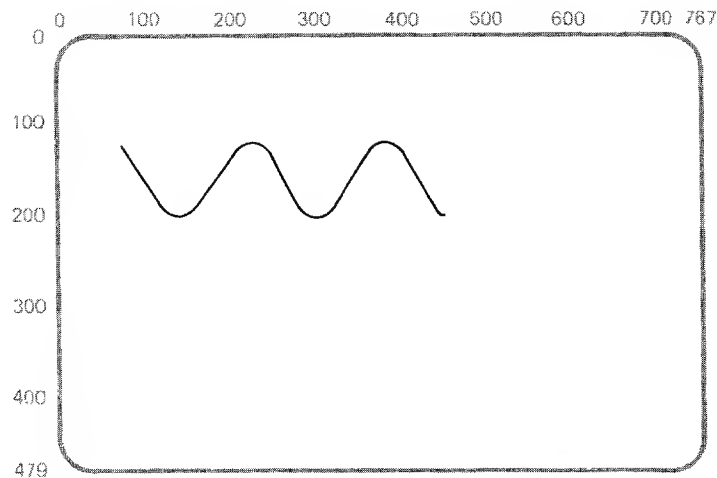


Figure 42

Curve

Figure 43 shows another example of an open curve. Type the commands listed in Figure 43 and notice that the curve is drawn one segment at a time.

```
S(E)  
P[100,100]  
C(S) [ ] [370,50]  
      [420,360]  
      [120,390]  
      [ ] (E)
```

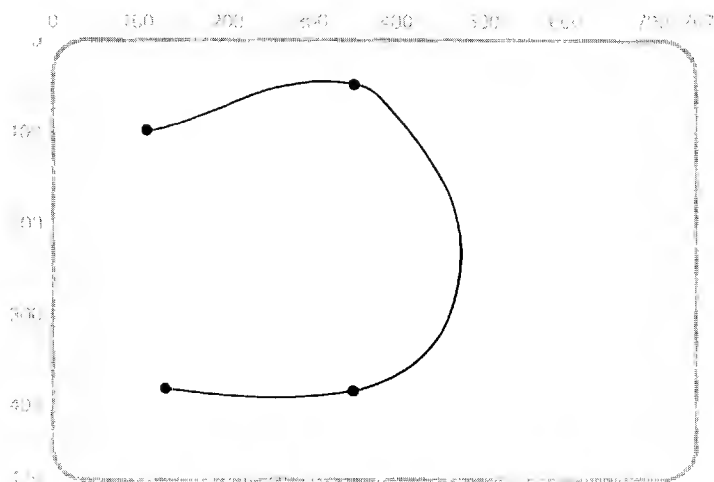


Figure 43

CLOSED CURVES

A closed curve is a curve with end points that meet. The closed curve is a bounded shape like a circle (which is a special case of a closed curve) or an ellipse. The general form of the closed curve command is C(B) [X1,Y1] [X2,Y2] [X3,Y3] . . . (E).

NOTE: The open curve sequence begins with an (S); the closed curve sequence begins with (B). Be careful not to confuse the two commands.

Type the commands listed in Figure 44. Notice the curve is identical to the curve in Figure 41 except the end points are joined.

Type the commands listed in Figure 45. The resultant figure is an ellipse.

C(B)

[] [75,125]

[150,200]

[225,125]

[300,200]

[375,125]

[450,200]

[525,125]

[] (E)

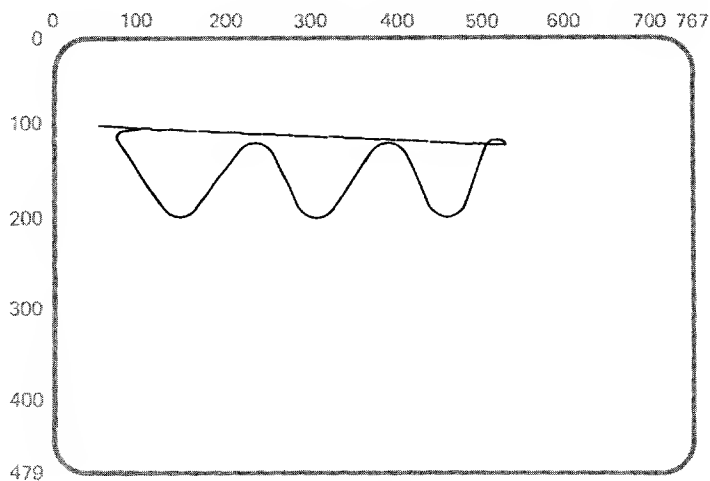


Figure 44

S(E)

P[230,240]

C(B) [320,160]

[480,120]

[570,160]

[480,240]

[320,280]

(E)

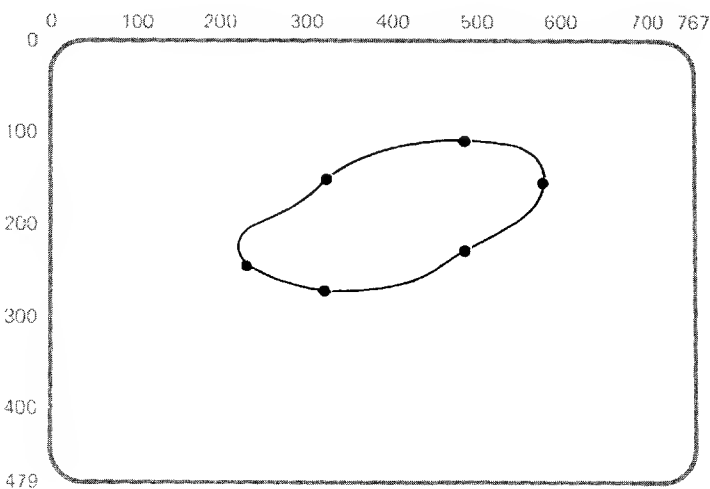


Figure 45

Text Command

In graphics mode, the VT125 displays text characters using the T (text) command. The ReGIS T (text) command allows you to draw characters with many combinations of size, orientation, and position.

The T command is formatted using the T keyletter followed by options in parentheses and a quoted string.

Be careful to open and close quoted strings with the same type of quotation mark (' or "). If a string is opened with a double quotation mark ("), then it must be closed with a double quotation mark ("). If a string is opened with a single quotation mark ('), then it must be closed with a single quotation mark ('). All characters that you type will be displayed on the screen as graphics text, until you close the quote correctly.

An option, once specified with the T command, is the *default* text writing condition. See the *VT125 User's Guide* for additional information.

CHARACTER SIZE

The **T(S)** (text *character size*) option allows you to select a character size from a standard set of sizes, numbered 0 through 16. The VT125 automatically calculates the size (width and height) of the text character and spacing between characters when you use the size option.

Type the commands listed in Figure 46 and observe the difference in the character sizes.

NOTE: The last command, T(S2), sets size 2 as the default character size. The character size will remain at size 2 unless you specifically change it.

```
S(E)
P[50,50]
T(S0)'0'
T(S1)'1'
T(S2)'2'
T(S3)'3'
T(S4)'4'
T(S5)'5'
T(S6)'6'
T(S7)'7'
T(S8)'8'
T(S9)'9'
P[100,200]
T(S12)'12'
T(S14)'14'
T(S2)
```

* 123456789

12

14

Figure 46

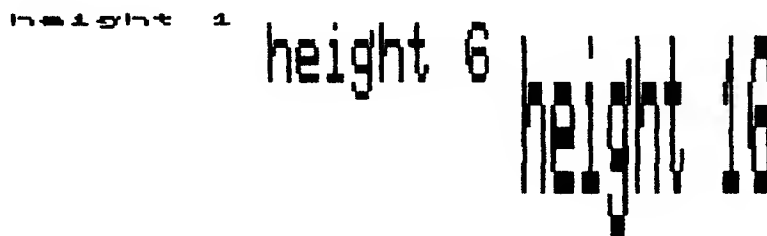
CHARACTER HEIGHT

The **T(H)** (text character height) option allows you to change the height of a character without altering the width of the character. The character heights are numbered 1 through 25.

