SECTION 2
OPERATION

2.1 THE CONTROL PANEL

The control panel consists of 12 membrane switch keys and four LED indicators (see Figure 2-1).

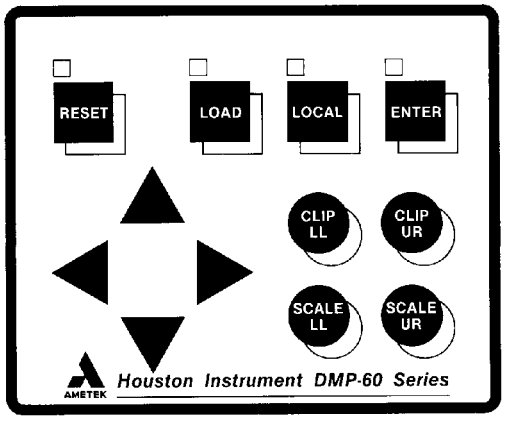


Figure 2-1.
THE CONTROL PANEL

In general, the RESET key causes the plotter to cold reset, and the LOAD key causes the plotter to warm reset. The LOCAL and ENTER keys are used to place the plotter in either remote, local, menu, or window mode. The present operating mode of the plotter determines the functions of the remaining control keys. Control panel-selected operating parameters, such as windows and velocities, override menu and DM/PL-selected parameters. The control keys and the four operating modes are explained in the following sections.

The RESET, LOAD, LOCAL, and ENTER keys have LED indicators that illuminate when their function is activated. The LED indicators also display certain operating modes and flashing error conditions and error codes. A summary of these codes and their reference sections are listed in Table 2-1.

Table 2-1.
LED INDICATOR CODE SUMMARY

LED INDICATOR				CONDITION AND REFERENCE SECTION
RESET	LOAD	LOCAL	ENTER	
Normal Operation				
□	■	□	□	Remote mode, 2.2
✸	✸	□	□	Out of media, 1.7
□	■	■	□	Local mode, 2.3

Table 2-1 (Continued).
LED INDICATOR CODE SUMMARY

LED INDICATOR				CONDITION AND REFERENCE SECTION
RESET	LOAD	LOCAL	ENTER	
Error Conditions				
□	✱	□	✱	Window error, A.3.2
✱	□	□	✱	Pen changer status change, A.3.3
✱	□	✱	✱	Pen changer error, A.3.3.1
□	□	□	✱	NVRAM error, A.4.1
□	□	✱	□	ROM error, A.4.2
□	□	✱	✱	RAM error, A.4.3
□	✱	□	□	Communication error, A.5
✱	✱	✱	□	Voltage error, A.6.1
✱	✱	✱	✱	Current error, A.6.2
□	✱	✱	□	Extended buffer error, A.7
□	✱	✱	✱	RS-232-C loopback test error, A.8
✱	✱	□	✱	Program error, A.9
✱	□	□	□	Plot Command Condition, A.10

□=LED off ■=LED on ✱=LED flashing

2.1.1 The Reset Key

The RESET key enables you to manually cold reset the plotter at the control panel.

Pressing this key causes all software-defined parameters and control panel entry parameters to reset to the plotter's power up default values (see Tables 1-2a and 1-2b). The RESET key also clears the plotter's DM/PL buffer and the extended buffer, if installed.

After RESET is pressed, the plotter first determines the size of the presently loaded chart and positions it for use, and then parks the pen holder at the plot origin and enters remote mode.

NOTE

When installing or replacing media of any size, the chart *must* be aligned with the front loading groove before pressing the RESET key. The plotter uses the position of the front loading groove as a reference to the front plot margin.

2.1.2 The Load Key

The LOAD key enables you to manually warm reset the plotter at the control panel.

If LOAD is pressed, all software-defined parameters are defaulted to the present menu selections, but control panel entries such as window or temporary velocity settings are retained. The extended buffer data is also retained after LOAD is pressed.

