Honeywell

Picture Editor Data Entry

SW11-650

Total Plant

Honeywell

Implementation

Engineering Operations - 2

Picture Editor Data Entry

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INTRODUCTION
Section 1

Custom Graphic Displays can contain text, shapes, touch screen targets, and other features. Probably most often, they are a schematic representation of the process. The Picture Editor allows you to build and edit Custom Graphic Displays without the need for extensive programming knowledge. This manual explains how to use the Picture Editor.

Figure 1-1 — Picture Data Entry 1195

1.1 OVERVIEW

The process of building a Custom Graphic Display consists of two parts:

- Designing the display
- Entering display data into the system, using the Picture Editor.

1.1.1 Display Design

Display design is described in the *Picture Editor Form Instructions* manual (see References). Honeywell also provides a series of paper forms to collect the information necessary to create a custom display. The *SW88-551,* Display Form is used to make a sketch of the intended display. Forms *SW88-552* through *SW88-559* are used to collect supporting information such as color, intensity, and other data needed during the data entry session and to sketch subpictures. The Form Instructions manual describes basic objects that can be built with the Picture Editor and explains how to use the forms. Anyone attempting to design a Custom Graphics Display should study that manual.

1.1.2 Display Data Entry

The display data entry process (picture building) consists of using the keys at the Universal Station's Engineering Keyboard to enter data and invoke the commands that put lines, shapes, characters, etc., on the screen. This manual discusses the data entry process and offers some tips and suggestions. Two companion publications, the *Picture Editor Reference Manual* and the *Actors Manual,* (see References) are also useful; in fact, essential to anyone using the Picture Editor for the first time. First time users should study the General Data Entry and Display Editing sections of this manual before attempting to build any displays.

Whenever you are unfamiliar with a command mentioned in this data entry manual, you should refer to the *Picture Editor Reference Manual* where each command is described in great detail. After building a few pictures, you may need only a list of the commands and abbreviations such as is provided in Appendix A of this manual.

1.1.3 Display Storage Medium

As you build Custom Graphic Displays, you will want to store your work. A History Module, floppy, or cartridge disk can be used as a storage medium. Floppy and cartridge disks must be prepared in advance, using the Command Processor functions. Refer to the Create command in the *Command Processor Operation* manual (see References).

Before Custom Graphic Displays can be used in an operating system, you must enter related pathname information into the Area Database Pathname-Catalog. This is usually done at system configuration time, or this information can be added to a configured system by reconstituting the Pathname Catalog Configuration Display. The procedures are described in the *Data Entity Builder Manual* or the *System Startup Guide* (see References).

1.2 REFERENCES

Picture Editor Form Instructions	SW12-650
Picture Editor Reference Manual	SW09-650
Picture Editor Forms—Complete set	SW88-650
Screen Form	SW88-551
Behavior Form	SW88-552
Values	SW88-553
Conditional Behavior	SW88-554
Targets	SW88-555
Variants	SW88-656
Subpictures	SW88-557
Subpicture Detail	SW88-558
Bar Charts	SW88-559
Actors Manual	SW09-655
Command Processor Operation	SW11-607
Application Module Parameter Reference Dictionary	AM09-540
Computer Gateway Parameter Reference Dictionary	CG09-540
Process Manager/NIM Parameter Reference Dictionary	PM09-640
System Startup Guide - Cartridge Drive	SW11-604
System Startup Guide – CD-ROM	SW11-600
System Startup Guide - Zip Drive	SW11-614
Data Entity Builder Manual	SW11-511

GENERAL PROCEDURES AND TECHNIQUES
Section 2

This section describes the Engineering Keyboard and tells how it is used with the Picture Editor to build Custom Graphic Displays.

2.1 ENTERING THE PICTURE EDITOR

The Picture Editor is a function of the Universal Personality and that personality must be running in the Universal Station. The Universal Personality (UP) contains both engineering and operator functions. Press the MENU key (hold down CTL and press HELP) to call up the Engineering Main Menu.

With the main menu displayed on the screen, use the engineering keyboard's cursor-keys to move the cursor to the words Picture Editor; then press the SELECT key. If the system has the touch screen option, just touch the words Picture Editor on the menu.

You can leave the Picture Editor by executing an END command or by pressing the MENU key on the Engineering Keyboard. You can temporarily switch to the Command Processor (e.g., to use a File Utility function) by pressing the ESC key. Pressing MENU returns the Picture Editor.

If you are working at a Universal Work Station or Micro TDC Station, see the next paragraph.

2.1.1 Universal Work Station or Micro TDC Station

If you are using a Universal Work Station (UWS) or a Micro TDC Station, keep the following differences in mind. The station must have an Engineering Keyboard connected. You may have to press the PF1 key to enable engineering entry functions (i.e., enable Engineering Keylock). Although these stations do not have touch screens, you will find it easy to move the cursor with the mouse or track ball and you can use the ENTER and SELECT keys on these devices to duplicate those same functions on the Engineering Keyboard.

2.2 USING THE ENGINEERING KEYBOARD

In addition to the normal letter/number keys, the following keys are used as described with the Picture Editor (see Figure 2-1).

NOTE

DUAL-USE KEYS

The edge functions on most dual-use keys such as MENU, HOME, RED, etc., are enabled by holding down the CONTROL key and pressing the desired key.

TAB/CUR (arrow keys)—These keys move the cursor.

TAB—When a CTL key is held down, the tab function is enabled. Pressing CTL and an arrow key moves the cursor between entry points on the screen forms. If there is no screen form, pressing CTL and any arrow key during the Picture Editing session causes the cursor to go to the Command Line. Within a port, holding down a CTL key and pressing in sequence LF TAB allows you to quickly move the cursor to either end of a line, or either end of text on a line or to the upper or lower line in a port, depending on where you start.

CUR—When none of the CTL keys is held down, the cursor function is enabled. Pressing an arrow key moves the cursor in any of the four indicated directions. Two cursor keys can be simultaneously pressed to cause diagonal movement. The cursor continues to move as long as the key or keys are held down.

The cursor appears in various forms depending on the display generator board used in the Universal Station. A rectangle represents the screen space allocated for one alphanumeric-character cell and moves in 1-cell increments. A cross-hair cursor provides extra refinement for graphic work (e.g., drawing lines) and moves in 1-pixel increments. The cursor may also appear as an arrow or, within pick (target) areas, as a bulls eye. You can choose between a character cursor and a pixel cursor by pressing the F1 key (CTL/1). For example, if the rectangular cursor is displayed, pressing F1 switches to the cross-hair cursor and pressing F1 again switches back to the rectangular cursor. When a cursor key is held down, the rectangular cursor moves across the screen in correspondingly larger steps than the cross-hair cursor.

For systems with the touch screen option, the cursor can be moved by touching the screen. The cursor jumps to the position indicated by your finger.

ENTER—After typing a Picture Editor command, and later after entering command-specific information, press ENTER to signal that the last entry is complete and should be acted upon. Thus, the ENTER key both begins and ends a command.

SELECT—When choosing coordinate points, this key signals the system to accept the point where the cursor is positioned. Coordinate points are used to indicate the ends of lines, the vertices of shapes, and the position where you want something to appear in the picture (also see the DEL-key description).

DEL—To build shapes, values, variants, and other objects, you must enter one or more coordinate points on the screen. The DEL key allows you to erase the last point entered and re-enter a different point. If all coordinate points are successively erased, the command is terminated.

CANCEL—CANCEL is used to recover from errors; it is a request to cancel the previous user action. In general, this key cancels the current command. If the Picture Editor is waiting for command input and the CANCEL key is pressed, the effects of the last operation are canceled. For example, if the last command executed was used to add a line, pressing CANCEL causes the line to disappear from the picture; pressing the CANCEL key again causes the line to return (i.e., the cancel operation is canceled). The effect of the cancel key is pointed out for specific instructions throughout the *Picture Editor Reference Manual*. This key allows switching between the current picture and the last picture.

BLINK, INTEN (Intensity), BKGD (Background), WHT (White), BLK (Black), CYAN, BLUE, MAGN (Magenta), RED, YEL (Yellow), and GRN (Green)—are used to change behavior attributes of the next objects or text added to the display (see the Behavior discussion later in this section).

Letters, Numbers, Symbols—The alphanumeric-character keys are used to

- enter text into the picture (using the Add Text command)
- enter command data
- fill in forms on the screen

Alphabetic characters can be entered in either upper or lower case for all of the above.

PAGE FWD/PAGE BACK and DISP FWD/DISP BACK—The Page Forward/Page Backward keys roll the edit region up or down by one half-screen (12 lines). The Display Forward/Display Backward keys roll the edit region right or left by one half-screen (40 columns). Refer to Figure 2-3 for a drawing of the edit region/total drawing-area concept.

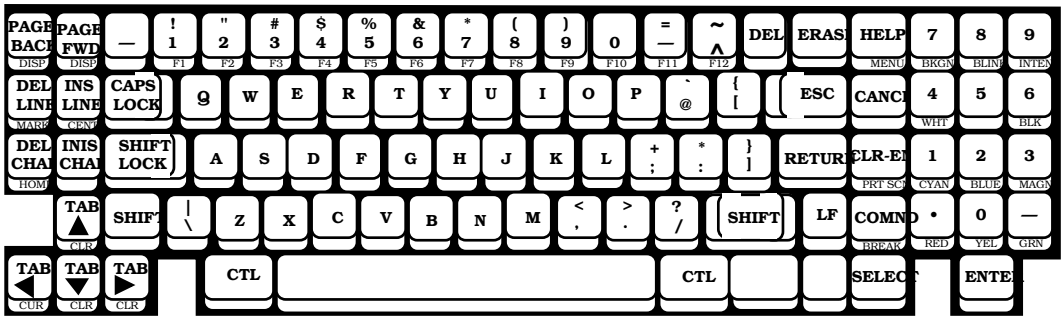

Figure 2-1 — Engineering Keyboard 1196

INSERT/DELETE CHARACTER—These keys are useful to correct typing errors when entering commands or filling in the screen forms. Pressing the Insert Character key locks it in alternate positions. In the down position you can enter characters ahead of the current cursor position. Press the Insert Character key again to release it.

Pressing the Delete Character key deletes the character under the cursor.

INSERT LINE/DELETE LINE—These keys are useful for deleting/copying and inserting blocks of text. You can delete/copy and insert text using the following method:

1. Move the cursor to the beginning of the text you want to copy or delete.
2. Hold down CTRL and press DEL LINE. This places an invisible marker at the cursor location to mark the start of the text block.
3. Move the cursor to the end of the text you want to copy or delete.
4. To delete only, press DEL LINE, and the text disappears.
5. To copy, first delete the text as described in steps 1 through 4. The deleted text is held in temporary memory. Without moving the cursor, press INS LINE to make the text reappear. The text is now ready to copy elsewhere.
6. To insert, move the cursor to the position where you want to add the text, then press INS LINE. You can repeatedly insert the text block until you choose another text block to delete or copy.

HOME—This key moves the cursor to the top left corner of the display.

MENU (CTL/HELP)—Pressing this key signals the system that you want to leave the Picture Editing session and return to the Engineering Main Menu. If current work on the screen has not been saved, the following message appears: `Modified Picture Exists. End?` Press the MENU or the ENTER key to leave the Picture Editor and lose the modifications, or press the CANCEL key to revoke the action.

ESCAPE—This key allows you to switch to the Command Processor from the Picture Editor (for example, to use a utility function). When you are ready to return to the Picture Editor, press the MENU key.

HELP—Several pages of on-screen help information are available when you press this key. You can page forward or backward through the information by pressing the PAGE FWD or PAGE BKWD keys. To return to normal, press either the CANCEL or HELP key.

CLR ENT—If you want to clear all the information out of a port, move the cursor to that port and press the CLR ENT key.

2.3 SCREEN FORMAT

Figure 2-2 illustrates the Universal Station's screen as seen during picture building. The top two lines and the lower two lines are called communications lines. These lines appear during the Picture Editing session but are not present at operating time (the top two lines appear in a different format, however). The messages that appear on these lines provide communication between the user and the Picture Editor.

The picture is built in the middle 24 lines. This area is called the edit region. As explained later, up to 48 lines of small-size text could be entered into the edit region. Unless otherwise stated in this manual, all discussions of lines and character cells assume large size text (16 pixel units high and 8 pixel units wide).

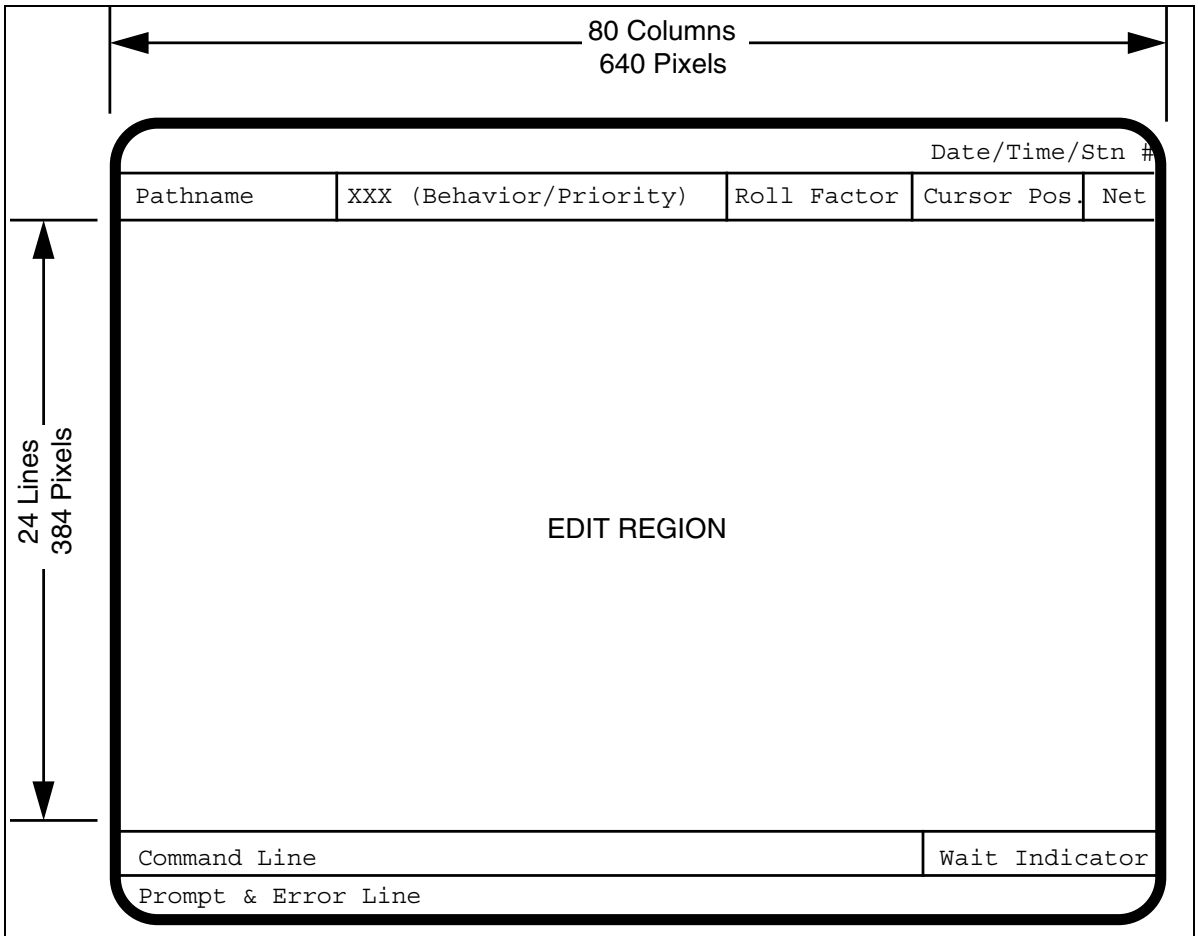

Figure 2-2 — Screen Arrangement for Picture Editor 1197

2.3.1 Communications Lines

2.3.1.1 Upper Communications Lines

The information on the upper communication lines is described as follows:

Top line—The date, time, and station number appear at the right end of the top line.

Second line—The information here is called current settings and shows

- the current pathname (for use with Read/Write/Compile commands).
- an abbreviation, such as FGB, that represents the current order of priority between text and graphic objects (F=Foreground, G=Graphics, B=Background). The abbreviation is displayed in the current behavior (e.g., half-intensity cyan) and text size. Current behavior and priority settings apply to the next screen information entered. Behavior characteristics are color, intensity, steady state/blink, and reverse/normal video. Priority determines what is seen when parts of text or values overlap with graphic objects. Current behavior and priority are discussed later in this section of the manual.
- the roll factor and cursor position (explained in the following paragraphs).

Roll Factor—Roll factor is a number that tells where the edit region is located with respect to the bottom left-hand corner of the drawing area (see Figure 2-3). The numbers are shown as follows:

R-XXX,YYY where XXX and YYY are the current X-Y roll coordinates in large size character units. (A large-size character unit is 8 pixels wide and 16 pixels high. It can contain one large-size text character.)

The viewable screen area is 80 columns wide by 28 lines long but, as Figure 2-3 illustrates, the total available drawing area is much larger. The picture is built in the 80-column by 24-line edit region, which can be moved anywhere in the full drawing area by executing the Set Roll command or the Page/Disp keys.

Cursor Position—When coordinate entry is expected, the cursor-position numbers tell where the cursor is located with respect to the lower left-hand corner of the drawing area. The numbers are shown as follows:

C-XX, YY where XX and YY are the current X-Y cursor coordinates in pixel units.*

Net—Current network-mode status. When the status is N-ON the log builder has access to the network to check type-information about the variables you enter. When the status is N-OFF, network access is disabled. The Set Network command is used to make the switch.

* Pixel units are the smallest possible points of light on the screen (like a dot over the letter i).

2.3.1.2 Lower Communication Lines

Command Line—Picture Editor commands appear on the command line as you type them on the engineering keyboard. Command entry is explained in the next section of this manual. At the right end of the command line, the wait message appears when the Picture Editor is busy, such as during Write/Read/Compile commands.

Prompt and Error line—Many commands require additional input, so this line is used to request coordinate or other information when it is needed. For example, invoking the Add Line command causes the Picture Editor to print the message Enter Line Coordinates on the prompt/error line.

The Picture Editor also uses this line to report errors.

2.3.2 Edit Region

The edit region is the current work area available to draw the picture (80 columns by 24 lines). As shown by Figure 2-3, the total available drawing surface is much larger than the edit region, but only 28 lines by 80 columns can be seen on any one monitor at a time. It is likely that you will at least want to use the area occupied by the upper communications lines. The communications lines are not present at operating time. You can use the Set Roll command to move the edit region over the total drawing area. Think of the edit region as a window through which you can draw.