Type the commands listed in Figure 47. Notice the different character heights.

NOTE: The last command, T(H4), sets height 4 as the default character height unless you specifically change it.

```
S(E)  
P[50,50]  
T(H1)'height'1'  
T(H6)'height'6'  
T(H16)'height'16'  
T(H4)
```



height 1 height 6 height 16

Figure 47

TEXT STRING TILT DIRECTION

By combining the D (direction) option and the S (size) option you can tilt character strings. The format of this command is **T(D#,S#)**, where D# is the direction and S# is the character size. [Remember, the range for the number following the S (size) option is 0 through 16.] This command controls the tilt of the baseline for the text string. A text string can be tilted at any 45 degree interval, either positive or negative, from 0 to 360 degrees. (Values other than 45 degree intervals are translated as the nearest lower 45 degree increment.) The S (size) option can be a repeat of the last chosen value or a new value. You may need to adjust the size of the tilted characters because ReGIS does not control the scaling between horizontal or vertical characters and diagonal characters.

Type the commands listed in Figure 48.

NOTE: Characters reading from left to right are not tilted if the baseline is at 0 degrees, but they are upside down if the baseline is at 180 degrees.

```
S(E)  
PL300,300]  
T(D0,S2)'--0'  
T(D45,S2)'--45'  
T(D90,S2)'--90'  
T(D180,S2)'--180'  
T(D270,S2)'--270'  
T(D0,S2)'--0'
```

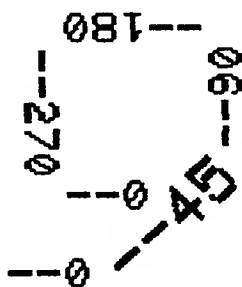


Figure 48

TEXT STRING AND CHARACTER TILT DIRECTION

By including the S (size) option in the option list, you can use the same D (direction) option twice. This allows you to tilt both the character string and the individual characters in the string. The first D value sets the tilt of the complete character string; the second D value sets the tilt for each character in the string.

Type the commands listed in Figure 49. Notice that both the characters and the character strings are tilted.

```

S(E)
W(V)
PE[100,100] T(D0,S2,D0)'0_TILT'
PE[100,150] T(D0,D45)'4_5__T_I_L_T'
PE[100,200] T(D0,D90)'9_0__T_I_L_T'
PE[100,250] T(D0,D135)'1_3_5__T_I_L_T'
PE[100,300] T(D0,D180)'180_TILT'
PE[100,350] T(D0,D225)'2_2_5__T_I_L_T'
PE[100,400] T(D0,D270)'2_7_0__T_I_L_T'
PE[400,100] T(D0,D315)'3_1_5__T_I_L_T'
PE[400,150] T(D0,D360)'360_TILT'
T(D0,S1,D0)

```

Note: The _ signifies a single space; a __ signifies a double space.

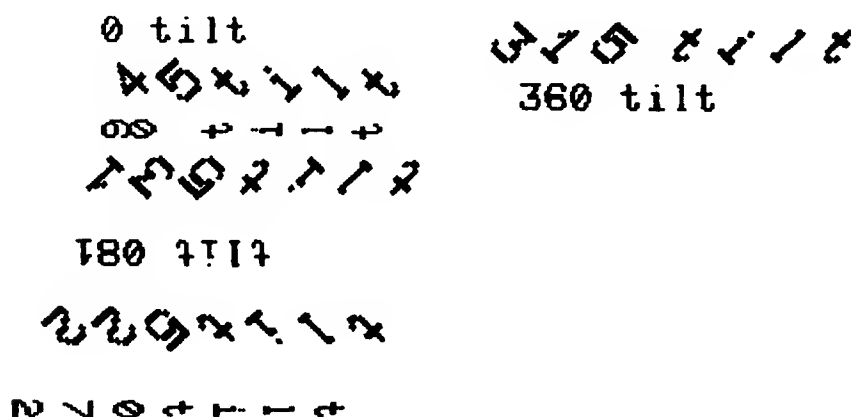


Figure 49

ITALICS

You can direct the VT125 to draw characters in *italics* using the I (italics) option. The format of this command is T(I#), where # is a signed integer between ± 45 degrees. A plus (+) sign tilts the characters to the left and a minus (—) sign tilts the characters to the right. This command can be used with the D (direction) command.

NOTE: The actual angles of tilt are approximate. Smaller tilt angles may distort small characters.

Type the commands listed in Figure 50. Compare your results with those shown.

NOTE: Once a text option has been selected, that option remains active until you change it.

S(E)

P[100,100]

- A. T(S2,I-20) '-20 DEGREES<CR> <LF>'
 - B. T(I-45) '-45 DEGREES<CR> <LF>'
 - C. T(I+20) '+20 DEGREES<CR> <LF>'
 - D. T(I+45) '+45 DEGREES<CR> <LF>'
- T(I0)

- A. *-20 Degrees*
- B. *-45 Degrees*
- C. *+20 Degrees*
- D. *+45 Degrees*

Figure 50

SUPERSCRIPTS AND SUBSCRIPTS

By using the T (text) command with an offset number (any number 0 through 7), you can display both superscripts and subscripts. The amount of the offset is determined by the character size and is one half of the character's size in the direction of movement. (See Figure 30 for the possible directions. Notice that these are the same offset directions used with the P and V commands.)

The offset direction is relative to the baseline of the character string; therefore, this command is affected by the D (direction) command. The offset number can appear anywhere in the T (text) command except in quotes.

Type the commands listed in Figure 51. Compare your results with those shown.

- A. S(E)
PL100,100]
T'SUPERSCRIPT'7'TEXT'7'subscript'
- B. PL100,200]
T'H'7'2'1'0'

A. SUPERSCRIPT TEXT subscript

B. H₂0

Figure 51

Write Commands

ReGIS allows you to not only draw images on the screen but also to control how you draw images. You can control writing patterns (such as dashed, dotted, or solid lines), shading (either solid, patterned, or character-filled), intensity, and writing modes. The W (writing controls) command gives you greater flexibility when drawing on the VT125 screen.

WRITING PATTERNS

Writing patterns allow you to vary the appearance of lines and shaded areas. The format of this command is **W(P#)**, where **#** is any number 0 through 9. Figure 52 lists the P (pattern) options with an example of how each appears on the VT125 screen.

W(P1) _____

W(P2) - - - - -

W(P3)

W(P4) _____

W(P5) _____

W(P6)

W(P7)

W(P8) - - - - -

W(P9) - - - - -

Note: (P0) is a blank line.

Figure 52

Type the commands listed in Figure 53. Notice that the W (writing controls) command does not cause anything to be drawn on the screen. The W command only affects the way other commands, such as V (vector) or C (curve), appear.

```

S(E)
P[100,100]
V[,+300] [+400]
W(P2)
P[100,-80]
C(S) [ ] [+100,-30]
    [+100,-50] [+100,-30]
    [+100,-20] [ ] (E)
W(P4)
P[100,300]
C(S) [ ] [+100] [+100,-40]
    [100,-20] [+100,-40]
    [ ] (E)
W(P1)

```

Note: The W(P1) command sets
writing pattern to a solid line.