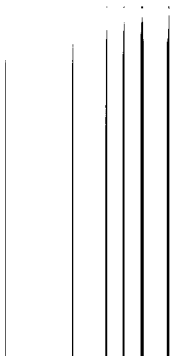


Table 2-2 lists the effects of the LOAD key.

Table 2-2.
LOAD KEY EFFECTS

ACTION	DEFAULT
Plotter is deselected	
Remote mode is active	
Horizontal text path active	
Character size 8 active	
Text italics are off	
Pen up velocity	Menu value
Pen up acceleration	Menu value
Pen up delay	Menu value
Pen down velocity	Menu value or control panel entry
Pen down acceleration	Menu value
Pen down delay	Menu value
Pen change	Menu value
Plot origin	Menu value
Constant velocity option	Menu value or last control panel entry
Addressing resolution	Menu value
Menu units	Menu value

Table 2-2 (Continued).
LOAD KEY EFFECTS

ACTION	DEFAULT
Text font	Menu value
Character set	Menu value
Auto-pen capping	Menu value
Baud rate	Menu value
UART parity	Menu value
Handshake RTS/DTR	Menu value
Pass-through port option	Menu value
Number of pens	Menu value
Zero character	Menu value
Comm errors	Menu value
Window limits	Maximum or last control panel entry
Scale Box limits	Maximum or last control panel entry

2.2 REMOTE MODE

Remote mode enables your computer to communicate with the plotter and allows the software to control all plotting activity. Remote mode is active when only the LOAD key indicator is illuminated.

Remote mode is automatically activated after plotting media is installed and the RESET key or the LOAD key is pressed.

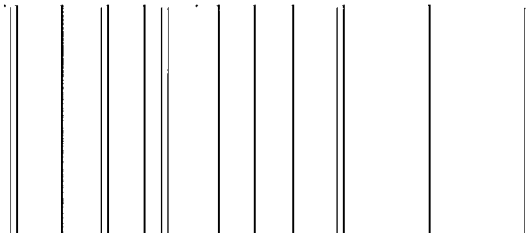
In remote mode, a DM/PL Mode One or Mode Two Plotter Select command establishes the communication link between the two devices. (The select sequence is explained in your DM/PL manual.) After the plotter is selected, it will continue to operate under computer control until you either deselect, reset, exit remote mode, change chart sizes, or power down the plotter.

Remote mode disables the manual use of all control panel functions (except RESET and LOAD) until the LOCAL and/or ENTER keys are used to specify a different operating mode.

2.3 LOCAL MODE

NOTE

When the plotter is placed in local mode, the manual movement keys can be used to move the pen. When the plotter is returned to remote mode, the present position of the pen is defined as the new home position (x-,y-coordinate 0,0). This enables you to move the origin to any point on the media and produce plots over different areas of the same chart. After a plot completes, the pen returns to the present origin. You can then place the plotter in local mode again and use the manual movement keys to move the origin to a different point on the media. To return the pen to the normal left or right plot origin,



Local mode enables you to operate the plotter using the control panel keys. Local mode is initiated by first placing the plotter in remote mode (RESET, LOCAL, and ENTER indicators are off) and then pressing LOCAL. (The LOCAL indicator will illuminate.) To exit the plotter from local mode and return it to remote mode, press LOCAL. (The LOCAL indicator will turn off.)

2.3.1 Local Operation

When the plotter is placed in local mode, plotting activity can be manually controlled from the control panel keys. Manual operation of the plotter is explained below.

When this key is pressed and held, the chart drives toward the rear of the plotter. To stop the chart drive, release the key.

When this key is pressed and held, the chart drives toward the front of the plotter. To stop the chart drive, release the key.

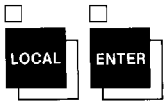
When this key is pressed and held, the pen drives along the pen bar to the right. The pen will stop at the right pinch roller assembly or when the key is released.

The pen holder moves to the present lower left corner of the window if this key is pressed and released (see Section 2.5.1).

The pen holder moves to the present upper right corner of the window if this key is pressed and released.