At operating time, the lower communication lines are not present and the picture effectively moves down two lines to fill that part of the screen. The upper communication lines are replaced by a standard 2-line format with the date/time and a prompt area. Therefore, at operating time, the picture contains 26 lines (versus 24 lines at build time), so you may want to roll the edit region up and draw in the area that is normally under the upper communication lines.

2.4 COMMAND ENTRY

Picture Editor commands are entered through the Engineering Keyboard by typing the name or an abbreviated form of the name on the command line (see Figure 2-2) and then pressing the ENTER key. For example to enter the Add Line command, position the cursor to the left end of the command line and type `ADD LINE`. Either upper-case or lower-case letters can be used. Press the ENTER key to activate the command.

Multiple commands can be entered by separating the command names with a semicolon. Each command is executed in order. For example, SELECT;COPY;SELECT;SCALE.

2.4.1 Command Abbreviations

Most commands have an abbreviated form that can be used instead of the full command. Appendix A contains a list of the commands and their abbreviations.

Errors—If you see that the command is incorrectly typed before pressing the ENTER key, use the cursor keys to back up. Then type over the incorrect part of the command.

If you incorrectly type a command (or an unacceptable form of the command) and press the ENTER key, the Picture Editor prints an error message on the screen and the incorrect part of the command is changed to red. The command is not executed. To recover, retype the command information correctly; then press the ENTER key.

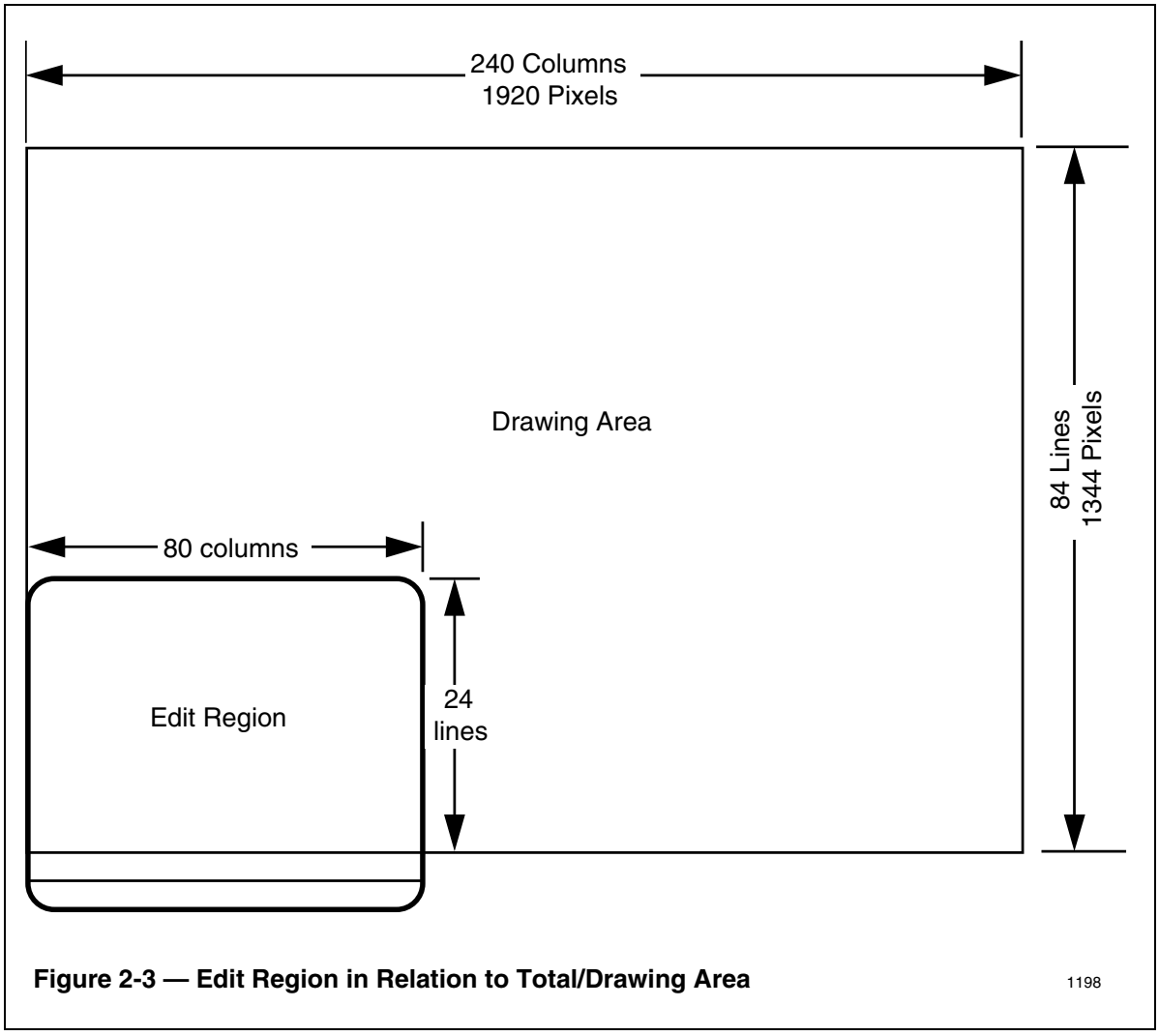

Figure 2-3 — Edit Region in Relation to Total/Drawing Area

2.4.2 Specifying Screen Coordinates

Many commands require that you enter one or more screen coordinates. For example, coordinates for the ends of a line during the Add Line command.

Coordinates can be entered in several ways:

1. By moving the cursor to the desired screen location with the cursor keys, then pressing the SELECT key.
2. By touching the screen at the desired points (if the Universal Station has the touch screen option). This is equivalent to moving the cursor and then pressing the SELECT key as a single operation.
3. By typing the X-Y coordinates (usually, in pixel units) on the command line following the command. For example

   ```
   ADD LINE 100 30 200 30
   SET ORIGIN 20 10
   ```

   Note that coordinate information for method 3 is specified in X-Y pairs (in the Add Line example, X=100, Y=30, and X=200, Y=30 specifies the ends of the line). The coordinate numbers are in pixel units with respect to the bottom left-hand corner of the drawing area. The bottom left-hand corner of the drawing area has the X-Y coordinate 0000, 0000. From this point to the desired location, count each full column as 8 pixel units and each full line as 16 pixel units.

   Coordinates for the Set Roll command are specified in large character units. A large character unit (or character cell) holds one large alphanumeric character and is 8 pixels wide by 16 pixels high.

Throughout the remainder of this publication, the assumption is that coordinates are specified with the cursor or touch screen.

2.5 GENERAL DATA ENTRY INFORMATION AND PROCEDURES

2.5.1 Display Form Drawings

Before data entry time, each custom graphic display should be sketched on an *SW88-551* or similar Display Form, such as shown by Figure 2-4. The circles with pointers are not part of the picture. The letter-number code inside each circle is called a key and refers to a specific entry on a specific support form that provides details about that object (distinct parts of the picture such as text and shapes are referred to as objects). For example, Key T-1 refers to Item 1 on the Target Form. Also note that the Display Form is labeled Drawing 1 and you will want to make sure that the Target Form you use to build this object references Drawing 1. Sometimes there will be subpicture drawings in the same package and each of these may also have support forms. In such cases, the subpicture drawing should have a different number and the support forms would refer to that number. Building individual types of objects (shapes, targets, text, etc.) is discussed in detail later in this publication.

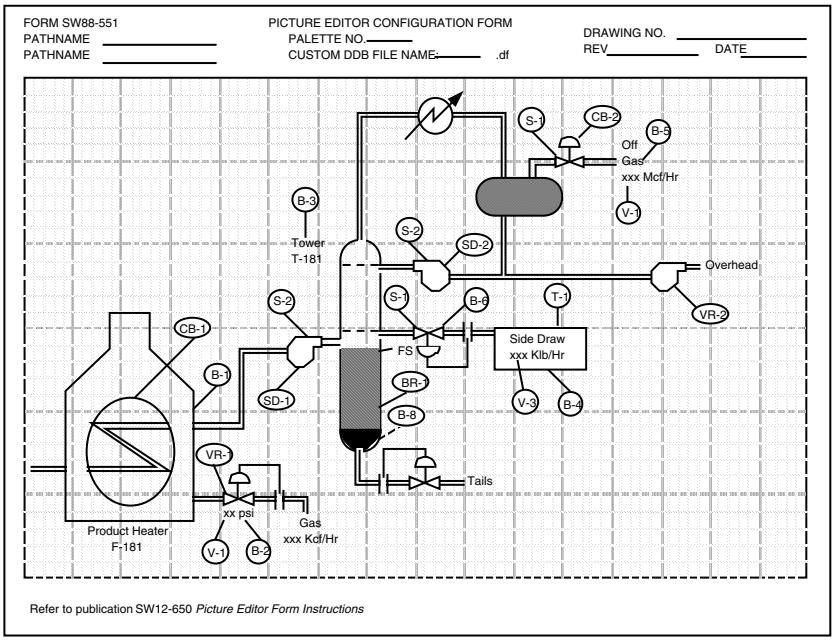

Figure 2-4 — Custom Graphic Drawing on Display Form

2.5.1.2 Alternate Methods

Simple sketches that have colors or other characteristics written beside the objects on paper Display Form do not require support forms (at least not for that characteristic).

Some designers may make copies of the main Display Form and use only one type of key on each form; therefore, one Support Form would apply to each Display Form.

Even if one of the alternate methods is used, you will be able to build the display, as long as the designer has provided all the details and you understand what is wanted. This manual presumes that the circle and pointer method was used and that there is one main Display Form accompanied by a packet of support forms.

The Support Forms are listed in Table 2-1.

2.5.1.3 Color Palette

If a color palette number was entered on the form you should enter a `SET PALETTE nn` command with the palette number substituted for nn. If you need to return to the default palette, execute a `SET PALETTE 0` command.

Table 2-1 — Support Forms

Abbreviation	Title	Form No.
B	Behavior Form	SW88-552
BR	Bar Charts	SW88-559
CB	Conditional Behavior	SW88-554
S	Subpictures	SW88-557
SD	Subpicture Detail	SW88-558
T	Targets	SW88-555
V	Values	SW88-553
VR	Variants	SW88-656

2.5.2 Text

After executing the Add Text command, text can be typed in from the Engineering Keyboard. Text can fall only within character-cell boundaries (this is called character resolution). Two text sizes are available; large and small.

- Large size text is five pixels wide by nine pixels high on a cell that is eight pixels wide by 16 pixels high.
- Small size text is five pixels wide by seven pixels high on a cell that is eight pixels wide by eight pixels high.

The default text size is large, but you can change from one text size to the other with the Set Text size command (this affects the next text you type). The size of existing text can be changed with the Add Textsize command. You can correct typing errors or change the letters in existing text with the Modify Text command.

Each rectangle on the Display Form represents a large character cell and is twice as high as it is wide (see Figure 2-4). Dotted lines do not appear on the screen, but text is still arranged in the line-and-column format shown on the Display Form.

2.5.3 Graphics

Graphic objects (Lines, Solids, and Bar Charts) can be drawn anywhere in the edit region. The graphic drawing procedure is described elsewhere in this publication and generally involves using the cursor to specify vertices of shapes or end points of a line. Graphic work generally requires finer resolution, called pixel resolution (pixel means picture element). The F1 Key (CTL/1) on the Engineering Keyboard allows you to switch between character and pixel resolution if necessary. The Picture Editor tries to provide the right cursor for the command being executed.

Some objects (Values, Variants, and some Subpictures) have characteristics similar to text because they call text into the picture; therefore, they must be located on cell boundaries. This is discussed more later.

2.5.4 Screen Forms

Certain objects require that you type in detailed information. In such cases, the Picture Editor presents a form on the screen. The commands that cause screen forms to appear are:

- Add Condition (Conditional Behavior)
- Add Target
- Add Variant
- Add Value
- Add Bar (Bar Charts)
- Add Subpicture (if the subpicture has parameters)
- Define
- Scale
- Set Collection

Figure 2-5 illustrates a typical Screen Form. Specifications are typed into the boxed areas of the form (e.g., Cyan, No Blink, Full). The forms usually contain default specifications. You can accept the default specifications or you can type over them to make changes.

For the example shown in Figure 2-5, If, Then, Else statements are also required and these are unique for each situation. The statements in this illustration are indented, but this isn't necessary (however, it is easier to tell what is intended). In any case, the information should be provided to you on support forms for the object you are building. When the Screen Form is completely filled in, press the ENTER key.

2.5.4.1 Variable Types and Formats

An additional Screen Form may be presented in some cases, which requests the variable type and/or format for some process point that you entered on a Screen Form. When this information is necessary, you should find it on the Paper Support Form that first mentioned that point. If necessary, refer to Appendix A in the *Picture Editor Reference Manual* for format and type information.

2.5.4.2 Comments on Screen Forms

Screen Form comments—You can type comments directly into the screen forms for bar charts, values, variants, conditional behavior subpictures and targets. The comment must be within braces { }. For example: {This is a comment}. Comments do not show on the screen at run time.

In general, you can place a comment anywhere that spaces, commas, braces or semicolons are allowed. Examples of what you can do are on some of the screen forms that follow.

You cannot place comments—

- inside of a variable, e.g., A100{comment}.PV
- inside of a character string with quote marks around it, e.g., "ENTER SP {comment}"
- inside of any key words or command names, e.g., NO {comment} BLINK

You can page forward and continue your entry, but do not break up identifiers or key words (e.g., an IF, THEN statement) between two pages.

Refer to 2.5.6 for a discussion of the Define Comments command.

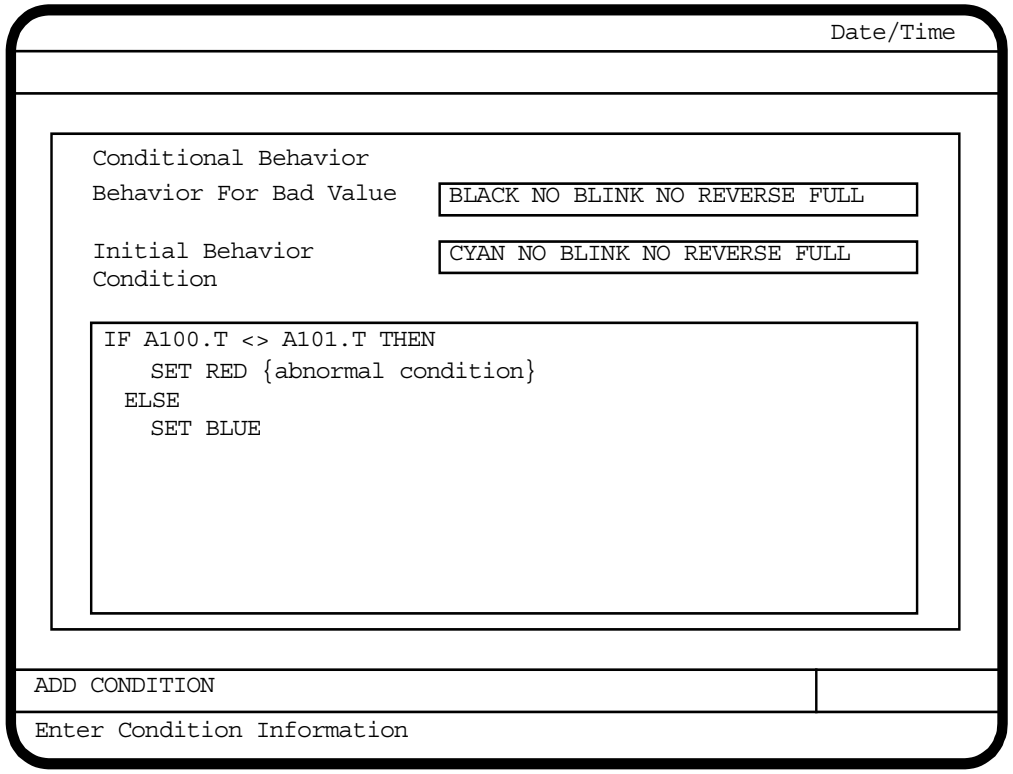

Figure 2-5 — Typical Screen Form 1200

2.5.5 Behavior

The behavior characteristics are color, intensity, reverse field, and blink. When starting a Picture Editor session, the initial settings are

- Full Intensity
- No Blink
- No Reverse
- Cyan

The next object you add to the picture will have the current behavior characteristics (as shown by the 3-letter code on the second line from the top of the picture).

2.5.5.1 How to Set Current Behavior

You can change the current behavior settings (i.e., behavior for the next object you add) by

- executing a Set Behavior command (followed by a list of characteristics)
- pressing the desired behavior keys on the Engineering Keyboard

The Display Editing section tells how to change behavior of existing objects.

2.5.5.2 Understanding the Behavior Form

In Figure 2-4, the keys with B prefixes refer to a Behavior Form, *SW88-552*. Figure 2-6 shows the item identified by Key B-1 and the Behavior Support Form referenced by that key. Key B-1 is the first item on the form and tells you to build the furnace outline in blue, no blink, no reverse video field, with half intensity.

The procedure for drawing shapes is explained later in this manual but remember that you will set the current behavior before drawing the object. The abbreviations are defined at the bottom of the form (also in Appendix A of this manual) and can be used with the behavior commands. Also notice that the common behavior section of the Behavior Form tells you to build the connecting pipes as green, no blink, no reverse, half intensity. Common behavior means that all of the same type objects in the display (e.g., all text, all pumps, all pipes, etc.) should be built with the color, intensity, etc., as specified for common behavior.

2.5.5.3 Conditional Behavior

Conditional behavior is a mechanism that allows the object to change its behavior, depending on process conditions. For example, a motor symbol could turn red and blink to indicate overheating. The display-building section of this manual explains how to add conditional behavior to existing shapes, text, etc.

2.5.6 Define Comment Command

With this command, you can add comments to a picture. The comments do not show up at operating time. You can enter several pages of comments if necessary.

1. With a picture on the screen, type `DEFINE COMMENT` on the command line and press the ENTER key.
2. A port (like a screen form) appears.
3. Type in your comments. Page Forward, if necessary, and continue.
4. When all comments have been typed in, press ENTER.
5. The picture reappears.

When the picture is saved, the comments are stored with the source file. To read the comments previously stored with a picture, read the picture onto the screen and enter the `Define Comment` command.

Also, refer to subsection 2.5.4.2 for comments in screen forms.