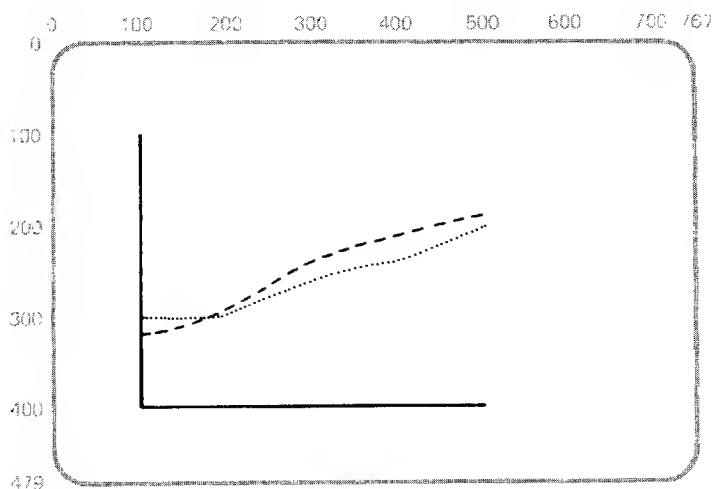


Figure 53

AREA SHADING

The shading command, **W(S1)**, lets you fill the inside of a graphic object as you draw the object. When shading is on, the V (vector) and C (curve) commands operate as usual. However, as you draw each point on the vector or curve path, the area between the vector or curve path and the *shading reference line* is filled. The shading reference line is a horizontal line whose Y-coordinate is specified when shading is turned on. The default shading reference line is the current Y-coordinate. You can specify a different shading reference line in the shading command. (See the *VT125 User's Guide* for additional information.)

The VT125 shades using patterns, either a writing pattern or a fill character. The default writing pattern is the current writing pattern, **W(P#)**. You can choose a fill character from the VT125 character set to be used as a shading pattern.

Figure 54 illustrates three shading patterns: completely filled area (writing pattern 1); filled with a writing pattern (writing pattern 2); and filled with a fill character. Type the commands listed in Figure 54 and observe these shading patterns.

S(E)
P[100,100]
W(S1)—————Turns shading ON.
C[+60]
P[100,250]
W(P2,S1)—————Selects writing pattern 2.
C[+60]
P[100,400]
T(S1)W(S'X')————Turns shading ON and selects X as a fill character.
C[+60]
W(P1)—————Sets the writing pattern to a solid line.
W(S0)—————Turns shading OFF.

A.



B.



C.

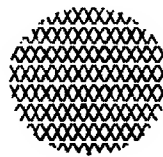


Figure 54

Write

Figure 55 is another example of shading. **W(S1)** turns shading on. Notice that the last command typed, **W(S0)**, turns shading off.

Type the commands listed in Figure 55.

```
S(E)
P[100,200]
W(S1)
C(S) [ ] [190,160]
      [260,250] [305,160]
      [390,250]
      [440,160]
      [ ] (E)
W(S0)
```

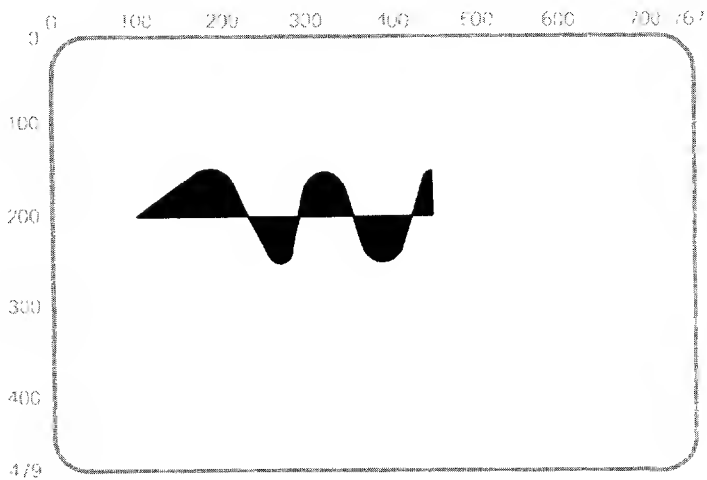


Figure 55

WRITING INTENSITY

The VT125 can be used to write in three shades of grey.

The format for writing in a different grey shade is **W(I#)**, where # is a number 0 through 3. These writing intensity numbers and their corresponding shades are as follows.

Number	Shade
W(I0)	Dark
W(I1)	Dim grey
W(I2)	Light grey
W(I3)	White

Figure 56 illustrates the shades of grey. Type the commands listed in Figure 56 and observe the results.

NOTE: The VT125 can drive an external color monitor. Color can be displayed only if you are using an external color monitor. Refer to the VT125 User's Guide for more information.

```
S(E)  
P[600,100]  
W(S1,I2)————— This command turns shading ON and selects  
P[ ,+300]           light grey as the shade.  
V[ ,-125]  
W(I1)  
V[ ,-125]  
W(I0)  
V[ ,-125]  
W(I3)  
V[ -125]  
W(S0)————— This command turns shading OFF.
```

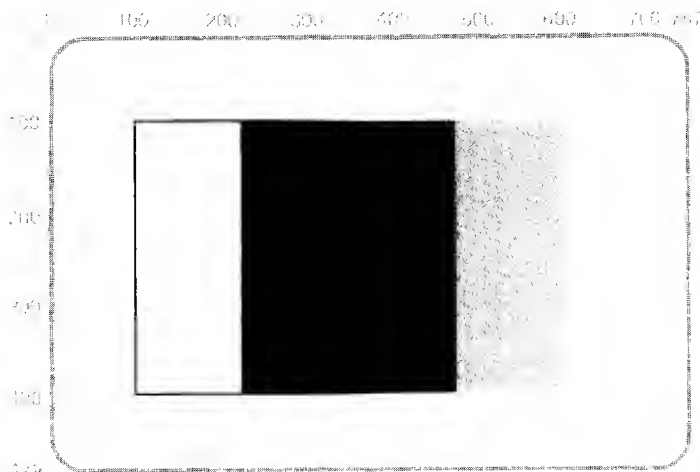


Figure 56

WRITING MODES

The VT125 has four writing modes. They are: C (complement), E (erase), R (replace), and V (overlay). These modes can be used at any time, but only one mode can be used at a time. The writing modes control how graphic images are written to the screen.

COMPLEMENT WRITING

The complement writing command, **W(C)**, allows you to draw images on the screen in a shade opposite the shade being overwritten. For example, if you are writing over an area that is dark, the new image will be written in white. If you are writing over an area that is dim grey, the new image will be written in light grey.

Figure 57 shows an example of complementary writing. Type the commands listed in Figure 57 and notice the change in the writing shades.

PL,-2001

W(C)

T(S3) 'COMPLEMENT WRITING'

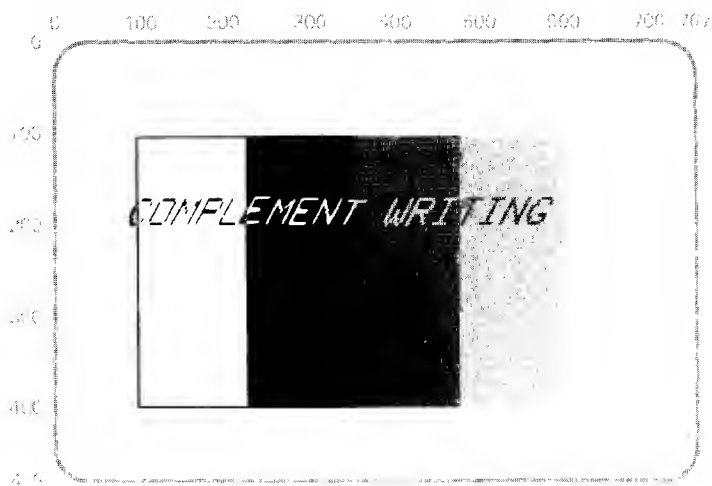


Figure 57

ERASE WRITING

The erase writing command, **W(E)**, lets you erase the area of the screen that is being overwritten. This command is particularly useful when you need to erase only a portion of a graphic image.