The pen holder moves to the present lower left corner of the scale box if this key is pressed and released (see Section 2.5.1).

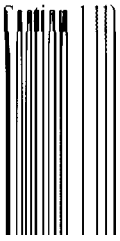
The pen holder moves to the present upper right corner of the scale box if this key is pressed and released.



The pen holder's up/down status changes when the LOCAL key is pressed and held, and then the ENTER key is pressed.

If these two keys are pressed simultaneously, the plotter performs the customer confidence test routine (see Section 2.3.2).

If these two keys are pressed simultaneously, the plotter draws the Europlot design (see Section 2.3.2) or replots the data in the extended buffer accessory if it is installed and if it contains a plot file (see



2.3.2 Customer Confidence Test

The customer confidence test plot (see Figure 2-2a) displays several features and specifications of the DMP-60 series plotters.

To initiate the customer confidence test at the control panel, place the plotter in local mode, and then press the ▲ and the ▼ keys simultaneously. The procedure for initiating the routine from your computer is explained in your DM/PL manual.

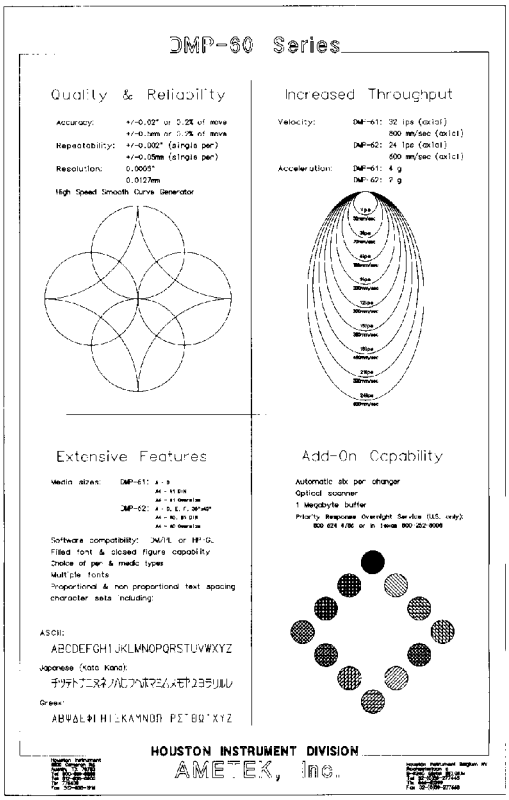

DMP-60 Series
Quality & Reliability
Accuracy:
Repeatability:
Resolution:
High Speed Smooth Curve Generator
Increased Throughput
Velocity:
Acceleration:
Extensive Features
Media sizes:
Software compatibility:
Filled font & closed figure capability
Choice of pen & media types
Multiple fonts
Proportional & non proportional text spacing
character sets including:
ASCII:
ABCDEFGHIJKLMNOPQRSTUVWXYZ
Japanese (Kata Kana):
Greek:
Add-On Capability
Automatic stx per changer
Optical scanner
1 Megabyte buffer
HOUSTON INSTRUMENT DIVISION
AMETEK, Inc.

Figure 2-2a.

A Europlot design is also available (see Figure 2-2b). Europlot can be initiated by first pressing LOCAL, and then pressing the ◄ and ► keys simultaneously. If the plotter has the extended buffer board accessory installed and it contains a plot file, the plotter must first be reset before initiating the Europlot design. Otherwise, the plotter will process the extended buffer contents.

The Europlot design enables you to verify the quality and performance of your plotter. Draw the Europlot on the different recommended pen type and media combinations and at different menu velocities and accelerations. This allows you to experiment with the different pen types and media and helps you determine which are best suited for your particular plotting applications. The recommended pen type and media combinations are listed in Section 1.2 and 1.2.1, and in *The Perfect Plot!* (part number MI-1098), which is supplied with your plotter.

Europlot should be plotted on chart size A4 or larger. Otherwise, its border will be clipped.