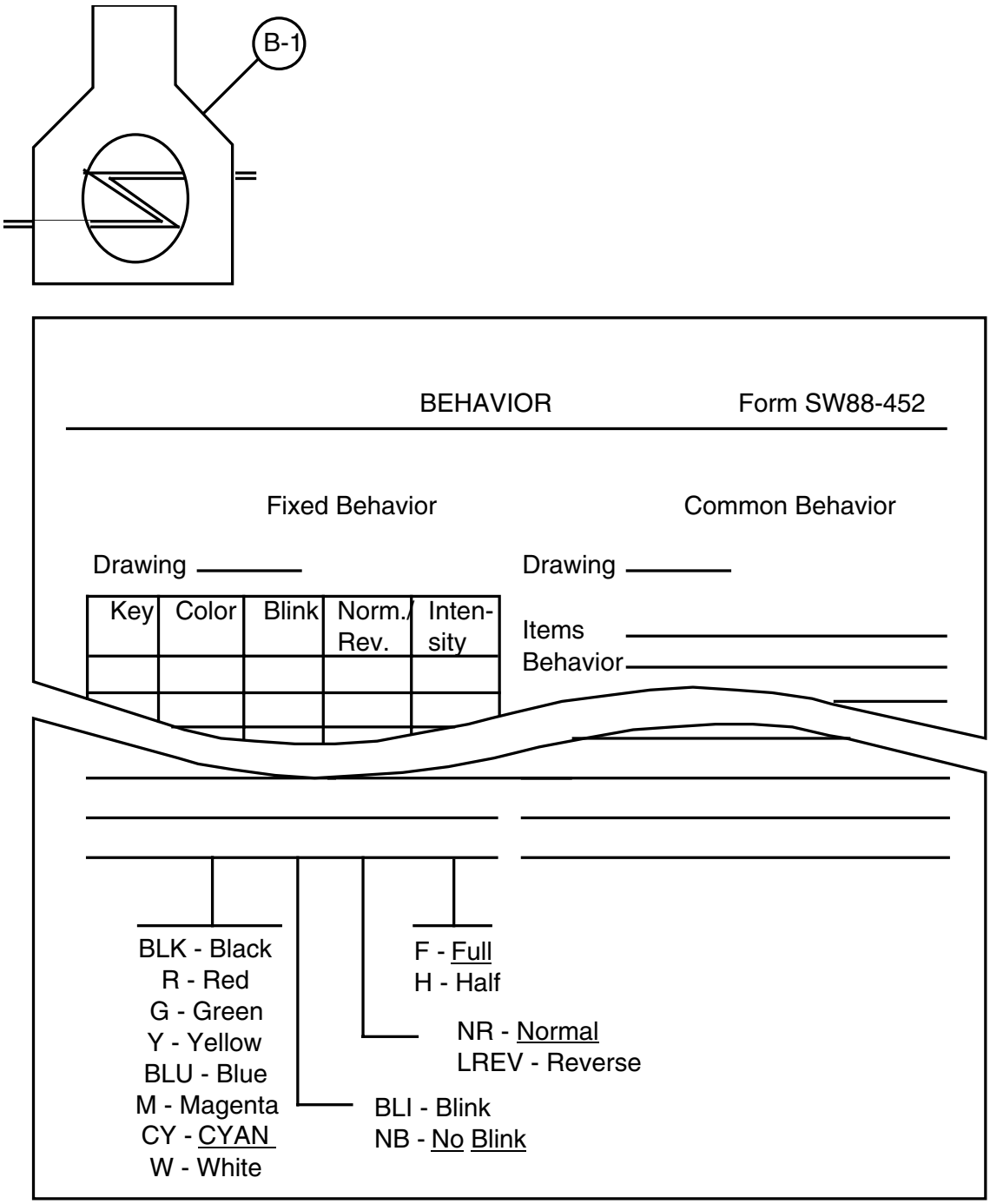

Figure 2-6 — Behavior Form

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2.6 PRIORITY

2.6.1 Color Priority

Color priority should have been considered by the display designer, but if not, some problems can occur at data-entry time. Color-priority order is listed in Table 2-2. When graphical objects with different colors overlap, the color higher on the list predominates. For example, white shapes would cover blue shapes where they overlap, and blue shapes would cover red shapes where they overlap. As explained elsewhere in this manual, when text and graphic objects overlap, text of any color can be given priority over graphic objects.

Table 2-2 — Color Priority

Priority	Color	Comments
1	White	Highest priority- Covers all else
2	Cyan	
3	Magenta	
4	Blue	
5	Yellow	
6	Green	
7	Red	
8	Black	Lowest Priority

Note that if you are working within any of the palettes other than the default palette, the color priority is still determined by the key that produces the color. For example, in palette 14, purple covers blue, brown covers cyan, etc. (see Appendix A, subsection A.1.5).

2.6.2 Text/Graphics Priority

When graphic objects and typed characters overlap in the picture, there are three parts to consider: the character, the cell surrounding the character, and the graphic object. As shown in Figure 2-7b, the graphic object (a line representing a pipe in this case) overlaps the background cell but not the character. You can change the current priority so that graphic objects overlap both text and cell (Figure 2-7c), or neither one, as shown in Figure 2-7a. On the command line, type `Set Priority ppp` where ppp is one of the priority choices: FBG, FGB, or GFB. When entering the Picture Editor, or after a New command, the priority is FGB as shown by Figure 2-7b. The current priority code is shown on the second line from the top of the screen. None of the paper form entries will tell you what priority to use; the sketch itself must show how the designer wants the finished display to appear.

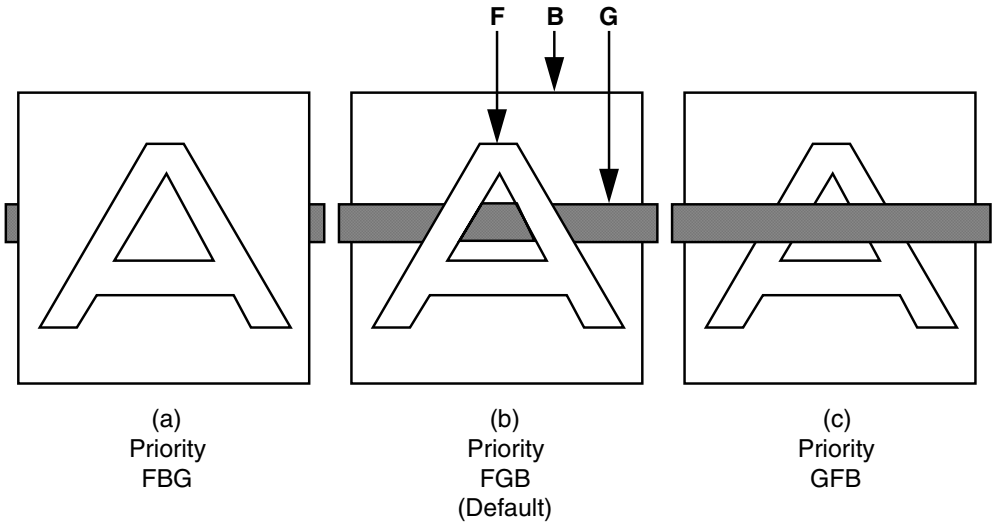


Figure 2-7 — Effects of Priority on Text 1202

2.7 CUSTOM DISPLAY DATABASES

If a custom display database (DDB) is needed, it can be built with the TDC 3000 Text Editor. The main display form shows the file name and an attached sheet will provide the text that must be entered. The *Text Editor Operation* manual, *SW11-506* explains how to use the Text Editor. If the file has already been built, it may be provided to you on a floppy or cartridge disk and you can use it as is, or edit it as described below.

The procedure to build the custom DDB file is—

- Get the file name from the main display form (e.g., DBFILE1.df).
- Enter the Command Processor by either selecting it from the Engineering Main Menu or, if you are presently using the Picture Editor, by pressing the ESC key.
- Enter **EDIT nnnn.df**
  where nnnn is the pathname of the file. The file extension df is required (e.g., **`EDIT $F1>DDBS>DBFILE1.DF`**). The example assumes a floppy or cartridge disk ($f1) with the volume name DDBS. If this is a new file you will get a message that the file was not found, but will be created. If you are editing an existing file, it is read in and displayed.
- Enter the statements. The general format is **name: type, index, disposition;**
  For example: BOOL50: Boolean, 500, Local;

Here are the main rules that you need to know for data entry—

- Spaces can appear anywhere within a statement except within identifiers.
- A statement must begin and end on the same line.
- Blank lines are OK.
- Comments can appear on the same line with the DDB declaration statement, before the statement or after the statement, or both, but not within the statement.
- A comment must begin and end on the same line.
- Comments must be enclosed in braces { }.

All of the rules are listed in the Actors Manual (Appendix A). An example DDB file is shown in Figure 2-8. Note that it illustrates correct and incorrect entries.

When the statements have all been typed in, check carefully for spelling errors, proper placement of the colons, commas, semicolons and braces. Save the file (press F1, then press F2). You should get the message: `File was updated, nn lines written.` If you escaped from the Picture Editor, press MENU to return.

Once the file is built, a Load command (explained in Section 4) is executed to declare and define those variables for use with the custom graphic display you are building.

```
SEL_ENT : ENTITY , 200,  G ;     { spaces are allowed  }
SEL_ENT2: ENT,200,L;             {  but not necessary  }

my_int: int, 100, local;         { Lower case is okay  }

REAL01: R,  500,  L;             { This will not be recognized }
                                 {  because it is a duplicate of }
                                 {  a standard name              }

BOOL50: Boolean, 500, L;         { This is okay }
BOOL50: Boolean, 250, L;         { This will not be recognized }
                                 {  because it is a duplicate name }

XYZZY : STRING,  400, G;         { This is okay }
PLOVER: STRING,  400, G;         { This is an alias of XYZZY }

My_Date:Date_Time, 700, L;    My_Int3:Integer, 5, GLOBAL;

{  This is okay  }    My_Enum :  ENUM:MODE,  450,  LOCAL;

{   All of the above are syntactically correct. }
{   All of the following have a syntax error.    }

_Int: INTEGER, 180, G;           { Cannot start with underbar }
10Real: REAL,  190,  Glob;       { Cannot start with numeric }
STR__5: S,  230,  G;             { Consecutive underbars are illegal }
INTEGER20 : INTEGER, 260, L;     { Name is longer than 8 characters }
My_Var_1 : VAR,  330,  G         { Missing semicolon }
My_Ent :  ENTITY,  Loc;          { Missing index }
My_Bool: LOGICAL, {  } 400, G;   { Comments within a statement }
My_Real: REAL,  50,   G;         { Index out of range   }
```

Figure 2-8 — Example of a Custom DDB File

DISPLAY EDITING AND STORAGE
Section 3

As you build a custom graphic display, you will need to correct and adjust objects in the picture. Later, it may be necessary or desirable to change the display because the process has changed, or because there is a better way to illustrate something. For these reasons, you need to be familiar with the principle editing commands.

3.1 EDITING COMMANDS

The principal editing commands are

- Copy and Move
- Scale
- Modify
- Delete
- Add Behavior
- Add Priority

In addition, you need to be familiar with the Select/Deselect commands because they are used with all of the above. Some other commands discussed in this section include the Read/Write/Compile, the New/End commands, and some special commands. Remember that this manual focuses on when to use the commands, and all commands mentioned here are fully described in the *Picture Editor Reference Manual* in the *Implementation/ Engineering Operations - 2* binder.

3.1.1 Selecting and Deselecting Objects

Many commands are designed to affect only selected objects. This means that before you can use those commands, you must first select the objects you wish to manipulate (more on this later). For example, if a picture contains solid objects, line objects, and text, it is possible to select one, several, or all objects in the picture. Then, for example, you might invoke a Move command to move only the selected object or objects. Either manipulating a selected object or using the Deselect command reverses the selection process.

Objects can be selected by either of two methods:

- with the Select command as described later or
- when the Picture Editor is waiting for a command to be entered—

  just touch two points on the screen (if the system has a touch screen). The Picture Editor draws a box that includes the two points. Objects that intersect or are enclosed by the box are Selected

  or, enter each of the points by positioning the cursor on the screen then press the SELECT key.

Selected objects appear as white and blinking.

3.1.1.1 Select/Deselect Commands

Figure 3-1 illustrates use of the Select command. After entering the Select (or Deselect) command, you must specify two coordinate points on the screen by moving the cursor to each location and pressing the Select key or, if the touch screen option is present, just touch the screen at each location. If you make a mistake, use the DEL key to remove a coordinate and then re-enter it. After both coordinates are entered, the Picture Editor draws a box that passes through them. Objects within or intersected by the select box are selected. Selected objects are displayed as white and blinking. Note that both coordinates can be at the same location and thus produce the smallest possible select-box.

In Figure 3-1 everything is selected except the text-string PSI. If you want to be more selective, you can specify a smaller box or use more than one Select command. Specifying the same location for both points creates the smallest possible box.

Probably a better way to select specific objects in the picture is to use qualifiers with the Select command. For example, by using the command Select Solid, only the pump would be selected by the box in Figure 3-1.

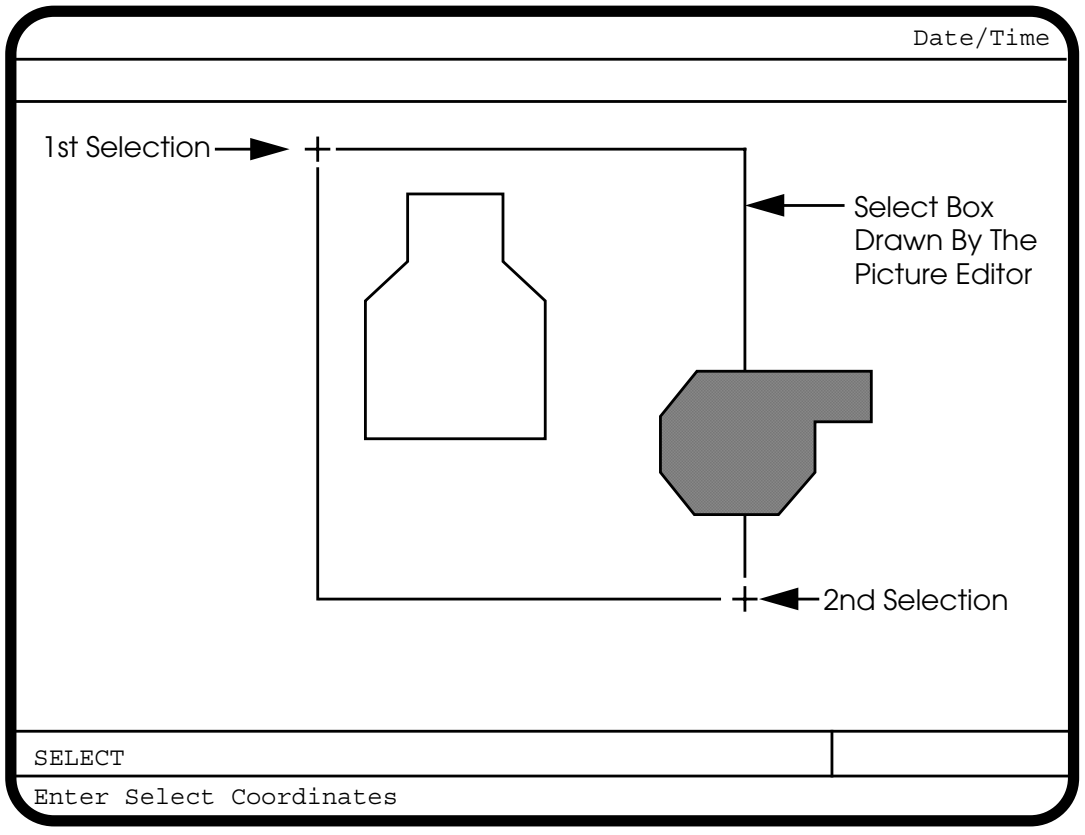


Figure 3-1 — Select Box 1203

3.1.1.2 Special Forms of the Select Command

These commands are invoked as described for the Select/Deselect commands, but the result is different and the intent is to select/identify all objects with common attributes as described below.

Select Behavior command—When any object in the picture is selected, all objects with the same literal behavior are automatically selected as well.

Select Condition command—This command is used to select an object with conditional behavior or sets of objects with identical conditional behavior.* Conditional behavior is described elsewhere in this manual.

Select Priority command—When any object in the picture is selected, all objects with the same specified priority are also automatically selected.

Select Inherit command—All objects in the picture that are intersected by a select box and that have inherited behavior are selected. Inherited behavior is discussed in connection with subpictures elsewhere in this manual.

Select Subpicture name command—Where name is the file name of the subpicture. When this command is executed, all subpictures with that name are selected. Any variants that refer to the subpicture are also selected.

3.1.2 Move and Copy

These two commands are used in a similar way. One or more objects can be moved to another location in the edit region with the Move command; one or more objects can be copied to another location in the edit region with the Copy command. Before invoking either a Move or Copy command, the affected objects must first be selected. The procedure used to specify distance and direction is the same in both cases. After invoking a Move or Copy command, the Picture Editor requests two coordinate entries, which you specify with the cursor and Select key or, if the touch screen option is present, by touching the desired location on the screen. The first cursor entry is the tail and the second entry is the head of a vector. You can think of the vector as an imaginary arrow. The direction of the arrow represents the direction that the object will be moved or copied. The distance between the two coordinates represents the distance the object(s) will be moved or copied.

Figure 3-2 shows how a solid object is being moved in the distance and direction indicated by the arrow. If no qualifier is used, all selected objects in the edit region are moved or copied. In Figure 3-2 even if both objects are selected, only the solid object is moved because a Move Solid command is used.

* Identical Conditional Behavior means that the same Add Condition command was used for all objects in the set.

Both the Move and Copy commands can be used with the following qualifiers:

BAR	SUBPICTURE	VALUE
LINE	SOLID	VARIANT
TEXT	TARGET	

NOTE

Lines, Solids, and Bar Charts can be moved anywhere in the edit region. Text, Values, Variants, Targets, and Subpictures have a text size attribute. Therefore, depending on that attribute, they can be moved or copied to large or small text boundaries only. The Special Considerations part of Section 3.3.5.and the Move/Copy commands in the Picture Editor Reference Manual (see References) discuss the details.