Figure 58 illustrates erase writing. Type the commands listed in Figure 58 and observe that some portions of the screen are erased.

```
S(E)  
P[100,100]  
V[+100] [ ,+100]  
  [-100] [ , -125]  
W(E)  
V[ ,+25]
```

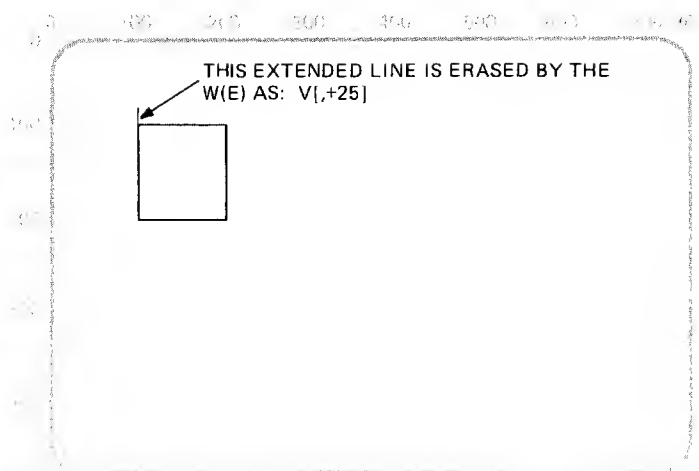


Figure 58

REPLACE WRITING

The replace writing command, **W(R)**, is used to replace images already on the screen with new images. The character or image appearing on the screen is erased and replaced with the new character or image being written. This command can be used to edit or change text or images on the screen.

Figure 59 illustrates replace writing. Type the commands listed in Figure 59. Observe the portions of the screen that are erased and replaced with new images.

```

S(E)
W(R)
P[200,200]
W(S'/'')
V[+100][,+100]
  [-100]
P[+50,-50]
W(S'\')
V[+100][,+100][-100]
P[+50,-50]
W(S'*')
V[+100][,+100][-100]

```

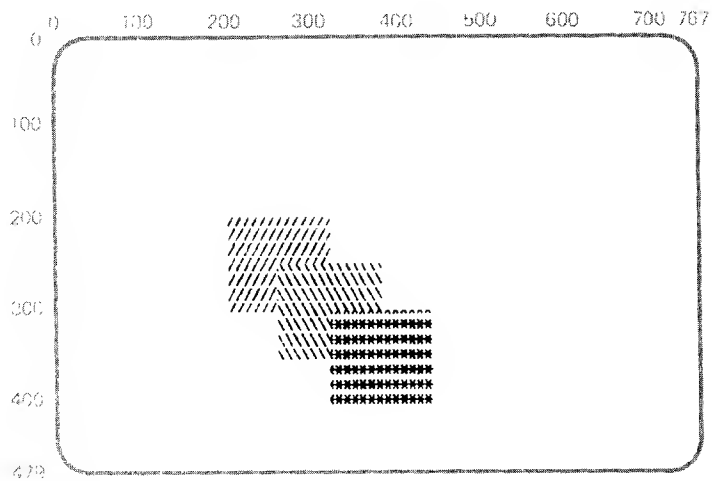


Figure 59

OVERLAY WRITING

The overlay writing command, **W(V)**, allows you to overlay one image on another. The character or image appearing on the screen remains and a new character or image is written over it. Both images are still visible.

Figure 60 illustrates overlay writing. Type the commands listed in Figure 60 and observe the areas of the screen where images are overlaid.

```
S(E)  
W(V)  
P[100,100]  
W(S'\')  
V[+100][,+100][-100]  
P[+50,-50]  
W(S'/'')  
V[+100][,+100][-100]  
P[+50,-50]  
W(S'\')  
V[+100][,+100][-100]
```

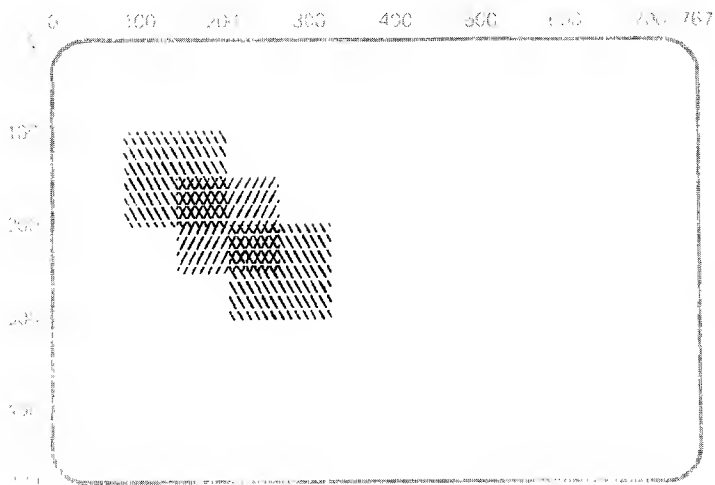


Figure 60

PIXEL MULTIPLIER

The write command has a pixel multiplier option, **W(M#)**. This option lets you set the number of locations that **P#** (position offset) and **V#** (vector offset) commands move or draw in one step. For example, when you precede the **V#** command with **W(M96)**, the VT125 will draw a line 96 units long in an offset direction.

Figure 61 illustrates the **W(M)** command. Type the commands listed in Figure 61. If you were to draw this figure without the use of pixel multipliers, you would have to strike each number key listed after the **V** command 96 times for each short segment.

```
S(E)  
PL300,100]  
W(M96)  
V642446064600206
```

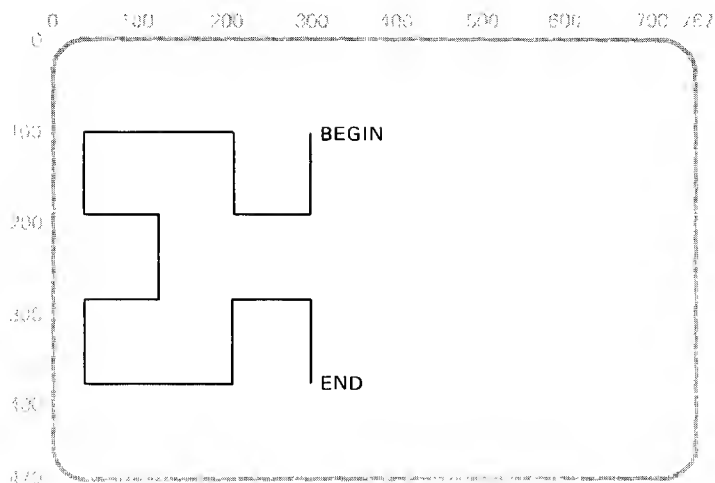


Figure 61

Screen Control Commands

Screen control commands, which are preceded by S, affect the entire VT125 screen. Screen control commands allow you to erase the entire screen, generate hardcopies of the screen's graphic images, scale the image size, change the background shade of your screen, scroll your screen image, and control the timing of writing. (See the *VT125 User's Guide* for a complete description of the screen control commands.)

SCREEN ERASE

You are already familiar with the S(E), screen erase, command. This command erases the entire graphics screen.

SCREEN HARDCOPY OUTPUT

The screen hardcopy command, S(H), generates a hardcopy image of the screen. The printers offered by DIGITAL that have the capability of generating a hardcopy output include:

LA34-RA	Graphics printer
LA100-RA	Letter printer
LA12-AA	Correspondent

(The LA34-AA with the -XL / -XM module installed can also generate hardcopy graphics output.)

To use a printer for hardcopy graphics output, a null modem cable must be used to connect the printer port of the VT125 (see Figure 4) and the communications port of the appropriate printer.