NOTE

The velocity and acceleration values shown in Figure 2-2b reflect the present menu selections. If a temporary control panel velocity is entered and in effect during the Europlot, then that value will be plotted instead of the present menu selection (see Section 2.4.7). These values and the plot time vary if the menu selections are changed or if different temporary control panel velocities are entered.

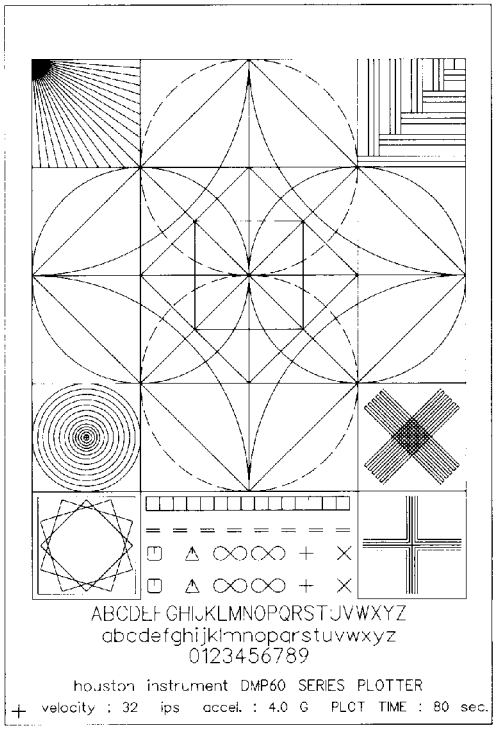


Figure 2-2b.
THE EUROPLOT DESIGN

2.4 MENU MODE

The menu mode enables you to personalize the power-up operating configuration of your plotter. For example, you can have your plotter ready to operate at 2400 baud, even parity, 0.001 inch resolution, 24 inches per second pen velocities, plot origin left, and ASCII character set active every time you set the power switch to on.

An example of a DMP-61 menu in English units is shown below.

```
MENU OPTIONS:      1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 list help

 1) UP-VELOCITY                  1  2  4  6  8 10 12 14 16 18 20 22 24 28 [32] (ips)
 2) UP-ACCELERATION              0.5 1.0 2.0 3.0 [4.0] (g)
 3) UP-DELAY                     25 [30] 35 40 45 50 55 60 65 70 75 80 (msec)
 4) DOWN-VELOCITY                1  2  4  6  8 10 12 14 16 18 20 22 24 28 [32] (ips)
 5) DOWN-ACCELERATION            0.5 1.0 2.0 3.0 [4.0] (g)
 6) DOWN-DELAY                   25 30 35 40 45 [50] 55 60 65 70 75 80 (msec)
 7) PEN-CHANGE                   [IGNORE] PAUSE
 8) PLOT-ORIGIN                  RIGHT LEFT [AUTO]
 9) CONSTANT VELOCITY            OFF [ON]
10) ADDRESSING                   [.001in] .005in .025mm .100mm NORM
11) MENU UNITS                   [ENGLISH] METRIC
12) TEXT FONT                    [F0] F1
13) CHARACTER SET                [G0] G1 G2 G3 G4 G5 G6 G7 G8 G9 G10
14) AUTO-PEN CAPPING               15   30   60  120  240  480 [DISABLE] (sec)
15) BAUD RATE                     300  600 1200 2400 4800 [9600] (baud)
16) UART PARITY                  [BIT 8=0] BIT 8=1  EVEN  ODD
17) HANDSHAKE RTS/DTR            [TOGGLE] ALWAYS HIGH
18) PASS-THROUGH PORT            [TOGGLE] ALWAYS ON
19) NUMBER OF PENS                1  2  3  4  5 [6]
20) ZERO CHARACTER               [PLAIN] SLASH DOTTED
21) COMM ERRORS                  [IGNORED] REPORTED

PROCEDURE:
- move pen to desired menu option using the <-- or --> arrow keys
- press ENTER key to display choices within selected option
- move pen to desired choice using the <-- or --> arrow keys
- press ENTER key to record choice pointed to by pen
- press SCALE UR key to save parameters and exit menu
- hold SCALE LL key to abort plotting of list or help

MENU EXIT:      parameters saved
```

The following paragraphs first provide an overview of the menu and then explain how to operate the plotter in menu mode.