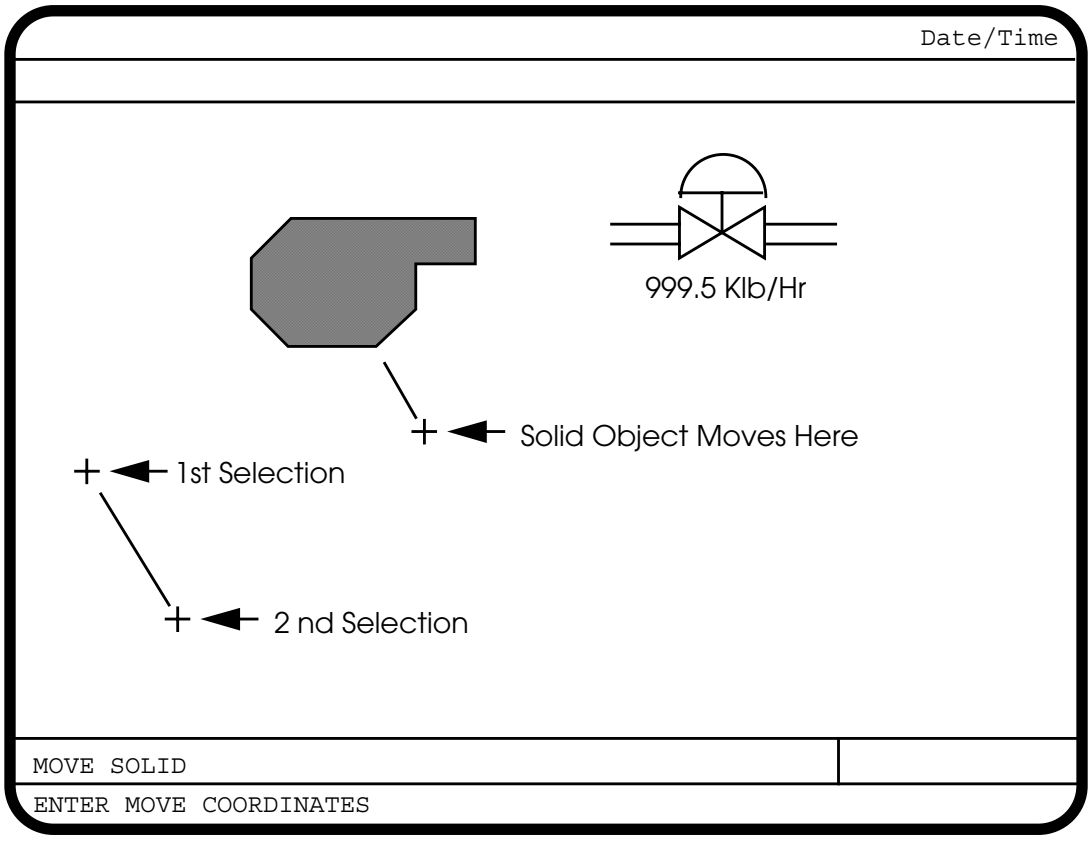


Figure 3-2 — Move and Copy 1204

3.1.3 Scale

The Scale command allows you to reduce or enlarge an object, or flip the object about its horizontal or vertical axis. Solid and line objects can be rotated. If the bounding-box technique is used, scaled objects can also be moved. Targets cannot be scaled and objects that contain text cannot be scaled.

To build more precise shapes, especially if the shape has a curved surface, you can draw the shape much larger than normal and then reduce it with the Scale command. Figure 3-3 illustrates a pump drawing that was both reversed and reduced.

The object or objects to be scaled must first be selected. As a practical matter, it is best to scale one object at a time.

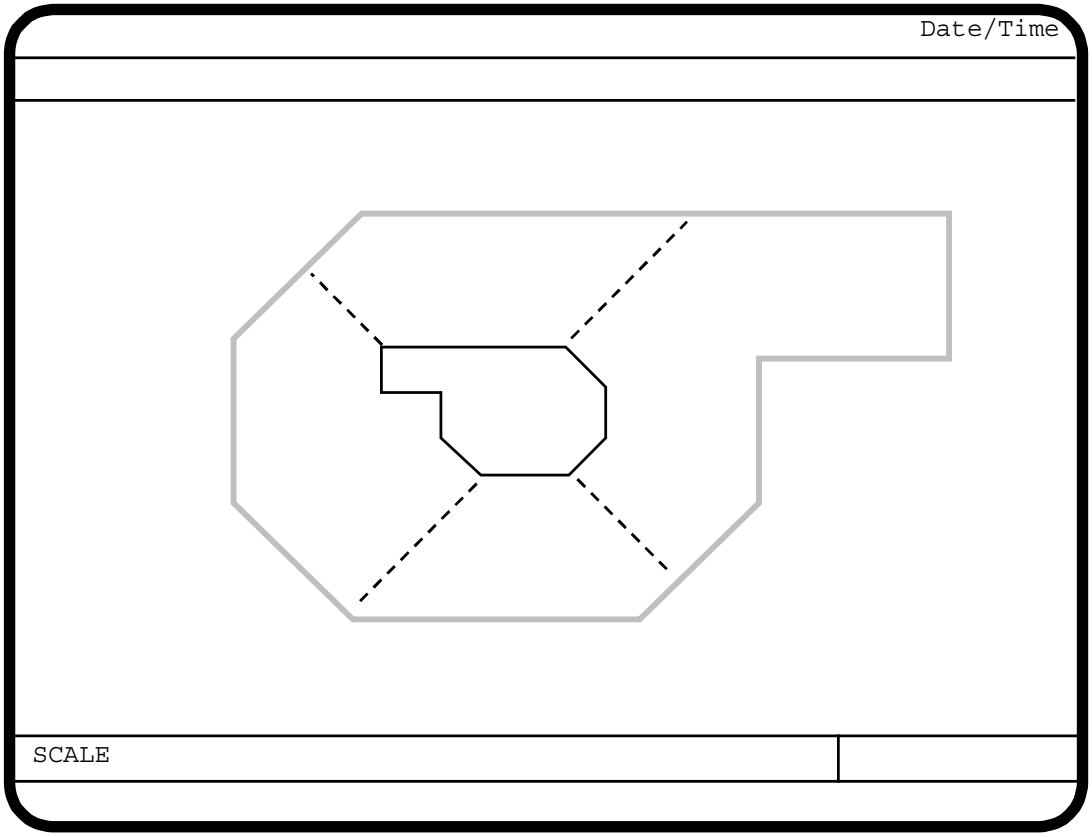


Figure 3-3 — Reduce/Reverse with the Scale Command 1205

3.1.3.1 Scale Form Method

Invoking a Scale command causes the Picture Editor to prompt: `Enter Scale Bounding Box`. If you press the ENTER key, a form appears on the screen (see Figure 3-4). The X-scale factor and the Y-scale factors tell how much to enlarge/reduce the selected objects in the X (horizontal) or Y (vertical) directions. For example, an X-scale

factor of 2.0 makes the original object twice as wide, a Y-scale factor of 0.5 makes the object half as tall (if the number is less than one, you must enter a 0 ahead of the decimal point). A scale factor of 1.0 means no change in that dimension. You can change the scale factor by typing over the default values.

Right-left reflection and top-bottom reflection entries on the form allow you to flip the object on its horizontal or vertical axis. In Figure 3-4 the right-left reflection entry was changed to `Yes`, causing the pump image to reverse direction. When you wish to switch the direction of an object, type `Yes` in the appropriate reflection-factor box.

If a group of objects are selected, scaling occurs about the center of the group. If more than one object in the picture is selected, but you want to affect only a certain object or objects, the Scale command can be used with the following qualifiers:

- Bar
- Solid
- Variant (but not if a text string can appear)
- Subpicture (but not if it contains text)
- Line (but a single line cannot be made thicker)

Solid or line objects can be rotated clockwise by entering the desired amount of rotation in degrees (e.g., 30.7) into the Rotation Angle port.

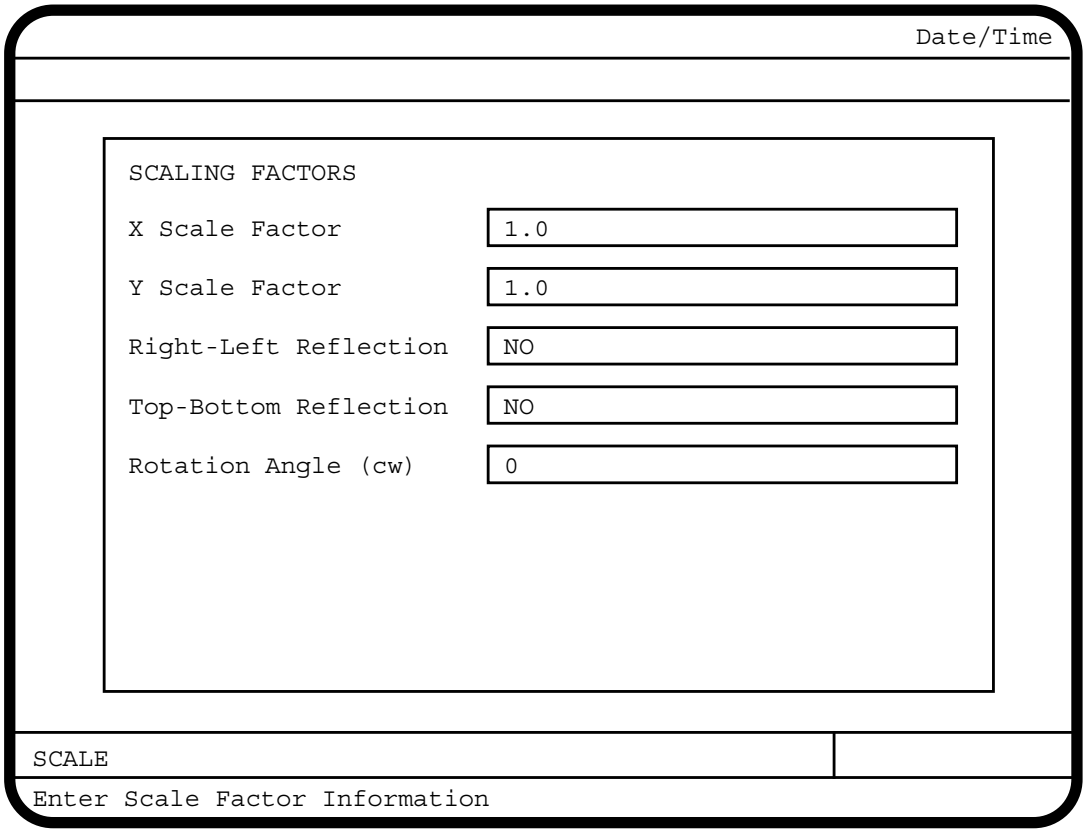


Figure 3-4 — Scale Screen Form 1206

3.1.3.2 Bounding Box Method

After invoking the Scale command, the Picture Editor responds, `Enter Scale Bounding Box`. The size of the bounding box determines how the objects are scaled, and the location of the bounding box determines where the objects are moved.

To create the bounding box, move the cursor to the first position and press the SELECT key. If the touch screen option is present, just touch the screen at the desired location. A cross appears on the screen to mark this location. Move the cursor to the next location and press SELECT (or use the touch screen). As the second location is entered, the Picture Editor draws a box that includes the two locations. Pressing the DEL key at this point erases the last coordinate entered and you can then respecify it.

When the ENTER key is pressed, selected objects are moved into the area defined by the bounding box. Figures 3-5 and 3-6 illustrates the process.

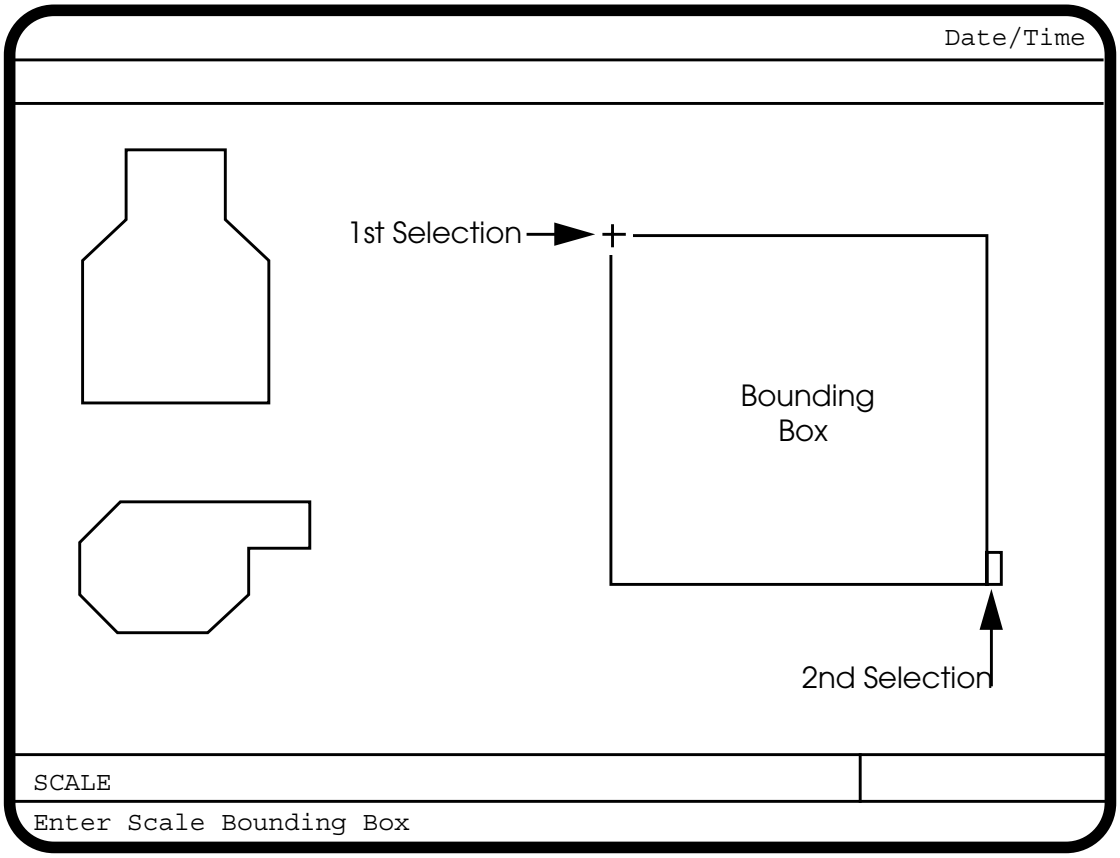


Figure 3-5 — Scale Command Using a Bounding Box 1207

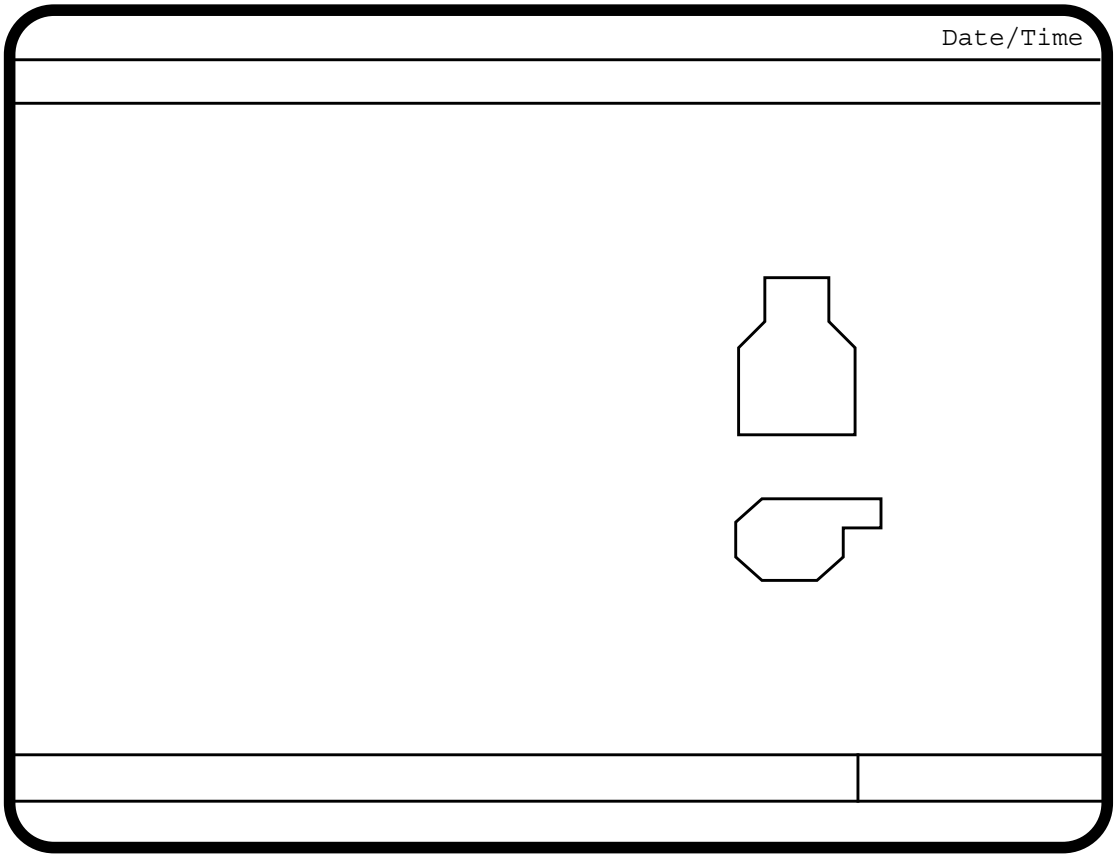


Figure 3-6 — Completion of Scale Command Using Bounding Box 1208

3.1.4 Modify Commands

Modify commands allow you to change an existing object in some way. You can change text or you can change the coordinates for objects where coordinates were specified. Other objects are modified by changing their screen forms. The Modify command can be used alone if only one object is selected, or with a qualifier (line, text, value, etc.) as described below. In all cases, the object must be selected before invoking the particular modify command.

3.1.4.1 Lines and Shapes

The Modify Line command allows you to change the end-points of a line or multisegment line (usually in the form of a hollow shape). The Modify Solid command allows you to change the vertices of a solid object. The Modify Bar and Modify Target commands allow you to change the coordinate entry points and to change entries on the associated screen forms.

3.1.4.2 Text

Use the Modify Text command to change the letters in selected text. As an alternative, you can remove the old text with a Delete Text command and then type in whatever you want by using an Add Text command. Use the Add Textsize command to change the size of existing selected text.

3.1.4.3 Objects With Forms

The following commands cause the Picture Editor to present the Screen Form for that object. You can then type over any previous form entry.

- Modify Condition (the object must be selected with the Select Condition command)
- Modify Value
- Modify Variant
- Modify Bar
- Modify Target
- Modify Subpicture (parameters only)
- Define nnnn

3.1.5 Delete Commands

Most Delete commands allow you to remove some existing object(s) from the picture. Objects to be deleted must first be selected. Delete can be used alone (to delete all selected objects) or with one of the qualifiers listed below to delete only a specific type of object:

Bar	Solid
Target	Subpicture
Line	Text
Value	Variant

3.1.5.1 Special Forms of the Delete Command

- Delete Behavior replaces existing literal behavior of a selected object with the current literal behavior.
- Delete Condition replaces existing conditional behavior of a selected object with the current literal behavior.
- Delete Inherit replaces existing inherited behavior of a selected object with the current literal behavior.
- Delete Priority replaces the existing priority of a selected object with the current priority.

3.1.6 Add Behavior

The Add Behavior command (followed by a specified behavior) allows you to change all, or any part, of the literal behavior of selected objects. Example: ADD BEHAVIOR RED HALF means that you want to change the color and intensity of the object to red with half intensity. Note that if you are working in one of the color palettes other than 0, the special colors are not specified by name (e.g., orange). You must specify them the same way as if you were pressing the keys. For example in palette 15, the command ADD BEHAVIOR RED H would cause the selected object to turn orange.

3.1.7 Add Priority

The Add priority command (followed by a specified priority) allows you to change the text/graphics priority of a selected object, or objects, to some other (specified) priority.