NOTE: Most printers can only display two intensities, on and off. The VT125 can display four intensities. When generating a hardcopy of the graphic image on the VT125 screen, the printers listed above put a dot wherever there are lines or shading on the screen. All grey shading is black (dark) when printed.

Type **S(H)** to generate a hardcopy of the screen's contents after the printer is connected to the VT125. If you do not have an appropriate printer, continue on to the next section.

NOTE: Entering and exiting SET-UP mode cancels the S(H) command. Press the SET-UP key once to enter SET-UP mode and once again to exit SET-UP mode.

SCREEN SCALING

The screen scale command, **S(S)**, allows you to change the graphic image on the screen. For example, **S(S2)** multiplies both the X- and Y-dimensions by 2. The **S(S(X2))** command multiplies only the X-dimension by 2. The **S(S(Y2))** command multiplies only the Y-dimension by 2. Substituting a 1 for any of the 2s in the commands above returns the image to its original size.

Figure 62 contains some simple examples of screen scaling. Type the commands listed in Figure 62 and observe the changes in the image size.

```
S(E)  
P[150,150]  
C[+100]  
P[-50]  
T'SCALE'  
S(S2)  
S(S1)  
S(S(X2))  
S(S(Y2))  
S(S1)
```

Note: This command returns the image to its original size.

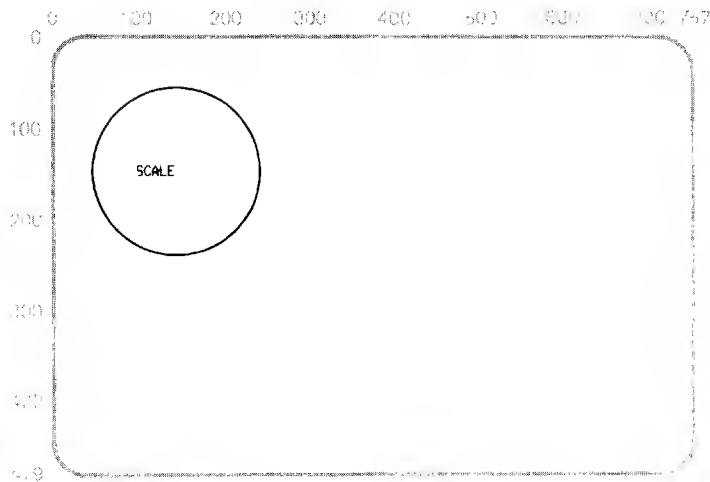


Figure 62

SCREEN BACKGROUND

The screen background command, **S(I#)**, lets you select the background screen shade. (The background is the intensity of shade that the screen has when it is erased by **S(E)**.) The background is selected from a range of four intensities mentioned in the text about the write command, **W(I#)**. The **S(I#)** command must be followed by an **S(E)** command in order for the screen background to change.

Figure 56 illustrates the background shades of grey. Type the commands listed in Figure 63 and watch how your screen changes.

S(E)
 S(I1) S(E)
 S(I3) S(E)
 S(I2) S(E)
 S(I0) S(E)

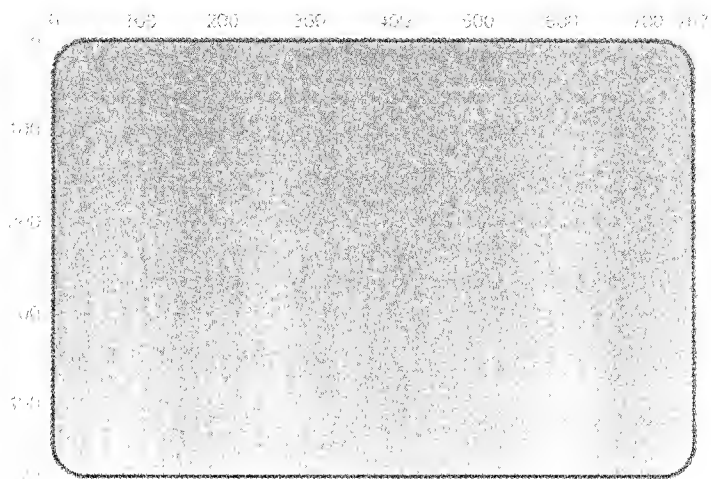


Figure 63

SCREEN SCROLLING

The screen scrolling command, **S#**, allows you to scroll or move the graphic images on the VT125 in any one of eight offset directions.

Type the commands listed in Figure 64. These commands allow you to move the graphic images on your screen.

NOTE: Pixel multipliers can be used with this command.

SCREEN TIME DELAY

The screen time delay option, **S(T#)**, causes ReGIS to delay the processing of the next ReGIS command for the specified amount of time. The # value is the number of ticks (either a 50th or a 60th of a second, depending on your line frequency) you would like to wait before the image appears on your screen. The largest possible value of # is 255, which is approximately 4 or 5 seconds.

```

S(E)
P[50,50]
T(S14,I-12)'SCROLL'
W(M1)_____ This command sets the pixel
S777771111100000 multiplier to 1.
W(M10)_____ This command sets the pixel
S777666222333 multiplier to 10.
W(M1)_____ This command sets the pixel
multiplier back to 1.

```

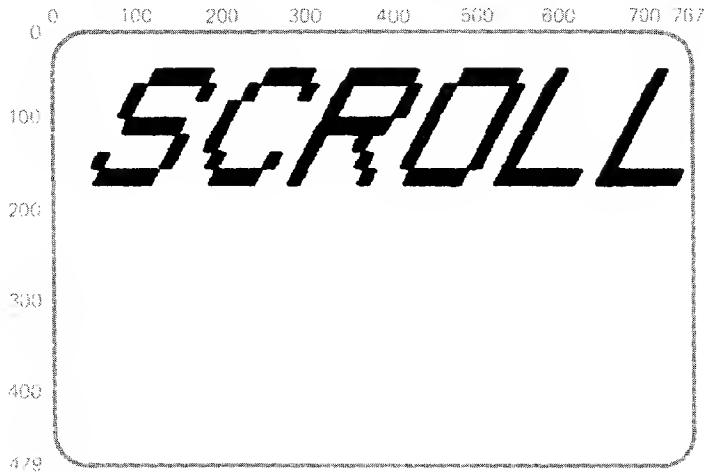


Figure 64

Macrographs

The ReGIS macrograph is a facility for storing and recalling text and command strings. For example, if you wanted to draw a certain figure frequently (such as your company's logo), you could define the ReGIS string that draws the figure to be a macrograph and store it in the VT125.

Use the macrograph command to define, delimit, and invoke a macrograph definition text string. The general form for defining macrographs is:

@: Keyletter string @;

- The VT125 interprets @: as the delimiter which begins the macrograph string. The VT125 interprets @; as the delimiter that ends the macrograph definition.
- "Keyletter" defines one of the 26 letters of the alphabet to be the name of the macrograph. The VT125 interprets uppercase and lowercase characters as the same keyletter.
- "String" specifies the ReGIS string that includes the contents of the macrograph. String has no fixed maximum length.
- The command @. clears all macrographs.

Macrographs

A macrograph can summon another macrograph but cannot summon itself. A macrograph cannot be defined in another macrograph or in a quoted string.