In general, menu mode works like this:

- To initiate menu mode, first be sure the plotter is in remote mode, and then press the ENTER key and then the SCALE UR key.
- After menu mode is initiated, the menu parameters and options must be selected by first using the ◄ and ► keys to move the pen over the desired parameter or option, and then registered by pressing the ENTER key.
- If the plotter is instructed to plot the help list or the parameter list, the *plotting of the lists* can be aborted without exiting the plotter from menu mode by pressing and holding the SCALE LL key.
- To exit menu mode, press the SCALE UR key. (The plotter resets and installs all of the menu values when the mode is exited.) Exit the plotter from menu mode *before* changing charts for plotting activities.

2.4.1 Entering Menu Mode

To enter menu mode for the first time, install a pen into the pen holder, load a B-size (or DIN A3) chart or larger, and then press the LOAD key.

Press the ENTER key and then press the SCALE UR key to activate menu mode. The plotter will then list the menu option select line and park the pen over the *help* option.

2.4.2 The Menu Option Select Line

After menu mode is initiated, the menu option select line is plotted.

```
MENU OPTIONS:    1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 list help
```

The menu option select line allows you to select either an individual menu parameter

2.4.3 The Menu Help Option

The pen automatically parks over the *help* option after menu mode is initiated. If *help* is selected by pressing the ENTER key, the plotter will list the following information.

```
MENU OPTIONS:     1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 list help

 1) UP-VELOCITY
 2) UP-ACCELERATION
 3) UP-DELAY
 4) DOWN-VELOCITY
 5) DOWN-ACCELERATION
 6) DOWN-DELAY
 7) PEN-CHANGE
 8) PLOT-ORIGIN
 9) CONSTANT VELOCITY
10) ADDRESSING
11) MENU UNITS
12) TEXT FONT
13) CHARACTER SET
14) AUTO-PEN CAPPING
15) BAUD RATE
16) UART PARITY
17) HANDSHAKE RTS/DTR
18) PASS-THROUGH PORT
19) NUMBER OF PENS
20) ZERO CHARACTER
21) COMM ERRORS

PROCEDURE:
- move pen to desired menu option using the <— or —> arrow keys
- press ENTER key to display choices within selected option
- move pen to desired choice using the <— or —> arrow keys
- press ENTER key to record choice pointed to by pen
- press SCALE UR key to save parameters and exit menu
- hold SCALE LL key to abort plotting of list or help
```

The *help* option lists the names of the parameters and menu instructions, and then returns the pen to the menu option select line. If the ◄ and ► keys are now used to select a numeric parameter designator, the pen will move to the list of menu parameter names and plot the options of the selected parameter. After the parameter options are plotted, the pen will park over the present setting.

To change a present setting, use the ◄ and ► keys to move the pen to a new setting, and then press the ENTER key. The pen will then underline the new selection and return to the menu option select line where this process can be repeated for other parameters. After the desired parameters have been changed, press the SCALE UR key, and the plotter will then draw a box around the new settings, save the options, and then exit menu mode.

To abort the plotting of the menu help list and return the pen to the menu option select line, press and hold the SCALE LL key. Release the SCALE LL key after the pen finishes plotting the present string and returns to the menu option select line.

2.4.4 The Parameter List Option

If the ◄ and ► keys are used to move the pen over the *list* option and then ENTER is pressed, the plotter will list the following information.