Example: ADD PRIORITY GFB.

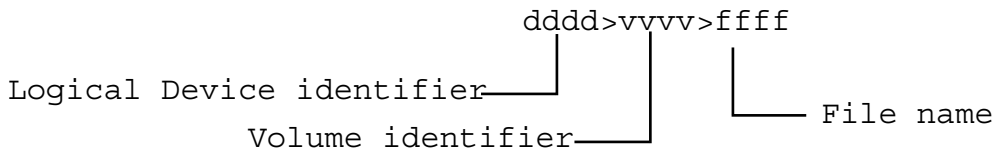
3.2 SAVING THE DISPLAY

As you create pictures and subpictures (explained elsewhere) you will want to store and read them back. Before a display can be used at operating time, it must be compiled. The Read, Write, and Compile commands are similar in that they all use a pathname to address the storage area.

3.2.1 Pathnames

The display designer should have assigned a pathname for each display and written it on the *SW88-551* Display Form. This is the pathname you will need to use when storing and compiling the display. You may also need to make up pathnames for any subpictures, especially those you want to keep as library items. If so, pathname rules are explained in the Set Pathname command description.

The current pathname is used as the default pathname when entering the Picture Editor, otherwise, the pathname is established by executing a Set Pathname command. The pathname appears on the second line from the top of the screen. You can change all, or any part, of the pathname with another Set Pathname command. Write, Read, or Compile commands automatically use this pathname unless you specify otherwise. As explained later, you can append a full or partial pathname change to the Write, Read, and Compile commands. The parts of the pathname are as follows:



If the Logical Device identifier is the word NET, the storage area is in the History Module. If it is $Fnn, the storage area is removable media (floppy or cartridge disk) and nn is the disk drive number. Examples are:

NET>HMV1>FRED

$F4>V123>FRED

3.2.2 Write, Read, Compile and Verify

The Write command is used to store the current picture (often called a schematic). The Read command copies back a stored picture.

The Compile command has two uses. One use is to check subpictures for errors (discussed under the heading Building Subpictures in the next section). The compile command also creates an object file for use by the Operating Personality. The Verify command is used to clean up problems that prevent a picture from compiling. If you cannot compile a picture, especially one that was revised, execute a Verify (or a Verify Prompt) command to type check all of the variables in the picture.

In all cases, the current pathname, as shown on the second line from the top of the screen, is used to address the source file. If the current pathname is not the one you wanted, you can execute a Set Pathname command to change it, or you can specify a full or partial pathname with the Write/Read/Compile commands. For example, if you wish to change only part of the pathname, you can specify that part. Examples are:

READ SAM (Where SAM is a change to the file name)
WRITE >VOL2> (Where VOL2 is a change to the volume name)

You should *write* pictures to a temporary storage area as you build and refine them. This creates a source file (for example SAM.DS). Source files can be read back into the Picture Editor and modified or compiled later. If the system has an operating History Module (HM), you can *compile* the pictures to a volume on the HM (but you should still have a backup copy of the source files on a floppy disk or cartridge). The compile command creates both a source (.DS suffix) and an object file (.DO suffix) file. When you get the final picture built and compiled we suggest that you use the Command Processor to copy the source file to a floppy or cartridge for backup. By doing so, the date/time on your object file and on your backup source file are the same.

As long as you have a backup copy of the source files (presumably on a removable media), you can use the Command Processor to delete each picture's source file from the operating volume(s), if necessary, to save room.

CAUTION

The picture you want to compile must be on-screen when you execute the Compile command. The specified source file is overwritten with whatever is currently on the screen. When you change a picture that previously compiled OK, consider first compiling to a temporary file so that if the changed picture contains errors, the old source is preserved.

You can compile to a user volume or to an Area Database volume (&Dnn). If the system does not have a History Module, picture files are usually compiled to the Area Database volume (&Dnn). If you get the error message "Abstract Overflow", when attempting to compile, the picture contains too many objects. You may want to split the information into two or more pictures.

If you need to compile a number of pictures, you may want to use the Multiple Compile command. This command is especially useful when you need to revise a lot of schematics.

3.2.2.1 System Configuration

You need to tell the system where the compiled pictures are stored by an entry in the Area Database Pathname Catalog. The Pathname Catalog allows you to specify search paths to wherever the picture and Free Format Log files are stored (for example, to different directories or media). You must enter a search path or paths to your compiled schematics. You can also enter file names for up-to-200 pictures and logs that you want to keep in resident US memory. The system tries to load as many of the specified picture files as possible in US memory. Refer to the *Area Form Instructions* for more information.

When loading a US with the Operator or Universal Personality, the system searches each path specified in the Pathname Catalog for the schematics and logs that you want in resident US memory and attempts to load them in the order specified. At operating time, when a schematic is called, the system checks resident memory first and then, if necessary, searches each path for the schematic. The Title Summary Display shows which schematics actually became memory resident.

The default US schematic memory size is 72 K words. You may be able to increase the amount of US memory allocated for custom schematics if necessary to fit in more or larger schematics. The total memory space available should be at least as large as the largest schematic. After a schematic is compiled, you can use the Command Processor to list its .DO file to determine the size. The configuration entry for External Schematic Memory is described in the *Network Configuration Form Instructions*.

Search paths and file names should be entered in the Area Pathname Catalog at configuration time if known. Tasks 23 and 29 in the *System Startup Guide, Cartridge Drive* in the *Implementation/Startup & Reconfiguration - 1* binder, describe this process. If there are later changes to the Pathname Catalog, it can be reconstituted, changed, and reloaded. The *Data Entity Builder* manual in the *Implementation Engineering Operations - 1* binder describes the process. If you change the External Schematic Memory size for a configured US node, use the reconfiguration instructions provided in Table 7-42 of the *Network Configuration Form Instructions* manual to load the change into the US.

After the system is configured and operating, you can make changes to a picture but you must recompile it. If the picture file is memory resident, you must either invoke the Area Change function or reload all affected Universal Stations.

Schematic Redundancy—If two or more History modules are available, critical pictures can be stored on more than one HM, so that if one fails another can supply the information. Floppy or cartridge disk pathnames can also be used. If the paper screen-form calls for more than one pathname, compile the picture to one destination (e.g., COM NET>HMV1>FRED). Then escape from the Picture Editor and use the Command Processor functions to copy the object file to the other destinations (for example, CP NET>HMV1>FRED.DO NET>HMV2>= –D).

For the example given, HMV1 and HMV2 would be user volumes on different HMs. Alternatively, you could compile the same picture to each destination. The potential problem is that because file names are stored with a date/time stamp it might be confusing to determine which ones are the same version at some later date. Press the ESCAPE key to use the Command Processor functions. Press MENU to return to the Picture Editor.

3.3 END AND NEW

When you complete a Picture Editor session, and after the current work has been stored or compiled, you can return to the engineering menu by executing the End command. If current work on the screen has not been saved, the following message appears: `Modified Picture Exists. End?` Press the ENTER key to leave the Picture Editor and lose the modifications, or press the CANCEL key to revoke the action.

If, during a Picture Editor session, you want to clear the screen and start over, execute a New command. Except for the pathname, all current settings revert to their default values.

3.4 SPECIAL COMMANDS

3.4.1 Set Network

If you are using the Picture Editor at a Universal Station that is not connected to an active network, you should execute the command: SET NETWORK OFF. Otherwise, the system will try to check variable types through the network. When the network becomes available, reverse the effect by executing the command: SET NETWORK ON. Network access status is shown as N-ON or N-OFF on the second line from the top of the screen.

3.4.2 PRINT

If you want to make a record of the contents of a picture make sure the printer is ready, then use the command PRINT $Pn zzzz (n is the printer number and zzzz is an option). This command is used to print a complete listing of the objects and text in the picture, including their coordinates, color, priorities, behaviors, and actors (PRINT $Pn DEBUG). Other options allow you to print only selected items in the picture (PRINT $Pn SEL), or only symbols in the picture (PRINT $Pn SYM), or only comments to the picture (PRINT $Pn COMMENT).

You can also print the same items to a file (PRINT <Pathname> zzzz) and read the file with the text editor.

You can use the Multiple Print command to print numerous pictures to a file. This command could be useful to document your schematics, especially when many are revised.

3.4.3 Set Grid

The command SET GRID ON causes a grid to be superimposed over the edit region. The grid helps you to align objects in the picture and to draw straight lines that connect objects. The command SET GRID OFF removes the grid from the display. Grid lines are spaced 5 lines/columns apart and numbered every 10 characters (see Figure 3-7).

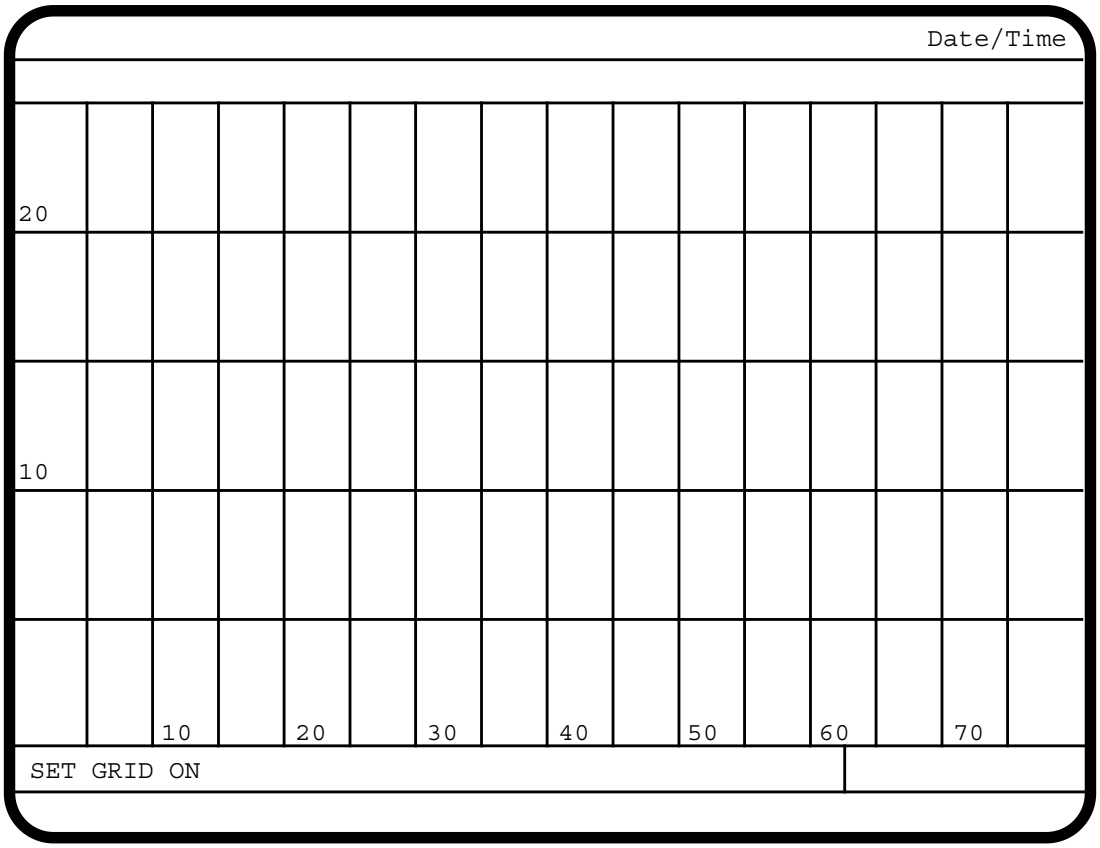


Figure 3-7 — Set Grid Command 1209

3.4.4 Set Textsize

When you start the Picture Editor, the default text size is large. The command: **Set Textsize Small** changes the current text size to small. This command is like a toggle switch and affects the *next* text objects and most other objects that you subsequently enter into the picture. Existing objects in the picture are not affected. To switch again, you can execute the command: **Set Textsize Large.** Look at the letters on the 2nd line from the top of the screen at any time to determine the current text size.

Large and small text is discussed in subsection 2.5.2 of this manual. Except for lines, solids, and bars, all other picture objects have an attribute known as text size. The things to remember when building pictures are—

- Check and, if necessary, set the current text size before building the object.
- The current text size determines the text size attribute of text, values, and variants when these objects are added to the picture.
- Targets always have their text size attribute set to large.
- The text size for a Subpicture is large if it contains any object with a text size of large; otherwise it is small.

Other than the obvious size difference in text, the main consideration is where you can locate objects in the picture. Objects with a text size of large can originate on large character cell boundaries only, but objects with a text size of small can originate on either large or small character cell boundaries. This of course affects the move and copy functions because objects can be moved only in the appropriate increments, 8 pixels, or 16 pixels. If you try to put an object at a point between the appropriate boundaries for its text size, the Picture Editor will move it to the nearest legitimate boundary.

If you need to change the text size of an existing object, select the object and execute the Add Textsize Large/Small command.

3.4.5 Select String

The Select String command gives you a way to search through a picture for a string of text, usually on a screen form. The command is used only at build time and you must specify the part of the picture you want to search. If the text string is found, it, or the object that contains it is selected (i.e., it turns white and blinks). Example: `SELECT "A101" 0 0 300 200` searches the picture within the X Y X Y coordinates for every occurrence of the string A101. There are some search options; for example, `SELECT "*.SP" 0 0 300 200` will search for every use of the parameter .SP. The *Picture Editor Reference Manual* explains the options.

CUSTOM GRAPHIC DISPLAY BUILDING
Section 4

This section deals with the process of building a complete Custom Graphic Display and assumes that you are familiar with the general procedures and editing techniques described in previous chapters.

Each display is different and probably will not contain every object that the Picture Editor is capable of drawing. You must carefully examine the drawing and identify what it contains. Unless you are familiar with the drawing, the keys (circles with pointers) are probably the best way to identify the objects. Of course, the keys really refer to an entry on a specific support form (see Table 2-1).

- Keys S and SD point to planned subpictures
- VR keys identify variants
- V keys identify values
- BR keys identify bar charts
- T keys identify targets.

B and CB keys refer to behavior and conditional behavior respectively. Because these are characteristics, not objects, B and CB keys could point to a variety of objects but especially to text and shapes. Some examples should clarify the examination process. In Figure 4-1, Keys B-1 and CB-1 point to parts of the furnace, which is obviously a hollow shape. Key B-2 points to text; Key S-2 points to a subpicture; and Key VR-1 points to a variant. Key BR-1 points to a bar chart in the bottom of Tower T-181. The upper part of the tower is a hollow shape described by Key B-7 and the lower part of the tower is a solid shape described by Key B-8. Hash lines are used here and on the condenser indicated by Key B-9 to indicate a solid object.

If you find it difficult to align objects in the picture, or to draw connecting lines at right angles, turn on the grid overlay with the SET GRID ON command.

NOTE

If you do not have a formal set of drawings and would like to try drawing a simple picture, the *System Startup Guides* contain a step by step procedure to build a simple picture. All you need is a Universal Station/GUS with the Universal Personality running.

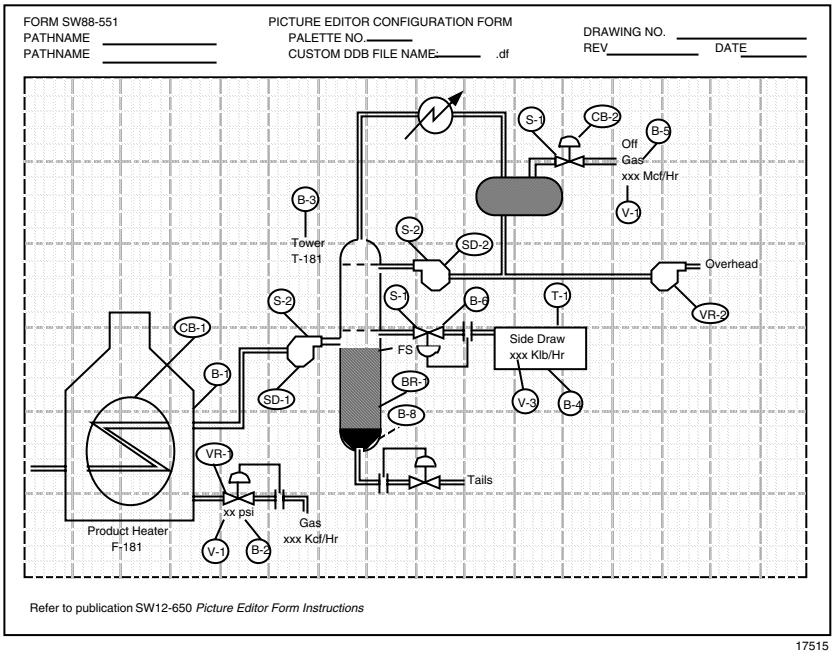


Figure 4-1 — Customer Graphics Display

4.1 THE SEQUENCE OF BUILDING

There is a preferred order for building Custom Graphic Displays. Of course, there are exceptions, but generally you should build objects that are higher on the following list before objects that are lower on the list. The list, in order of what should be drawn from first to last is

- Subpictures
- Shapes and Bar Charts
- Solid Shapes
- Variants
- Values
- Lines (pipes)
- Text
- Targets
- Conditional Behavior

NOTE

Before building any object check its behavior and text-size requirements, then set the current behavior/size.

If a Custom DDB File name is listed on the main display form, that file should be loaded before attempting to build any object that refers to a variable in the file. Type LOAD nnnn, where nnnn is the pathname. For example:

```
LOAD $F1>DDBS>DBFILE1
```

where:
DDBS is the volume name of a cartridge or zip disk that contains a custom DDB file named DBFILE1.

If there are no errors, the file will load. The file should have been built as described in section 2.8 of this manual. Once the Load command is successfully executed, the variables declared in that file stay in memory until you load another DDB file or leave the Picture Editor. If you get the message SYNTAX ERROR DETECTED, use the text editor as described in section 2.8 to correct the errors and then load the file. Also, remember that If you need to edit a picture previously built with a custom DDB file, you must load the DDB file before doing so.

CAUTION

While building a picture it is common to compile the work, go to the operating personality and check the work. Then, if changes are needed, return to the Picture Editor, edit the picture, re-compile it and go back to check it on the operating side again. With Release 510 and later software the last viewed schematic object file is kept in US memory. This benefits normal operation but can confuse the picture builder because the last compiled version of the picture is not in US memory; typically, it is on the HM (determined by the pathname used to compile).

The solution is to clear the schematic object file from US memory so that the latest version is loaded when you call for the schematic. There are two ways to do this:

One is by selecting the CLEAR SCREEN target on the system Menu.

The other is to invoke the CLR_SCRN actor.

It doesn't matter what is on the screen but invoke one of the screen clearing functions at the US where you want to view the picture while the operating personality functions are running. You might want to put the CLR_SCRN actor on a configurable button for use while building pictures.