Figure 65 illustrates the defining and calling of macrographs. Type the commands listed in Figure 65.

```
S(E)
@:S
W(S1)
P[+50,+50] V[-100] [-100,-50]
  [+100] [+50,-100] [+50,+100]
  [+100] [-100,+50]
P[+50,+125]
W(S1)
V[-50,-125] [-100] [-50,+125]
W(I0)
V[+100,-75] [+100,+75]
@;
P[200,200]
@S
W(I2) P[400,150] @S
W(I1) P[600,200] @S
```

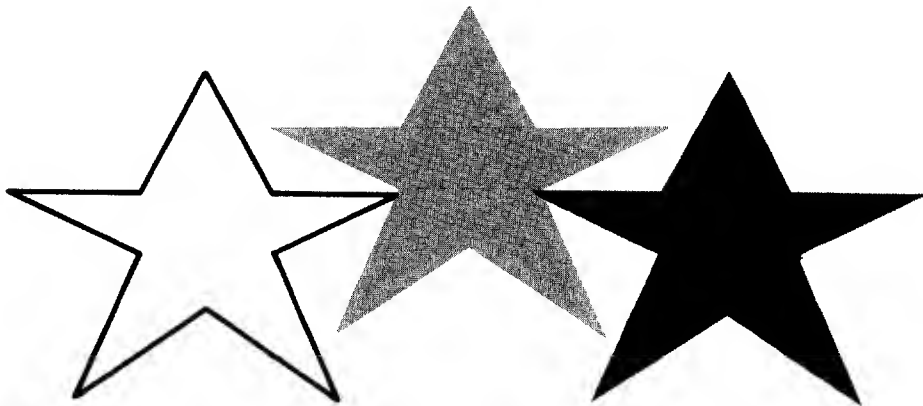


Figure 65

Macrographs

Figure 66 illustrates another macrograph. This macrograph draws and labels an X-Y axis. Type the commands listed in Figure 66.

```

S(E)
@.
@:TV[-10]P[+10,+50]@;
@:MV[+10]P[+125,-10]@;
P[100,100]V[+300][+560]P[100,150]
@T@T@T@T@T@TP[100,100][60,140]
T'100'P[60,+50]
T'80'P[60,+50]
T'60'P[60,+50]
T'40'P[60,+50]
T'20'P[60,+50]
T'0'P[225,400]
@M@M@MV[+10]P[225,400][-10,+20]
T'Q1'P[+105]
T'Q2'P[+105]
T'Q3'P[+105]
T'Q4'P[100,100][-50,+75]
T(D-90,S2,D-90) '% of Budget'
P[225,400][+125,+50]
T(D0,S2,D0)'QUARTER'
T(S1)

```

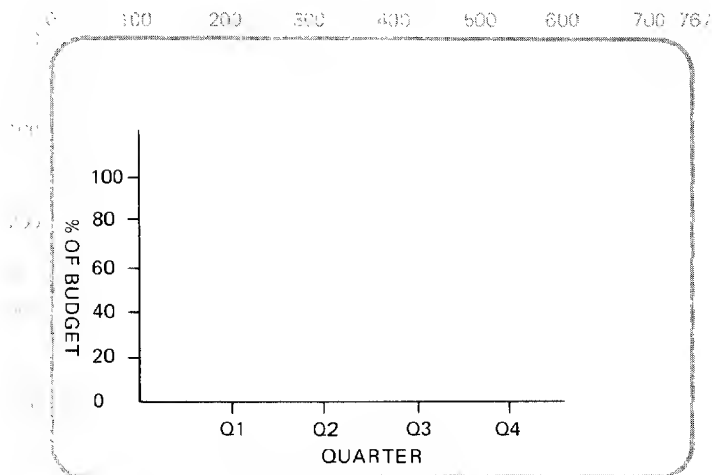


Figure 66

Combining Commands

This section illustrates how you can combine ReGIS commands to draw useful screen images in different shades of grey.

Combining Commands

The following commands, already described in this document, allow you to draw the shaded bar chart illustrated in Figure 67. Type the following list of commands and compare your results with those shown in Figure 67.

S(E)	V[+100]
P[50,100]	P[+30,-50]
V[,+300][+520]	V[+100]
P[-520,-1]	W(I1)
W(S1,I3)	P[70,380]
P[70,-100]	V[+100]
V[+100]	P[+30,-20]
P[+30,-30]	V[+100]
V[+100]	P[+30,-20]
P[+30,-150]	V[+100]
V[+100]	P[+30,+20]
P[+30,-20]	V[+100]
V[+100]	W(I3)
W(I2)	P[600,120]
P[70,340]	T(S2,I-20)'Product A'
V[+100]	P[600,250]
P[+30,-50]	T'Product B'
V[+100]	P[600,350]
P[+30,-75]	T'Product C'

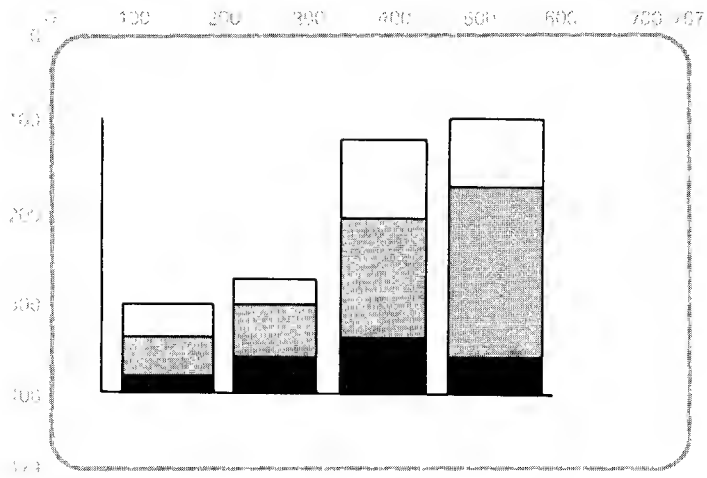


Figure 67

Combining Commands

The following commands, already described in this document, allow you to draw the illustration in Figure 68. Type the following commands and compare your results with those shown in Figure 68.

```
S(E)
PL300,320]
W(S1,S' / ')
W(I2)
CL+150]
W(S0)
CL+150]
PL+150]
W(S' ')
W(R)
C(C,A+45) [300,320]
VL300,320]
PL+25,-7]
W(S1)
PL+150]
C(C,A+45) [-150]
VL325,313]
W(I3)
PL220,200]
T(S2)' other'
PL220,233]
T' 90.0%'
PL505,205]
T'Administrative'
PL505,233]
T'10.0%'
PL50,25]
T(S3,I-20)'Administrative Costs Are'
PL50,85]
T'Small Portion of Total'
```

*Administrative Costs Are
Small Portion of Total*

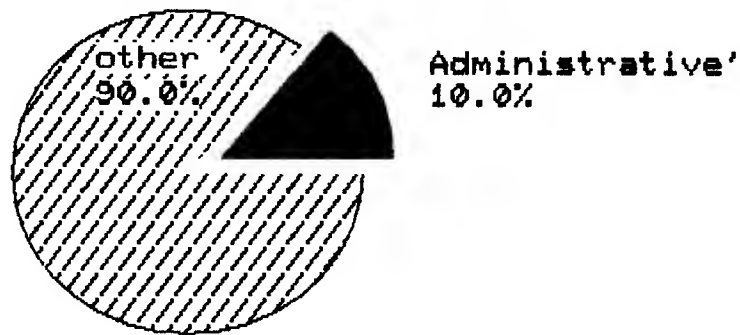


Figure 68

Combining Commands

Type the commands listed below, which have been covered in previous sections, and compare your results with those shown in Figure 69. This picture is identical to the one shown on the VT125 screen on the front cover of this document.

```
S(E)
P[50,20]
V[,+400][+650]
P[70,40]
T(S2)'Effective Sales Management Produced'
P[70,80]
T'Sales in Excess of Plan Each Quarter'
P[150,440]
T(I-30)'1'
P[+140]
T'2'
P[+125]
T'3'
P[+110]
T'4'
P[182,419]
W(S1,I3)
P[, -100]
V[-40]
P[342,419][, -150]
V[-40]
P[482,419][, -75]
V[-40]
P[612,419][, -200]
V[-40]
P[+20, -30]
W(I2)
T(S1,I0)'Actual'
P[162,419]W(S0,R,S'#')
P[, -80]
V[-40]
```

```

P[322,419] [, -115]
V[-40]
P[462,419] [, -60]
V[-40]
P[592,419] [, -170]
V[-40]
P[-55,+5]
W(S0,V)
T'plan'
P[592,419]
V[,-170] [-40] [, +170]
P[462,419]
V[,-60] [-40] [, +60]
P[322,419]
V[,-115] [-40] [, +115]
P[162,419]
V[,-80] [-40] [, +80]