MENU OPTIONS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 list help

1) UP-VELOCITY	1 2 4 6 8 10 12 14 16 18 20 22 24 28 32 (ips)
2) UP-ACCELERATION	0.5 1.0 2.0 3.0 4.0 (g)
3) UP-DELAY	25 30 35 40 45 50 55 60 65 70 75 80 (msec)
4) DOWN-VELOCITY	1 2 4 6 8 10 12 14 16 18 20 22 24 28 32 (ips)
5) DOWN-ACCELERATION	0.5 1.0 2.0 3.0 4.0 (g)
6) DOWN-DELAY	25 30 35 40 45 50 55 60 65 70 75 80 (msec)
7) PEN-CHANGE	IGNORE PAUSE
8) PLOT-ORIGIN	RIGHT LEFT AUTO
9) CONSTANT VELOCITY	OFF ON
10) ADDRESSING	.001in .005in .025mm .100mm NORM
11) MENU UNITS	ENGLISH METRIC
12) TEXT FONT	F0 F1
13) CHARACTER SET	G0 G1 G2 G3 G4 G5 G6 G7 G8 G9 G10
14) AUTO-PEN CAPPING	15 30 60 120 240 480 DISABLE (sec)
15) BAUD RATE	300 600 1200 2400 4800 9600 (baud)
16) UART PARITY	BIT 8=0 BIT 8=1 EVEN ODD
17) HANDSHAKE RTS/DTR	TOGGLE ALWAYS HIGH
18) PASS-THROUGH PORT	TOGGLE ALWAYS ON
19) NUMBER OF PENS	1 2 3 4 5 6
20) ZERO CHARACTER	PLAIN SLASH DOTTED
21) COMM ERRORS	IGNORED REPORTED

The *list* option causes the plotter to list the parameter names and options, underline their present settings, and return the pen to the menu option select line. The ◄ and ► keys can then be used to move the pen over a numeric parameter designator if you desire a new parameter setting. If a parameter designator is specified, the pen will move to and park over the present setting on the list. After using the ◄ and ► keys to move the pen over a new setting, press the ENTER key and the pen will underline the new selection and return to the menu option select line.

To abort the plotting of the parameter list and return the pen to the menu option select line, press and hold the SCALE LL key. Release the SCALE LL after the pen finishes plotting its present string and returns to the menu option select line.

To exit menu mode, press the SCALE UR key.

2.4.5 The Numeric Menu Parameter Designators

After menu mode is initiated and the menu option select line is plotted, the ◄ and ► keys can be used to move the pen over a numeric parameter designator. After the pen is positioned, press ENTER and the plotter will list the name of the parameter and its options and park the pen over the present option setting.

To change an option setting, use the ◄ and ► keys to move the pen over a new setting, and then press ENTER. After ENTER is pressed, the pen will underline the selected option and return to the menu option select line.

The menu parameters and options are explained below. The DMP-61 and the DMP-62 have different operating capabilities which will be explained in each situation where they differ.

NOTE

For best quality plots on the DMP-61, set the pen up delay menu parameter to 30 ms and the pen down delay parameter to 50 ms. For best quality plots on the DMP-62, set the pen up delay menu parameter to 30 ms and the pen down delay parameter to 70 ms. (Shorter

1) UP-VELOCITY 1 2 4 6 8 10 12 14 16 18 20 22 24 28 32 (ips)

or

1) UP-VELOCITY 30 50 100 150 200 250 300 350 400 450 500 550 600 700 800 (mm/s)

The *up-velocity* menu parameter selects a velocity for a pen in the up-position. If the English option is selected for menu units (parameter 11), the velocity options are listed in inches per second. If the metric option is selected, the velocity options are listed in millimeters per second. 28 ips, 32 ips, 700 mm/s, and 800 mm/s are available only on DMP-61 models.

2) UP-ACCELERATION 0.5 1.0 2.0 3.0 4.0 (g)

The *up-acceleration* menu parameter is the rate of acceleration (in g) for a pen in the pen up position. 3.0 g and 4.0 g are available only in DMP-61 models.

3) UP-DELAY 25 30 35 40 45 50 55 60 65 70 75 80 (msec)

The *up-delay* is the time in milliseconds that the plotter will wait before executing the next pen up vector move. The delay is necessary to eliminate "tails" on vectors which could result from the pen moving before it is fully raised.