Subpictures are built first because they are used throughout the display. You may also have some subpictures to build that are not directly indicated on the Display Form, but are shown on the *SW88-557,* Subpicture Form. Start building the main picture by adding the largest objects first.

Shapes and bar charts are usually dominant parts of the picture and determine spacing to other objects. Variants tend to be small shapes and therefore come next. Values take up different amounts of horizontal space, depending on the size of the number that they generate. Values must be placed into the picture for spacing, before proper placement of labels or engineering units can be determined. The shapes can now be connected with lines, and then text can be added. At this point, targets can be positioned over objects or text, or wherever needed, and finally, conditional behavior can be added to those objects that require it.

4.1.1 Building Subpictures

Subpictures are simply pictures that you build for use in other displays. Usually, the same subpicture is used repeatedly. Subpictures can contain shapes, targets, text, etc. Pictures of valves and pumps are frequently built for use as subpictures and adjusted with the Scale command to whatever size is needed. These pictures are built and stored much like any other picture and become subpictures when added to another display. To avoid confusion, they are referred to as subpictures throughout this discussion. You may want to build simple subpictures for a shape library. In that case, study the Subpicture section of the *Picture Editor Reference Manual* (see References).

Build each subpicture as it is shown on the *SW88-557* (S) Form, using the techniques already described and the techniques described in the following sections (i.e., shapes, values, variants, etc.). There will probably be keys on the S Form that refer to support forms for behavior, values, etc. Instead of using a separate support form for very simple objects, the designer might have indicated the behavior (colors, intensity, etc.) right on the Subpicture Form. Figure 4-2 illustrates the paper Subpictures Form (S Form).

After building each subpicture, add an origin (see the Set Origin command). Later, when you add the subpicture to a display, a message will appear on the prompt line: Enter Subpicture Coordinates. The coordinates you specify correspond to the subpicture's origin (but the origin does not appear in the picture). You can place the origin anywhere, but typically it is placed on or near the object (or at the point the subpicture connects to something else in the main picture). For Change Zones, the origin should be located in the bottom left-hand corner.

Subpictures can be stored with a Write command, at any time, as you work on them, but when you think a subpicture is finished try to compile it. Refer to the Compile command and use the pathname indicated on the Subpicture Form. If the subpicture has errors, it will be redrawn with the faulty objects selected. When you have corrected the errors, the subpicture should compile unless it contains parameters (discussed more later in this section). In that case, you will get the message, `Cannot Compile Subpicture` and you should then use a Write command to store it. There is no requirement to compile the subpicture; the purpose is to check it for errors before it is used. Note that the compile command automatically writes to a source file as part of the command execution.

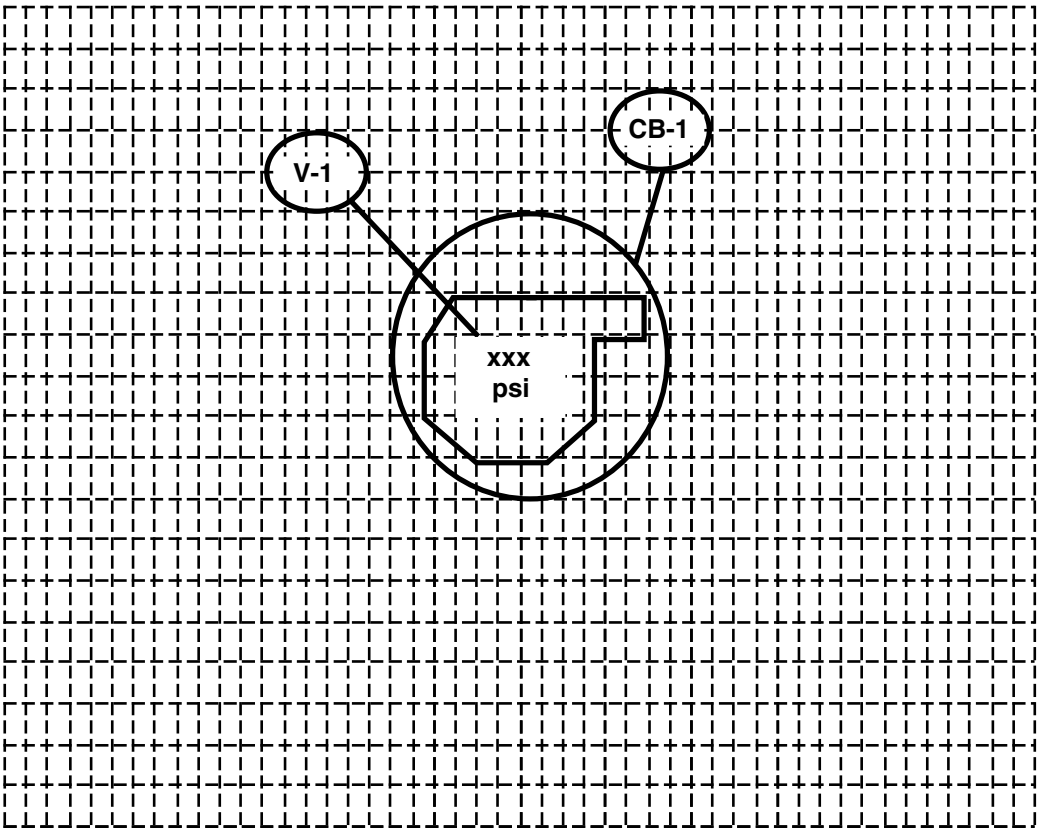
If several different sizes and orientations are needed, you can scale or otherwise modify the object as needed and use a different filename to store each version. You can scale and flip a subpicture horizontally or vertically even after it is added to a picture, but if you need to rotate a line or solid object, you must do it in the source picture (i.e., the picture you build for use as a subpicture).

-S-

SUBPICTURES

FORM SW88-457

Drawing No. 3 Palette No. _____ Date _____



SUBPICTURE

Dwg. 1 , Key S-2

Subpicture Pathname H PUMP

Inherited Behavior ? _____

Item	Parameter	Prompt
PUMP	&A.STATUS	POINT ID?

Figure 4-2 — Subpicture Form

6353

4.1.1.1 Inherited Behavior

If the S Form indicates that the subpicture should have inherited behavior, select it and execute an Add Inherit command before storing it. Inherited behavior allows you to change the subpicture's behavior after it is added into the main picture.

4.1.1.2 Parameters

If the S Form lists one or more parameters, you must specify some expression in the subpicture as a parameter (this is automatically taken care of as you enter information from the Subpicture Support Forms). Parameters begin with an & character (e.g., &A.Press). When you store a subpicture with a parameter, the Picture Editor presents a form on the screen requesting a prompt word-string for each parameter (see Figure 4-3). Refer to the S Form and type in the prompt word-string for each parameter. Figure 4-2 shows an example where the words `Point ID?` were used as the prompt word-string.

CAUTION

If a subpicture contains more than one parameter and you repeatedly delete/modify the subpicture parameters, it is possible for the prompt word strings to become out of sync with their associated parameters. When you store the subpicture, check the dialog box carefully to see if each prompt string is correctly associated with its parameter. One way to make this easier is to enter the parameter at the extreme right end of the port when you type in the prompt.

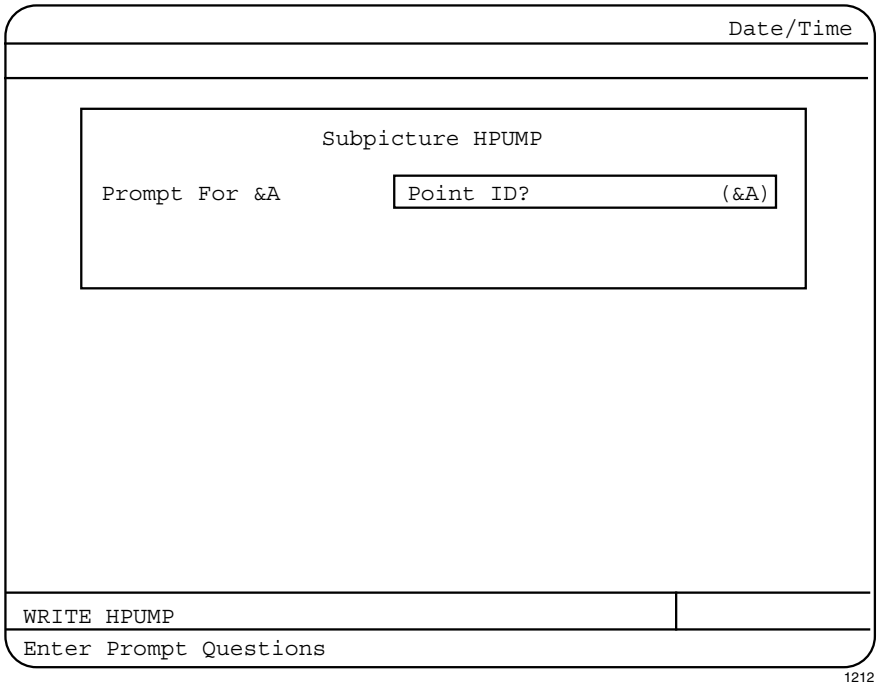


Figure 4-3 — Storing a Subpicture with Parameters 1212

4.1.1.3 Using Subpictures

The Add Subpicture command is used to add subpictures to Custom Graphic Displays. If the subpicture is on the volume specified by the current pathname (at the top of the screen), you can call for it by the filename (e.g., ADD SUB HPUMP). If not, you can specify a full or partial pathname (e.g., ADD SUB $F1>VOL1>HPUMP).

After invoking this command, use the cursor to indicate where you want the subpicture's origin (the origin does not show at operating time). If the Subpicture contains a parameter, the Picture Editor will present a form with the prompt word-string that you entered when storing the subpicture (see Figure 4-4). The word-string used in this example was Point ID? (see Figure 4-3). You must answer the question by typing in whatever is listed as the response for that subpicture's prompt on the Subpicture Detail Form (paper Form SD).

Variants—Subpictures can also be called into a picture by a variant statement as explained in section 4.1.3.

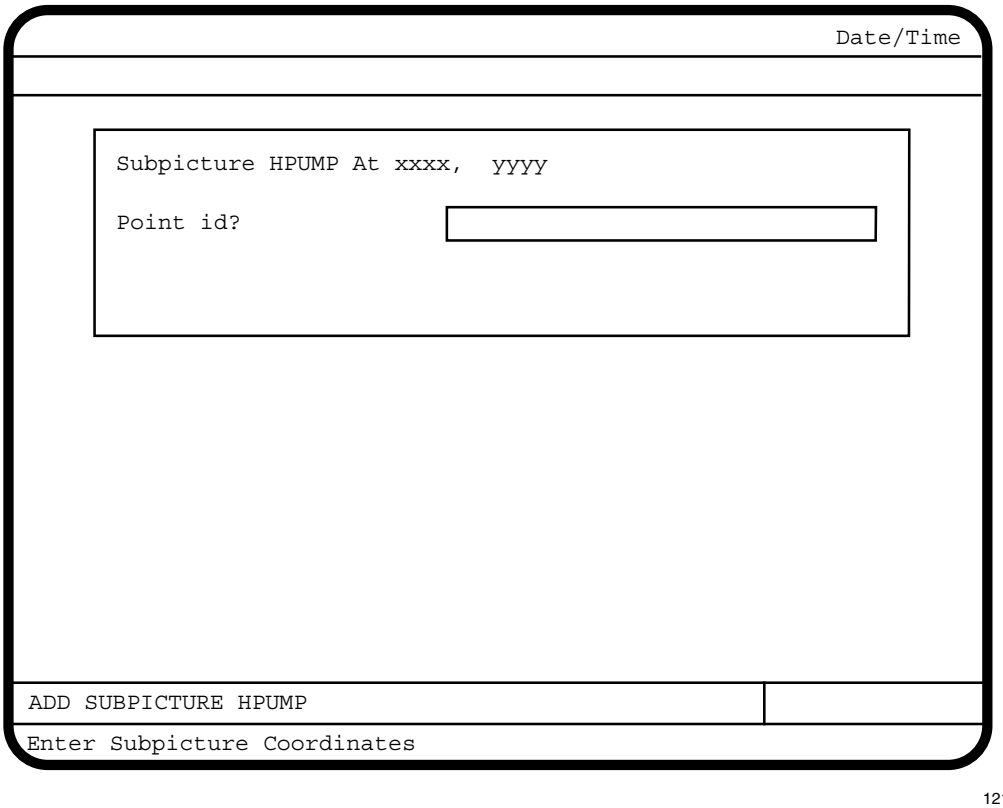


Figure 4-4 — Prompt Form When Adding Subpicture to Display

4.1.1.4 Application Subpictures

These are predesigned subpictures built with software. They cannot be built or changed with the Picture Editor, but they can be used in a Custom Graphics Display much like any other subpicture. When added to a picture, the image can be enlarged, reduced, flipped horizontally or vertically, but not rotated (refer to the Scale command). Application subpictures can also be combined with other items into another subpicture.

The *Picture Editor Reference Manual* lists the standard application subpictures, shows where each origin is located, and provides other details. If an application subpicture is called for, add it to the display with the command: `Add Subpicture nnnn`, where nnnn is the name of the application subpicture. Check through the packet of paper forms for any special instructions about this type object.

4.1.1.5 Changing Subpictures

A copy of the subpicture is stored with every picture that it is added to. The same is true if a subpicture is referenced (called for) on a Variant Screen Form. Thereafter, if the subpicture is changed, you must delete the subpicture image wherever it was used in every picture. Also delete every reference to that subpicture on variant screen forms (use the Modify Variant command). This action eliminates the subpicture copy stored with the picture. Then add the changed subpicture back to the picture(s) and variant screen forms.

An easier way to change a subpicture is with the Replace Subpicture command. With R600, this command has been modified to replace only the selected instances of the indicated subpictures, but the command will replace all instances of the indicated subpicture if no instances are selected. Refer to the *Picture Editor Reference Manual* for additional information. The following examples show how it is used.

Example 1—In the schematic PLANT1 there is a subpicture named PUMP1. You must modify that subpicture by adding a line to it. The subpicture does not contain any parameters. The procedure is as follows—

1. Read in the source file for the subpicture you want to modify (e.g., PUMP1).
2. Modify the subpicture (e.g., add the line).
3. If you don't need the original subpicture, write to the same source file (e.g., PUMP1), otherwise, write to a different file. Lets assume that you do want both subpictures and decide to save the modified subpicture as PUMP2.
4. Read in the schematic that contains the subpicture(s), e.g., PLANT1.
5. To replace the old subpicture PUMP1 with the modified subpicture PUMP2, type in the command: `REPLACE SUB PUMP1 PUMP2`

Only selected instances of subpicture PUMP1 is replaced by subpicture PUMP2. Note that you will only get the "`Duplicate Subpicture Exists`" message, if you select a subset of the subpicture PUMP1 and try to replace it with a modified version of subpicture PUMP1 without giving the modified version of subpicture PUMP1 a new name.

Example 2—The schematic PLANT1 contains one or more subpictures named GUAGE1. You must change subpicture GUAGE1 by adding a value with a parameter. It may or may not contain other values. The procedure is—

1. Read in the source file for the subpicture (e.g., GUAGE1).
2. Add a value using the Add Value command.
3. Enter the parameter when the Value screen form appears (e.g., &LIMIT).
4. Enter the format when requested (e.g., REAL).
5. Write the subpicture to either the old or a new file. Before completing this operation the Picture Editor presents a blank port and requests that you to type in prompt words for the parameter (e.g., you might type in `ENTER LIMIT`).
6. Read in the schematic that contains the subpicture(s), e.g., PLANT1.
7. To replace the old subpicture GUAGE1 with the modified subpicture, type in the command: `REPLACE SUB GUAGE1 GUAGE1`
8. If you wrote the subpicture to a new file such as GUAGE2, the command would be: `REPLACE SUB GUAGE1 GUAGE2`
9. The picture Editor presents the prompt words you used (e.g., `ENTER LIMIT`) and a blank port. After entering the actual entity that you want to display (e.g., A100.OP), press ENTER.
10. If the old subpicture contained other parameters, they are displayed but not changed.
11. Press ENTER and each old GUAGE1 subpicture is replaced with the new subpicture.

Example 3—The schematic PLANT1 contains one or more subpictures named MYCIRCLE. You want to replace them with the application subpicture CIRCLE and you want the final subpictures to be the same size. The procedure is—

1. Read in the schematic that contains the subpicture(s), e.g., PLANT1.
2. To replace all of the old subpictures with the application subpicture type in the command: `REPLACE SUB MYCIRCLE CIRCLE ORIGINAL`
3. When you press ENTER, all of the subpictures named MYCIRCLE are replaced with a proportionally sized CIRCLE application subpicture.

4.1.1.6 Replace Subpicture in Bulk (MULTREP)

With R600, a new Picture Editor Multiple Replace command is provided called “Replace Subpicture in Bulk.” This command will be modeled after the Picture Editor “Multiple Compile” command; in that a text file similar to the Multiple Compile text file will be read in allowing replacement of multiple subpictures in multiple schematic files.

An error file will be produced indicating errors if the number and types of the parameters of the subpictures don't match or if the subpicture or file names are invalid. The original source file will be replaced with the modified source file only if no errors occur on the Replace Subpicture commands. If no errors occur on the replace, allow compile (if indicated in the text file).

No parameter form will be provided for the user to modify in the automatic mode. A manual mode indicator, in the input text file, will bring up the parameter form for the subpicture and wait for the user to enter any changes to the subpicture parameters. The subpicture replace mode will remain in manual until the input file indicates to change the mode to automatic.

4.1.2 Building Shapes and Bar Charts

4.1.2.1 Hollow Shapes

Hollow shapes are built with the Add Line command. After invoking this command, the Picture Editor asks you to specify coordinates for the line end-points. Figure 4-5 shows how the cursor is used to enter a series of end-points. As you can see, the points outline a pump. Straight lines connect the points as the SELECT key is pressed, to form a hollow shape. Press the ENTER key to complete the drawing.