```

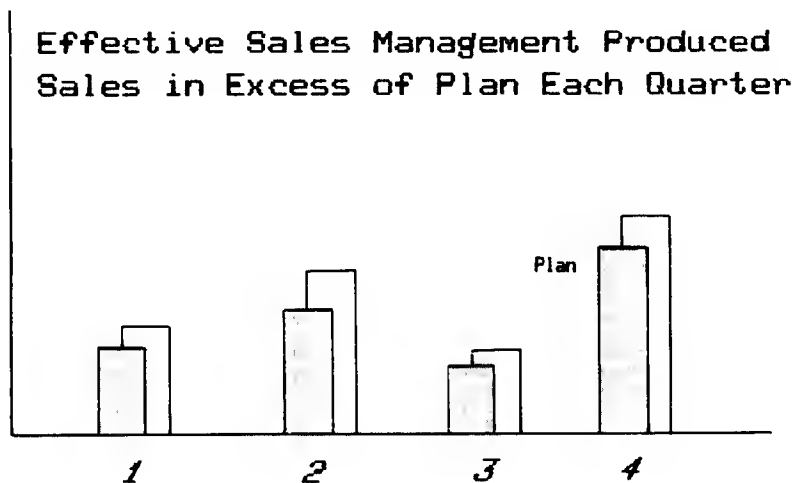


Figure 69

Appendices

APPENDIX A – ReGIS COMMAND SUMMARY

Command	Function
Position []	Reset pattern memory
[<position>]	Move to <position>
<pixel vector> or <pv>	Move <multiplier> pixels in <pv> direction
(B)	Save current location
(S)	Save dummy location
(E)	Move to last saved location
(W(<temporary writing controls>))*	P(W(M<multiplier>))
Vector []	Draw dot at current position
[<position>]	Draw vector to <position>
<pixel vector> or <pv>	Draw <multiplier> pixels in <pv> direction

*For additional command information, refer to the *VT125 User's Guide*.

Command	Function
(B)	Save current position
(S)	Save dummy position
(E)	Draw to last saved position
(W(<temporary writing controls>))	V(W(M<multiplier>))
Curve	[<position>]
	Circle with center at current position, circumference at <position>
	(C)[<position>]
	Circle with center at <position>, circumference at current position
	(A<degrees>) [<position>]
	Arc with center at current position, starting at <position> for <degrees>
	(A<degrees>c) [<position>]
	Arc with center at <position>, starting at current position for <degrees>
	(B) [position] ... [position] (E)
	Bounded (closed) curve
	(S) [[]position] ... [position][](E)
	Unbounded (open) curve
	(W(<temporary writing controls>))*

* For additional command information, refer to the *VT125 User's Guide*.

Command	Function
Text	
(S <number>)	Select text character size as a number 0 through 16
(D <angle number>)	Text direction - angles = 0° through 360° in 45 degree multiples
(H <number>)	Select text character height as a number 0 through 16
(I <number>)	Degree of italics angled 0° through $\pm 45^\circ$
(W(<writing options>))	Set temporary writing controls *
(A <character set>)	Select writing text using characters from a specified character set 0 through 3
(B)	Save current text attributes and begin temporary attributes
(E)	Restore saved text attributes and end temporary attributes
(S[width, height])	Set explicit character size in pixels
(M[width multiple number, height multiple number])	Set multiplier for explicit width and height in pixels

* For additional command information, refer to the *VT125 User's Guide*.

ReGIS Command Summary

Command	Function
<offset number (0 through 7)>	Move text cell in specified direction
[{ + } X spacing, { + } Y spacing]	Set explicit character spacing
Write (C)	Complement
(E)	Erase
(R)	Replace
(V)	Overlay
(F <foreground planes>)	0 = no planes 1 = plane 1 2 = plane 2 3 = planes 1 and 2
(I 0 or (D))	Foreground intensity: Dark or Dark
1 (R))	Dim grey Red
2 (G))	Light grey Green
3 (B))	White Blue
(C))	Cyan
(Y))	Yellow
(M))	Magenta
(W))	White
or	
(I (H <hue angle>	
L <lightness percent>	
S <saturation percent>))	
(M <multiplier>	
(N 1)	= negative on
(N 0)	= negative off
(S 1)	= shading on

Command	Function
(S 0)	= shading off
(S [,shading reference])	
(S 'shading character')	
(P <binary pattern>)	Enter pattern
(P <pattern number>)	Use VT125 pattern
(P <pattern multiplier>))	
(W<I>(P<J>,N<K>))	Custom writing control
Screen <pixel vector>	Scroll
[<position>]	
(A [<position>] [<position>])	Display addressing
(E) Erase screen	
(H) Hardcopy print all	
(H [<position>] [<position>])	Hardcopy (corner positions optional)
(H(P[<position>]))	Set hardcopy offset
(I 0 or (D))	Background intensity:
1 (R))	Dark or Dark
2 (G))	Dim grey Red
3 (B))	Light grey Green
(C))	White Blue
(Y))	Cyan
(M))	Yellow
(W))	Magenta
	White
or	
(I (H <hue angle>	
L <lightness percent>	
S <saturation percent>))	

ReGIS Command Summary

Command

	S(M<N> (<mono HLS>) (A<color HLS>))	Output mapping
	(S <scale>) (S (X<scale>Y<scale>))	
	(T <ticks>)	Time delay
@ (Macro- graph)	:keyletter character — string @;	Define macrograph
	@ keyletter	Retrieve and display macrograph
	@ . Clear all macrographs	
*Load	(A<integer>)	Select for loading
	(A“<name>”)	Give name to set
	“<ascii char>” <hex pair> ... <hex pair>;	Load cell
*Report	(L)	Set selected for loading
	(M(<keyletter>)	Contents of macrograph
	(M(=))	Use of storage
	“<free>,<total>”	Reply to use
	(P)	Cursor position

*These commands are not described in this document. For a description of these commands, see the *VT125 User's Guide*.

APPENDIX B – PROGRAMMING EXAMPLES

Example 1

This BASIC program draws a spiral shown in Figure 70. The ReGIS commands are shown in color.

```

10 REM DISPLAY A SPIRAL PATTERN
20 REM FIRST CLEAR SCREEN, SET UP WRITING CONTROLS, POSITION AT CENTER
30 PRINT "S(E)W(P1,r)P[350,240]"
40 REM APPROACH IS TO DRAW 23 SEMI-CIRCLES, EACH STARTING WHERE THE PREVIOUS
50 REM SEMI-CIRCLE ENDED; SHADING IS A FUNCTION OF THE ITERATION COUNT
60 FOR I=1 to 23
70 PRINT "W(I";INT(1+I/7);")"
80 PRINT "C(A180,C)[-";1*10;"]"
90 PRINT "C(A180,C)[+";1*10+5;"]"
100 NEXT I
110 REM HOME TEXT CURSOR TO PREVENT SCROLLING WHEN DONE
120 PRINT CHR$(27);"[H";
130 END
    
```