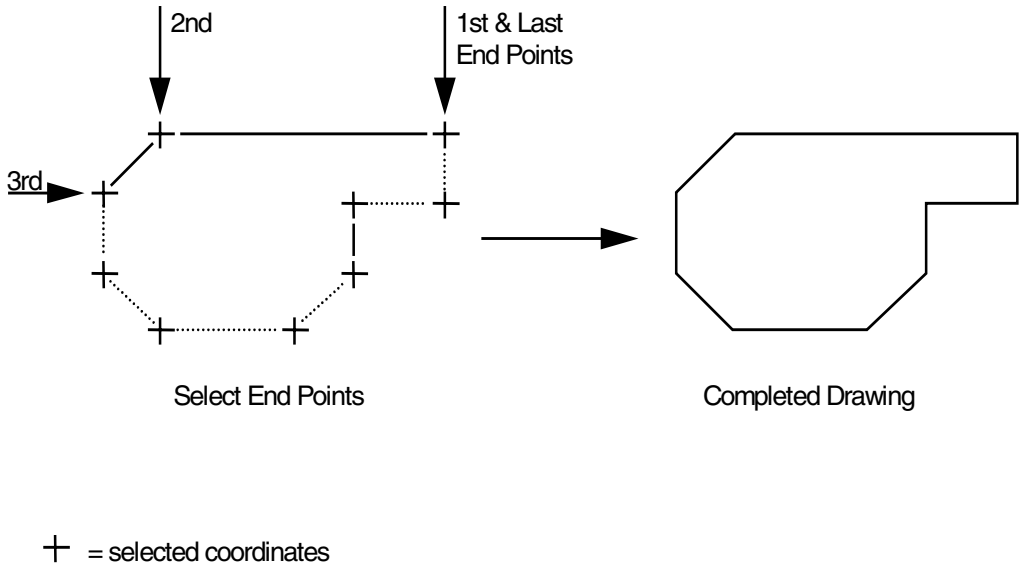


Figure 4-5 — Building Hollow Shapes 1214

4.1.2.2 Solid Shapes

Solid shapes are built much like hollow shapes. (See Figure 4-6.) Solid shapes on the paper Display Form contain crosshatched lines or shading to indicate that they are solid. Invoke the Add Solid command and use the cursor to specify the vertices of the object. When the ENTER key is pressed, the first and last vertex are connected and the object is filled in with color.

When building either solid or hollow shapes, you can correct any mistakes you make while entering the coordinates, by pressing the DEL key and re-entering the coordinate.

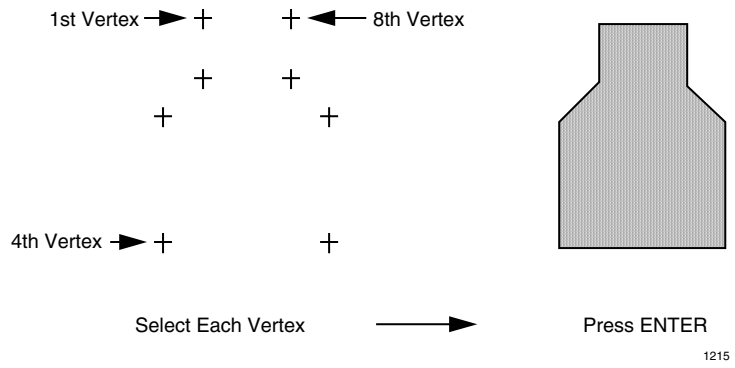


Figure 4-6 — Building Solid Shapes

4.1.2.3 Symmetry

To get perfect symmetry, draw half the object, copy it a short distance away, reverse its orientation with the Scale command, and move the two objects together. Figure 4-7 shows this idea. After you have done this a few times try lumping the commands together, for example, SELECT;COPY;SELECT;SCALE;SELECT;MOVE.

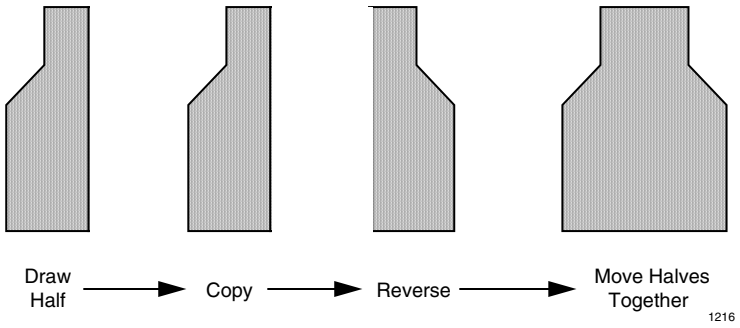


Figure 4-7 — Building Symmetrical Objects

4.1.2.4 Templates

If you have already drawn a shape similar (at least in part) to the one you want to draw, consider using the existing shape as a template or guide. For example, suppose that you have a subpicture of a circle and need to draw an object that contains a circle or at least a circular surface. Add the circular subpicture to the picture you are drawing, using the Add Line command, draw over as much of the circle as needed and, finally, delete the subpicture. What remains is a line with the desired curvature. In Figure 4-8, a few lines with exaggerated lengths are used to show this idea. Of course, many short lines would yield a smoother arc.

Alternatively, you could use a marking pen to draw the object on a clear plastic sheet and tape the sheet to the screen for use as a template.

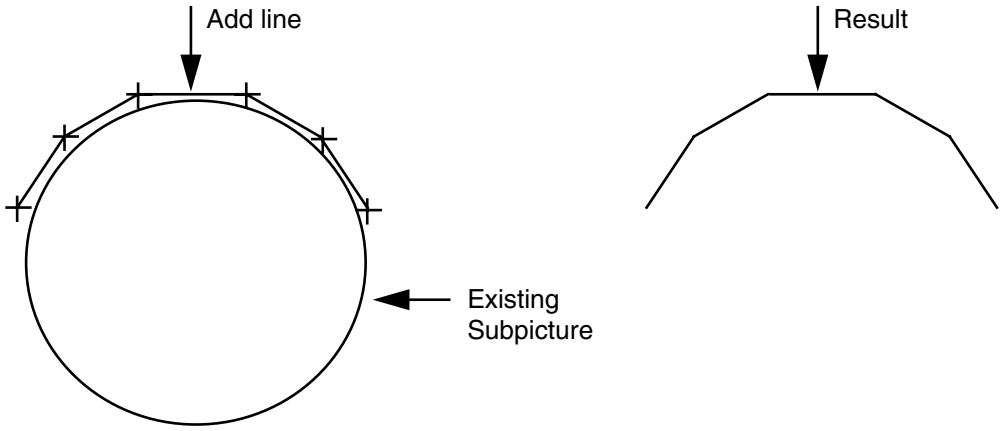


Figure 4-8 — Using a Template 1217

4.1.2.5 Bar Charts

Bar charts are designated by BR-keys on the paper Display Form. Bars can be either horizontal or vertical and, like many other Picture Editor objects, are built by specifying two locations with the cursor. The important thing to remember here is that the Picture Editor builds the bar to its full-scale length. You can enter multiple bars with a single command, by specifying additional pairs of locations. The Picture Editor draws a rectangle around each pair of entries, and presents a screen form for each bar. Fill in the screen form(s) using information provided on the paper BR Form. You cannot see the bar chart change its length until operating time.

4.1.3 Building Variants

Variants are used to switch the picture image between two or more objects. For example, a valve can appear as a hollow object when closed and a solid object when it is open. In this case, the valve images are two different subpictures. You cannot observe this switching until operating time, but you can see one of the objects at the chosen location when the command is completed. The objects can be subpictures, text strings or, values (in R610), or combinations of the three objects.

Variants are indicated by VR-keys (e.g., VR-1 in Figure 4-1). After invoking the Add Variant command, use the cursor to specify locations where the variants will appear. Each location is marked by a cross (see Figure 4-9).

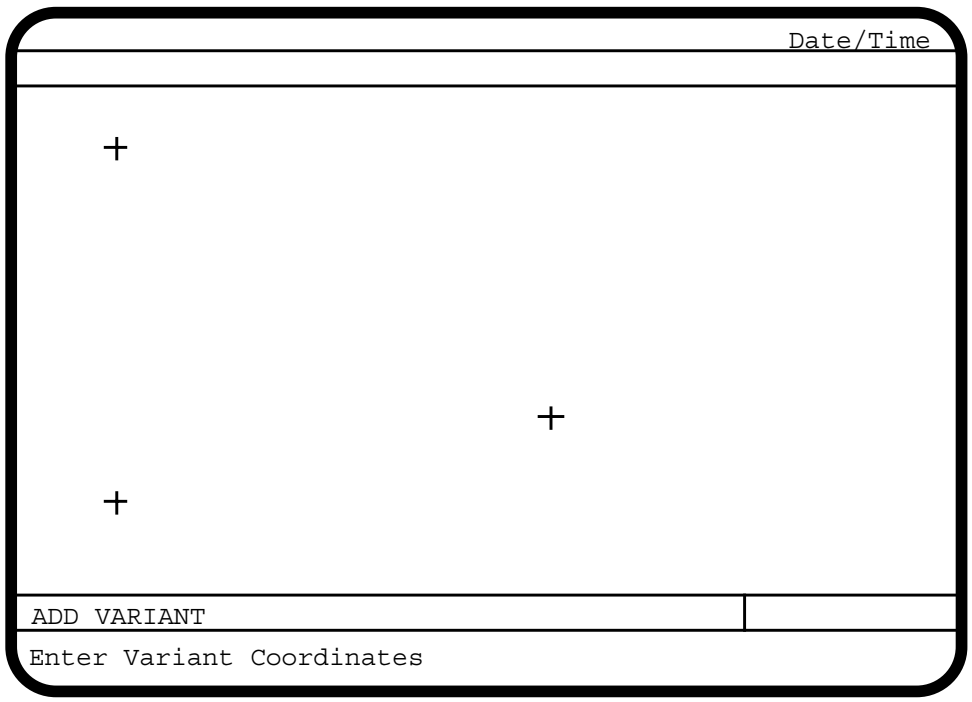


Figure 4-9 — Entering Variant Locations 1218

When all locations have been entered, the Picture Editor presents a screen form for each variant. Refer to the paper VR Form and enter the information as listed for each variant. If subpictures named in the variant statements are stored on the volume specified by the current pathname (at the top of the screen) you can enter the subpicture's filename (e. g. HPUMP) as it is shown on the paper form. If not, you can either change the default pathname, or just enter a full or partial pathname to the subpicture. For example, if the required subpicture HPUMP is stored on a floppy disk volume named SUB1, and that floppy disk is in the drive $F2, you should type in $F2>SUB1>HPUMP instead of HPUMP. You do not need to go back and delete the added pathname components.

The Picture Editor may or may not request a variable type, but if it does, this information should also be entered as it appears on the VR Form.

When all the form entries are completed, one of the subpictures, text strings or, in R610, values appear in the picture. If parts of the picture near the variant are blanked out, one of the subpictures, text strings or values may be too large. Subpictures called by a variant clear out a rectangular area equal to or somewhat larger than the subpicture. If this causes a problem, try adjusting the subpicture's origin with the SET ORIGIN command to obtain a better fit.

Note that Variants and subpictures have an attribute known as text size. If the variant has a text size of small, it cannot call in a subpicture with a text size of large. Also note that objects with a text size attribute can start on only the appropriate character cell boundaries (i.e., every 8 x 16 or 8 x 8 pixels). For more information see the *Picture Editor Reference Manual*.

If a subpicture name was previously entered on a variant screen form and you now want to make a change to that subpicture, refer to Changing Subpictures section in this document.

4.1.4 Building Values

Values provide a live number or status on the screen (during operating time) to represent measured quantities or conditions in the process. Values are indicated on the Display Form by V- keys. As in Figure, 4-1, they are usually represented on the sketch as a string of Xs. Invoke the Add Value command and use the cursor to specify where the values will appear.

You may find it helpful to make a scratch-pad note of the cursor-position numbers on the second line from the top of the screen when you press the SELECT key to mark the value locations. All of the value locations can be entered with a single command and they are marked with a cross, as shown in Figure 4-9. When all locations are specified, the Picture Editor presents a form that must be filled out to describe each value. Refer to the paper Value (V) Form and enter the expression. The Picture Editor may also prompt for the format and variable type. If so, enter this information as listed on the V Form for that value object.

When all form entries have been completed, values are represented something like those in Figure 4-10, depending on the format. At this time, values appear as a string of identical characters equal to the field width of the final object. If the format is Real, a string of Rs is used, if the format is Integer, a string of I's is used, etc. In any case, you can now determine where text (e.g., PSI) should be entered in relation to the value. Text is entered with the Add Text command.

4.1.5 Building Line Objects

Lines or pairs of parallel lines are used to represent pipes, wiring, the sequence of flow, etc. In the typical process schematic, once the major shapes are in the picture, you can connect them with lines. Use the Add Line command and specify each end-point (change of direction) with the cursor. To keep lines from tilting while connecting objects at opposite ends of the screen, you may find it helpful to watch the cursor-coordinate numbers on the second line from the top of the picture. For example, using the same Y coordinate at left and right ends of the screen results in a perfectly horizontal line. You may also find it helpful to turn on the grid overlay with the Set Grid On command.

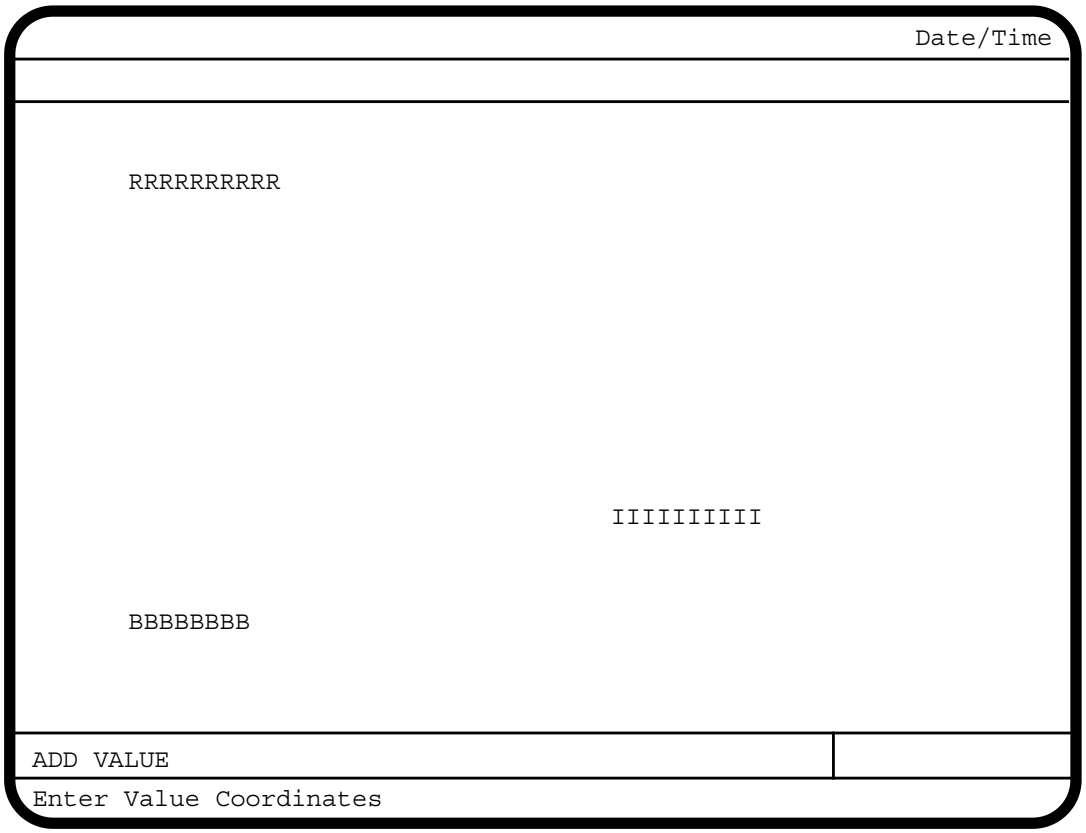


Figure 4-10 — Completion of Add Value Command 1219

4.1.6 Adding Text

Any text that is yet to be entered should go into the picture now. The current text size is shown by the size of the letters on the 2nd line from the top of the display (e.g., FGB). If you want to change the current text size, use the Set Textsize command. Then invoke the Add Text command, position the cursor to the desired locations and type from the Engineering Keyboard. Color and other behavior traits can be changed while entering text, by pressing the appropriate behavior keys.

All text of the same size can be entered with a single Add Text command if desired, but observe the following precautions. A text object is considered a group of characters that touch horizontally (including space characters). Note that if you use the cursor-positioning keys instead of the space bar to separate words or characters, they are then separate text objects. This is important when you want an entire string of text to have the same behavior. Do not use the insert character key (INS CHAR) with the Add Text command; refer to the Modify Text command if corrections are needed.

4.1.7 Adding Targets

Targets are boxes in the display that cause some action when activated—usually by touching the screen at that point. Targets are indicated by T- keys on the display drawing. Invoking the Add Target command causes the Picture Editor to prompt for target coordinates. Use the touch screen, or the cursor/SELECT key to specify two coordinate points for each target. The Picture Editor draws a box that includes the points (see Figure 4-11). Targets should not overlap. All targets can be entered with a single command. Once the coordinate pairs have all been entered, the Picture Editor presents a screen form for each target. Refer to the Target (T) Form and enter information as listed for each target. Invisible targets are shown as hollow rectangles during the Picture Editor session but are invisible at operating time. Note that targets always have a text size attribute of large.

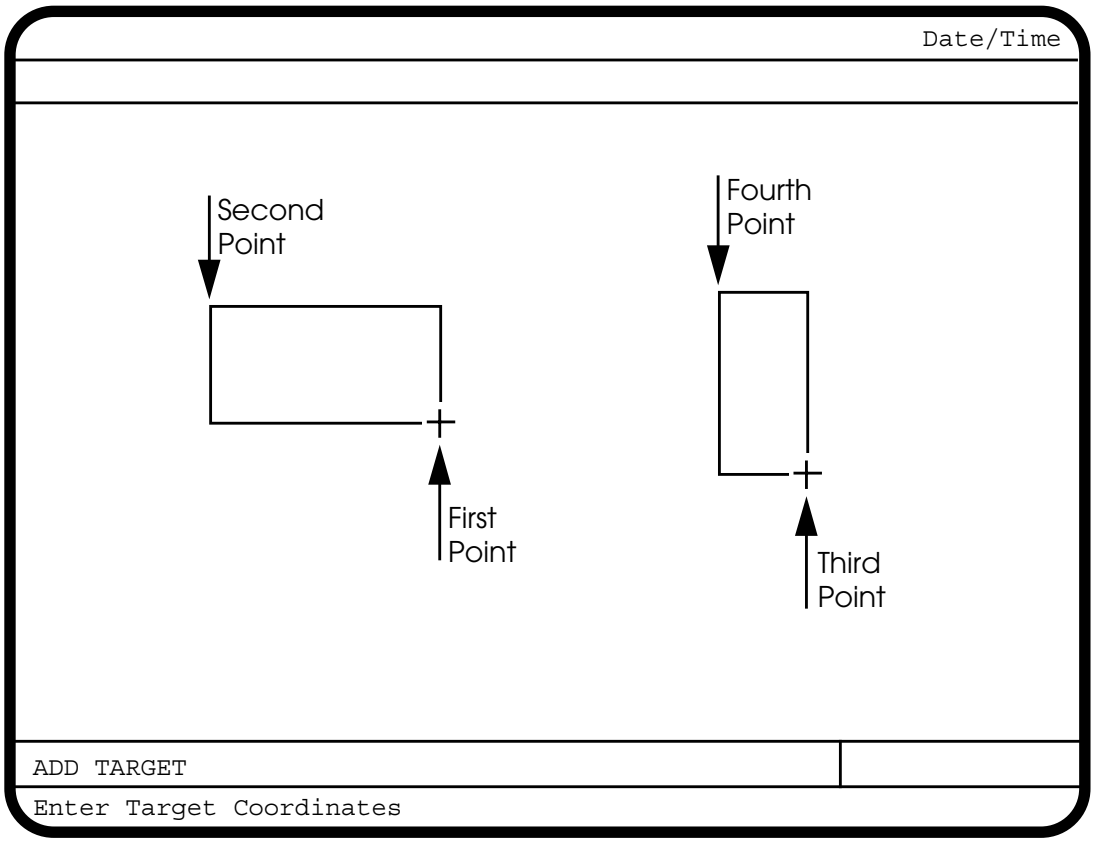


Figure 4-11 — Entering Target Coordinates 1220

4.1.7.1 Change Zones

Standard change zones are a combination of one or more targets and a 3-line by 80-column subpicture called CHG_ZONE. The origin for the Change Zone subpicture is usually placed in the lower left-hand corner of the edit region and the subpicture occupies the lower three lines of the picture. Related targets can be built anywhere else in the picture. This subpicture is supplied on the &DSY volume, therefore if you add it to a picture, the command is typically ADD SUB NET>&DSY>CHG_ZONE. Refer to the Call Up Change Zone actor in the *Actor's Manual* for construction details and information about a variation that uses the change zone object file as an overlay. Custom change zones are unique and you must build the subpictures.