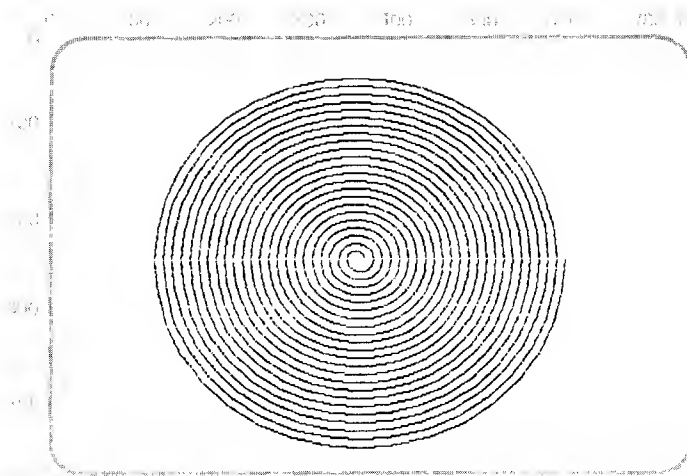


Figure 70

Example 2

This BASIC program incorporates the macrograph described in Figure 66. It is a general purpose program that allows you to enter data and display it in a line graph. The ReGIS commands are shown in color.

```
10 REM - - - - GRAPH - - - -
20 REM - - - - INITIALIZE SPECIAL CHARACTERS
30 E$=CHR$(27)
40 REM - - - - S$ TURNS GRAPHICS ON
50 S$=E$+'Pp'
60 REM - - - - R$ TURNS GRAPHICS OFF
70 R$=E$+'\'
80 DIM A(50),B(50)
90 REM - - - - CLEAR VT100 SCREEN AND SET SCROLLING REGION TO TOP
100 PRINT E$;'[2J';E$;'[1;2R';E$;'[1;1H';
110 REM - - - - DEFINE AXIS MACROGRAPHS
120 PRINT S$;':@:TV[- 10]P[+ 10,+ 50]@;
130 PRINT '@:MV[, + 10]P[+ 125, - 10]@;
140 PRINT '@:AW(P113)P[100,100]V[, + 300][+ 560]P[100,150]@T@T@T@T@T@T'
150 PRINT 'P[100,100][60,140]T(S1,I0)''100''P[60,+ 50]T''80''P[60,+ 50]'
160 PRINT 'T''60''P[60,+ 50]T''40''P[60,+ 50]T''20''P[60,+ 50]T''0''P[225,400]'
170 PRINT '@M@M@MV[, + 10]P[225,400][ - 10,+ 20]T''Q1''P[+ 105]T''Q2''P[+ 105]'
180 PRINT 'T''83''P[+ 105]T''Q4''P[100,100][ - 50,+ 75]'
190 PRINT 'T(D - 90,S2,D - 90)''% of Budget''p[225,400][+ 125,+ 50]'
200 PRINT 'T(D0,S2,D0)''QUARTER''T(S1)@;
210 PRINT R$
220 REM - - - - DRAW AXES
230 PRINT E$;'[2J';S$;S(E)@A';R$
240 REM - - - - ENTER DATA POINTS
250 I=0
260 PRINT 'ENTER POINTS X,Y (NEGATIVE VALUE WHEN DONE)';
270 INPUT A,B
280 IF A<0 GO TO 340
290 IF B<0 GO TO 340
300 I=I+1
310 A(I)=A
320 B(I)=B
330 GO TO 260
340 REM - - - - CHOOSE LINE PATTERN
350 PRINT 'ENTER LINE WRITING PATTERN (1-4)';
360 INPUT A$
370 REM - - - - DRAW CURVE
```

```

380 PRINT S$;'W(P';A$;')P[';A(1);',';B(1);]C(S)[]'
390 FOR Z=2 TO I
400 PRINT '[';A(Z);',';B(Z);']'
410 NEXT Z
420 PRINT '](E)';R$
430 PRINT 'ANOTHER CURVE ? (Y OR N)';
440 INPUT A$
450 IF A$='Y' GO TO 250
460 PRINT 'A NEW GRAPH ? (Y OR N)';
470 INPUT A$
480 IF A$='Y' GO TO 230
490 PRINT S$;'S(E)W(P1)T(D0,S1,D0)';R$;E$;'[2J';E$;'[1;24r'
500 END

```

APPENDIX C – GLOSSARY

Absolute location – An unsigned coordinate pair that specifies a location based on the screen origin.

Bracketed pair ([]) – A pair of values enclosed in brackets; used in ReGIS command strings.

Character size – The attributes defining the width and height of a character.

Closed curve sequence – A series of locations the VT125 uses to interpolate a curve whose end points meet.

Command keyletter – A letter which directs the ReGIS interpreter to perform a graphics operation.

Complement writing – Writing mode in which the VT125 complements the existing image as new images are written to the screen.

Coordinate pair – An X-coordinate and a Y-coordinate which together define a location.

Coordinate – A number used to specify the location or point on a line.

Current location – A location that the VT125 maintains internally which is a pointer to the location last moved to or drawn to.

Default – A value assumed when no specific choice is given by the user or a program.

Dot – See pixel.

Drawing – See writing.

Echo – Retransmit to the sender that which is sent.

Erase writing – Writing operation which removes previously drawn objects from the screen.

Graphics cursor – A diamond-shaped cursor displayed only when the VT125 is in graphics mode. It indicates the active pixel location.

Graphics mode – Terminal operating mode in which the ReGIS interpreter is enabled.

Graphic text – Text displayed in graphics mode.

Grey scale – Four levels of intensity the VT125 displays on the screen.

Image – All objects displayed on the screen.

Italic – Character slant.

Line pattern – An eight-dot pattern the VT125 uses to write with.

Location – A point defined by a coordinate pair.

Macrograph – A named string which can be recalled and which may consist of ReGIS commands.

Mnemonic – An abbreviation or acronym that is easy to remember.

Multiplication factor – Number used to multiply the pixels in a writing pattern before displaying the pattern.

Null position specifiers – A pair of square brackets ([]) used to ensure that the first and last segments of curves and vectors in a ReGIS command string are drawn.

Offset – A distance from a given location.

Offset direction – A numbered direction which directs the VT125 to write in a specific direction in relationship to the current location.

Open curve sequence – A series of points that the VT125 uses to interpolate a curve whose end points do not meet.

Overlay writing – Writing mode in which the VT125 overlays an existing image with new images written to the screen.

Picture – Any combination of drawings and text displayed on the VT125's screen.

Pixel – Picture element; the smallest displayable unit on the screen.

Relative location – A point on the screen measured from the current location rather than the screen origin.

ReGIS – Mnemonic for **R**emote **G**raphics **I**nstruction **S**et.

Replace writing – A writing mode in which the VT125 replaces existing images as new images are written to the screen.

Reset – Return to a known default condition.

Screen – That portion of the video monitor on which images are displayed.

Scrolling – The continuous horizontal or vertical movement of objects to make room for new objects.

Self-test – An internal test of the terminal hardware which the VT125 performs.

SET-UP mode – The VT125 mode in which the terminal SET-UP parameters can be changed; entered by striking the SET-UP key.

Shade character – User-specified character the VT125 uses during a write operation with shading enabled.

Shading reference line – Y-coordinate the VT125 uses to delimit an area to be shaded during a write operation.

Shading – Filling in a designated area with a writing pattern during a writing operation.

Text cursor – Block or underline cursor the VT125 displays both in text mode and graphics mode.

Glossary

Text mode – Terminal operating mode in which the VT125 operates as a VT100 or a VT52 terminal; graphics interpretation is disabled.

Vector – A directed line.

Writing – The operation the VT125 performs to display lines or text on the screen.

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What is your general reaction to this manual? In your judgement is it complete, accurate, well organized, well written, etc? Is it easy to use?_____

What features are most useful?_____

What faults or errors have you found in the manual?_____

Does this manual satisfy the need you think it was intended to satisfy?_____

Does it satisfy *your* needs?_____ Why?_____

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