4.1.8 Adding Conditional Behavior

Conditional behavior is a mechanism that allows objects to change behavior, depending on certain conditions. Initially, objects with conditional behavior (those with CB- keys on the display drawing) can be typed or drawn in any color and intensity, just to get them into the picture. Then, select only those objects that are to have the same conditional behavior. Invoke the Add Condition command and the Picture Editor will present a form on the screen. Refer to the paper CB Form and fill in the screen form. During the picture-editing session you cannot see the object-change behavior as called for in the If, Then, Else statements, but you should observe that the object(s) take on the behavior called for on the screen form line labeled Initial Behavior.

4.1.9 Overlays

A standard overlay display, as the name implies, is intended to be electronically superimposed over another display called the base display or base picture. The two pictures must be built and stored under different file names. Merging of the pictures takes place in the operating personality. The two pictures will probably be sketched on separate forms; however, to be certain they will fit together properly, you may want to build the composite picture and separate the overlay part as described in the following paragraphs.

Example—Figure 4-12a shows an example of a base display. Figure 4-12b shows the overlay display, and Figure 4-12c is a composite of the two (you may not receive the composite sketch). Build the base picture first and compile it (e.g., COM NET>HMV1>D122). Next, add the overlay items (values, targets, etc.). In this example, some of the text goes in the overlay and some goes in the base picture. The same goes for the targets. Continue until the composite picture is built. You might want to store a copy of this on a floppy disk (e.g., WRITE $F1>VOL1>TEMP1).

Select and delete all objects that occur in the base picture only (e.g., SEL LINE;DEL LINE;SEL SUB;DEL SUB). In the example, all line objects and subpictures can be deleted with one command by selecting the entire picture, but be careful when selecting items that appear in both pictures, such as text and targets in this case. Finally, only the overlay picture is left on the screen and all objects are in their proper locations. Compile the overlay picture under the proper pathname (e.g., COM NET>HMV1>D123).

With the base picture and overlay built and compiled, the work is completed.

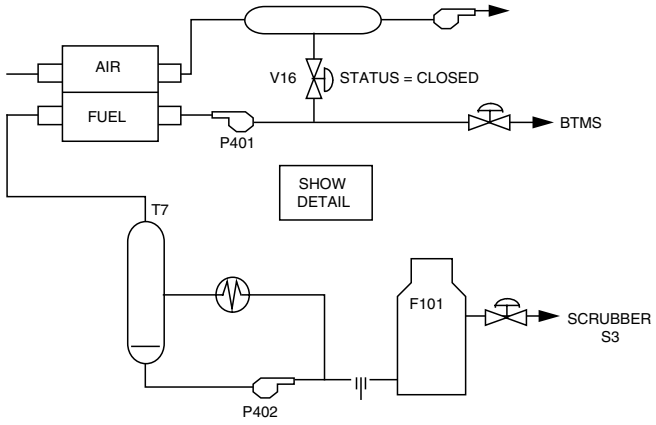


Figure 4-12a — Schematic D122 1398

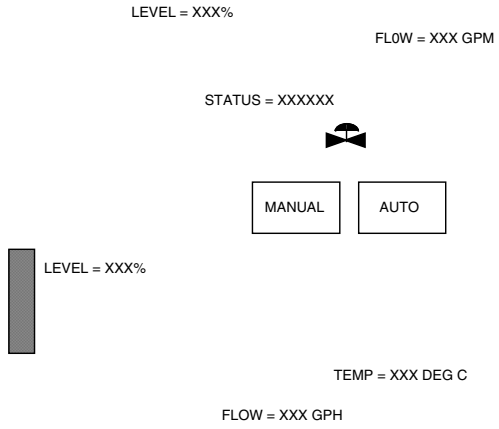


Figure 4-12b — Overlay D123 1399

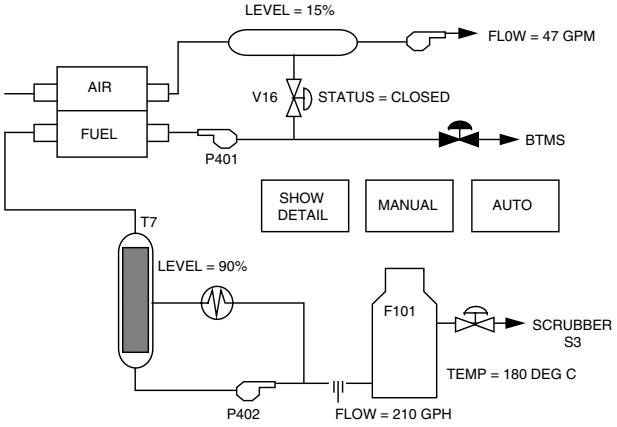


Figure 4-12c — Composite Picture 1400

4.1.9.1 Multiple Serial Overlays

Multiple Serial Overlays are built in a way similar to that described above. The main difference is that numerous overlay pictures can be built for use with a base schematic. Each overlay will probably occupy only a slice of the picture and is called into the picture by a target or configurable button. You must be careful to build objects in each overlay between the specified X-Y coordinate sets. The area in a schematic that was occupied by a Multiple Overlay is cleared if another Multiple Overlay is called in. For that reason you would not normally build anything in this area of the base schematic. Figure 4-13 illustrates one way to use Multiple Serial Overlays.

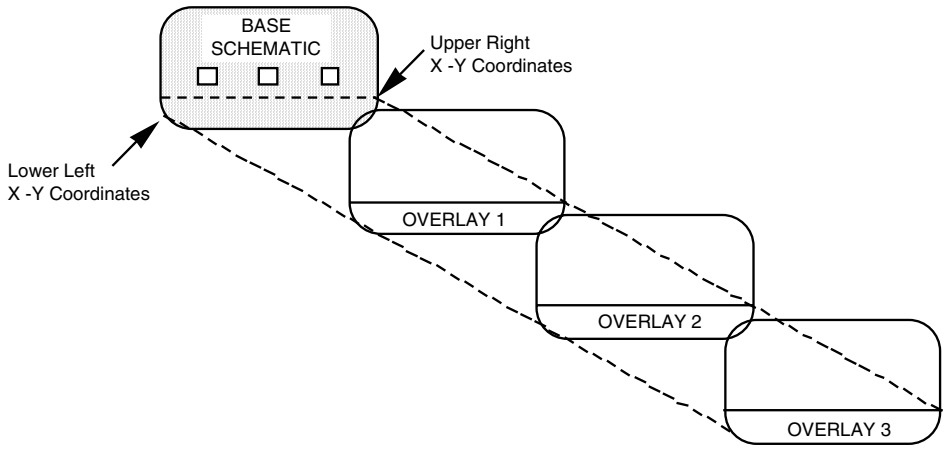


Figure 4-13 — Multiple Serial Overlays 2699

4.1.10 Define Command

The left edge of the main display form may contain an entry for the Define command(s). If so, with the custom graphic display on screen, type in the Define command (e.g., `DEFINE INITIAL`) and press ENTER. The Picture Editor presents a screen form like a Target screen form. Type in the actor(s) listed with the command and press ENTER. If you have to modify a Define command, just enter the Define command again exactly as before. Retype the actors as you want them or leave a blank action field to delete the Define command.

COMMANDS AND ABBREVIATIONS
APPENDIX A

A.1 COMMAND INDEX

The following table lists all of the Picture Editor commands. Most commands consist of two parts as defined where the prefix and suffix intersect in the table. For example, Add Line. For those commands, such as scale, that do not need a suffix, the first column of the index is blank.

Table A-1 — Command Index Matrix

Prefix \ Suffix (COMMAND)		Bar	Behavior	Collection	Comment	Compile	Condition	File	Grid	Inherit	Line	Network	Origin	Pathname	Print	Priority	Roll	Solid	String	Subpicture	Target	Text	Textsize	Value	Variant
Add		X	X				X			X	X					X		X		X	X	X	X	X	X
Compile	X							X																	
Copy	X	X									X							X		X	X	X		X	X
Define	X				X																				
Delete	X	X	X				X			X	X					X		X		X	X	X		X	X
Deselect	X	X	X				X			X	X					X		X		X	X	X		X	X
End	X																								
Listeq	X																								
Load	X							X																	
Modify	X	X					X				X							X		X	X	X		X	X
Move	X	X									X							X		X	X	X		X	X
Multiple						X									X										
New	X																								
Print	X																								
Read	X							X																	
Replace																				X					
Scale	X	X									X							X		X					X
Select	X	X	X				X			X	X					X		X	X	X	X	X		X	X
Set			X	X					X			X	X	X		X	X						X		
Verify	X																								
Write	X							X																	

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SUGGESTION

If you find the number of abbreviations for each of the following functions somewhat overwhelming, choose one abbreviation for each prefix, suffix, etc., and cross out the rest.

A.1.1 Command Abbreviations

Prefixes

Add	A		
Compile	COMP	COM	
Copy	COP	C	
Define	*		
Delete	DEL	D	
Deselect	DES	DS	
End	E		
Load	LD	L	
Modify	MOD	M	
Move	MOV		
New	N		
Print	*		
Prompt	P		
Read	REA	RD	R
Replace	REPL	REP	RE
Scale	SC		
Select	SEL		
Set	S		
Verify	VER	V	
Write	W		

* No abbreviation

A.1.1 Command Abbreviations (contd.)

Suffixes

Assoc	A		
Bar	(No abbreviation)		
Behavior	BEH	B	BEHAVE
Collection	COLLECT	COL	C
Condition	COND	C	
Disp_Back	DISP_B	DB	
Disp_Fwd	DISP_F	DF	
Final	FIN	F	
Grid	GRI	GR	G
Help	H		
Inherit	INH	IN	I
Initial	INIT	I	I
Line	LIN	L	
Network	NET	N	
Origin	ORIG	OR	O
Page_Back	PAGE_B	PB	
Page_Fwd	PAGE_F	PF	
Palette	PALET	PAL	
Pathname	PATH	P	NAME
Priority	PRI	PR	
Roll	ROL	R	
Solid	SOL		
String	(No abbreviation)		
Subpicture	SUBPIC	SUB	S
Target	TARG	TAR	
Text	TEX	T	
Textsize	SIZE	TS	
Value	VAL	V	
Variant	VAR		

A.1.2 Behavior Abbreviations

Color

White	WH	W
Cyan	CY	C
Magenta	PURPLE	MAG
Blue	BLU	
Yellow	YELL	YEL
Green	GRN	GR
Red	R	
Black	BLK	BLA

Intensity

Full	FUL	F
Half	H	

Field

Reverse	REV	Blink	BLI
No Reverse	NO REV	N R	NR

State

No Blink	NO BLI	N B	NB

A.1.3 Miscellaneous Abbreviations

Box	B			
Entity_ID	ENTITY	ENT		
Enumeration	ENUM	E		
Hollow	HOL	H	HOLL	
Horizontal	HORIZ	HOR	H	
Integer	INT	I		
Invisible	INVIS	I	IN	
Large	L			
Logical	L	B	BOOLEAN	
Network	NET	N		
Multiple Compile	MCOMP	MCOM	MC	
Multiple Print	MPRINT	MPRN	MPR	MP
Parameter	PARAM	P		
Real (Number)	NUM	R		
SD_ENUM	SD_ENM			
Small	S			
Solid	SOL	S		
String	S			
Unknown	U			
Vertical	VERT	VER	V	
Variable	VAR	V		

A.1.4 Command Descriptions

The following list provides a very brief explanation of the major Picture Editor commands. Many of the commands can also be used with qualifiers. Refer to the *Picture Editor Reference Manual* for a detailed description of all the commands.

A.1.4.1 ADD Commands

These commands add a new object or status to the picture.

ADD

- Line — Adds a multisegment line (can be hollow shape).
- Solid — Adds a solid polygon.
- Text — Allows text input from Engineering Keyboard.
- Bar — Adds a bar chart (horizontal or vertical).
- Behavior — Changes literal behavior of selected objects.
- Condition — Adds conditional behavior to selected objects.
- Subpicture — Adds previously built subpicture to display.
- Textsize — Changes text size of selected objects to the specified size.
- Variant — Adds a mechanism to choose between different subpictures, text strings or, in R610, values based on evaluation of an expression.
- Target — Adds touch targets to the display.
- Value — Adds an update region (live numbers) to the display.
- Inherit — Allows subpictures to have their current behavior defined in the display where they are used.
- Priority — Used to change the priority of selected objects.

A.1.4.2 SET Commands

Set commands typically direct the Picture Editor to change some standard management protocol in the display.

SET

- Behavior — Sets behavior for the next object added to the picture.
- Collection — Allows change of update rate for picture variables.
- Grid — Superimposes/removes a grid over the drawing area.
- Network — Enables/disables variable type-checking through the network.
- Origin — Sets a reference point in the subpicture.
- Palette — Determines the background tint and colors available to build with.
- Pathname — Specifies the storage device and file name for the picture.
- Priority — Determines what is covered when text and graphics overlap.
- Roll — Rolls the edit region over the drawing area.
- Textsize — Specifies the current text size.

A.1.4.3 SELECT Commands

Select commands direct the Picture Editor to select objects in the display for subsequent manipulation by other commands.

SELECT—Selects existing display objects.

SELECT

- Behavior — Selects objects with common literal behavior.
- Condition — Selects objects with conditional behavior.
- String — locates a string of text (at build time).

DESELECT—Reverse of select - allows deselection of objects.

Qualifiers for use with both Select and Deselect are, Line, Solid, Text, Value, Bar, Target, Variant, Subpicture, Inherit.

A.1.4.4 Manipulation

These commands direct the Picture Editor to perform some action on existing display objects. Refer to the *Picture Editor Reference Manual* for qualifiers that can be used with these commands.

- Move — Moves selected objects within the picture.
- Copy — Copies selected objects within the picture.
- Delete — Deletes selected objects, conditions, behavior, inherited behavior.
- Scale — Changes size or direction of selected objects (but not all types of objects).
- Modify — Modifies selected objects, behavior, condition, by changing their shapes or screen-form entries.

A.1.4.5 General Utility Commands

These commands deal with storing or retrieving pictures and miscellaneous functions. Unless a source file is named, Read and Write access the file specified in the current pathname.

- Print — Prints a text record of some part, or all of the picture currently on the screen.
- Read — Reads in a previously built picture from a source file.
- Write — Stores the picture currently on the screen in a source file.
- Compile — Stores the current picture in a source file; then creates an object file; flags errors.
- Multiple Compile — Compiles all of the source files on a list. Provides a results file.
- Multiple Print — Prints all of the files on a list to a specified file. Provides a results file.
- New — Clears the screen.
- End — Used to end the Picture Editor session and return to the Engineering Main Menu.
- Verify — Cleans up problems in a picture that may not allow it to compile.

A.1.5 Color Palettes

The engineering keyboard color keys select the following colors depending on the palette number that is enabled—

Full Intensity

				- Key -				
Palette	WHT	BLK	CYAN	BLUE	MAGN	RED	YEL	GRN
1	White	Black	Cyan	Blue	Magenta	Red	Yellow	Green
2	White	Lt Gry	Cyan	Blue	Magenta	Red	Yellow	Green
3	White	Med Gry	Cyan	Blue	Magenta	Red	Yellow	Green
4	White	Wrm Gry	Cyan	Blue	Magenta	Red	Yellow	Green
5	White	Black	Cyan	Blue	Magenta	Red	Yellow	Green
6	White	Lt Gry	Cyan	Blue	Magenta	Red	Yellow	Green
7	White	Med Gry	Cyan	Blue	Magenta	Red	Yellow	Green
8	White	Wrm Gry	Cyan	Blue	Magenta	Red	Yellow	Green
9	White	Lt Gry	Cyan	Blue	Magenta	Red	Yellow	Green
10	White	L/I Blue	Cyan	Blue	Magenta	Red	Yellow	Green
11	White	Med Gry	Cyan	Blue	Magenta	Red	Yellow	Green
12	White	Wrm Gry	Cyan	Blue	Magenta	Red	Yellow	Green
13	White	Lt Gry	Cyan	Blue	Magenta	Red	Yellow	Green
14	White	Lt Gry	Cyan	Blue	Magenta	Red	Yellow	Green
15	White	Med Gry	Cyan	Blue	Magenta	Red	Yellow	Green
16	White	Lt Gry	Cyan	Blue	Magenta	Red	Yellow	Green

Half Intensity

				- Key -				
Palette	WHT	BLK	CYAN	BLUE	MAGN	RED	YEL	GRN
1	L/I White	Black	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
2	L/I White	Lt Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
3	L/I White	Med Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
4	L/I White	Wrm Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
5	L/I White	Black	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
6	L/I White	Lt Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
7	L/I White	Med Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
8	L/I White	Wrm Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
9	L/I White	Lt Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
10	L/I White	L/I Blue	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
11	L/I White	Med Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
12	L/I White	Wrm Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
13	L/I White	Lt Gry	L/I Cyan	L/I Blue	L/I Magn	L/I Red	L/I Yel	L/I Green
14	Brown	Lt Gry	Blue-Gray	Sky Blue	Purple	Orange	Lt Yel	Mauve
15	Brown	Med Gry	Blue-Gray	Sky Blue	Purple	Orange	Lt Yel	Mauve
16	Brown	Lt Gry	Blue-Gray	Sky Blue	Purple	Orange	Lt Yel	Mauve

L/I = low intensity, Lt = light, Med = medium, Wrm = Warm
(Only the color abbreviations in part A.1.2 are useable in the Picture Editor.)
Note that the background color is the same as that specified for the Black key.

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