4) DOWN-VELOCITY 1 2 4 6 8 10 12 14 16 18 20 22 24 28 32 (ips)

or

4) DOWN-VELOCITY 30 50 100 150 200 250 300 350 400 450 500 550 600 700 800 (mm/s)

The *down-velocity* menu parameter selects a velocity for a pen in the down-position. If the English option is selected for menu units (parameter 11), the velocity options are listed in inches per second. If the metric option is selected, the velocity options are listed in millimeters per second. 28 ips, 32 ips, 700 mm/s, and 800 mm/s are available only on DMP-61 models.

5) DOWN-ACCELERATION 0.5 1.0 2.0 3.0 4.0 (g)

The *down-acceleration* menu parameter is the rate of acceleration (in g) for a pen in the pen down position. 3.0 g and 4.0 g are available only on DMP-61 models.

6) DOWN-DELAY 25 30 35 40 45 50 55 60 65 70 75 80 (msec)

The *down-delay* is the time in milliseconds which the plotter will wait before executing the next pen down vector move. The delay is necessary to guarantee that the pen is fully down before a vector is drawn.

7) PEN-CHANGE IGNORE PAUSE

The *pen-change* menu parameter activates the plotter's pen pause feature. The pen pause feature enables you to create multi-colored plots and graphs with your DM/PL software programs if the optional multi-pen changer accessory is not installed on your plotter. If this function is activated by selecting *pause* and the plotter receives a DM/PL New Pen command, the plotter will pause and a flashing code will appear on the LEDs (see Appendix A) indicating that the plotter is ready for a manual pen change. After changing the pen to the color you want, press LOCAL and the plotter will resume processing the program without loss of data. If *ignore* is specified, the plotter ignores New Pen commands. This parameter has no effect if the multi-pen changer accessory is installed on the plotter.

8) PLOT-ORIGIN RIGHT LEFT AUTO

The *plot origin* menu parameter moves the x-, y-origin point to either the front right (large chart) or the front left (small chart) corner of the chart. The x-, y-axis orientation is also rotated as shown in Figures 1-7 and 1-8. The *plot origin* parameter enables you to use one chart position for two different chart sizes. If the *auto* option is selected, the plotter automatically selects the plot origin for the standard x-, y-axis orientation for a chart.

9) CONSTANT VELOCITY OFF ON

If the *constant velocity* menu parameter is deactivated by selecting *off,* the plotter operates at its menu-selected velocity only on x-axis or y-axis movements. For diagonal moves there are both x-axis and y-axis velocities, giving a resultant velocity greater than either axis alone. For example, if 12 ips is selected on the menu for pen down velocity with this option deactivated and commands are given to draw a 45° diagonal line, the pen moves at a velocity of 17 ips ($\approx\sqrt{(12)^2 + (12)^2}$) relative to a point on the chart.

If this parameter is activated by selecting *on,* the pen will move at the selected velocity for any line angle. If this parameter is activated in the example above, the line will be drawn at a velocity of 12 ips relative to a point on the chart; the x-axis and y-axis velocities at that time would be 8.5 ips ($\approx 12 \div \sqrt{2}$).

The plotter will generally yield more uniform line widths when this parameter is activated, but at a sacrifice in speed.

10) ADDRESSING .001in .005in .025mm .100mm NORM

The *addressing* menu parameter options select the plotter's resolution (in inches or millimeters). The present English or metric menu unit selection (parameter 11) does not affect the resolution selection.

If the *NORM* option is selected, the plotter will automatically scale a plot to fit on the presently installed chart if the plot code was written using EC0 units (see Section 4).

11) MENU UNITS ENGLISH METRIC

The *menu units* parameter enables you to configure the menu in either English or

12) TEXT FONT F0 F1

The *text font* parameter selects a font style for the plotter to use when it receives DM/PL Text commands. The two font styles are (F0) stick and (F1) sans serif. The font styles are illustrated in Section 4.4.2.

13) CHARACTER SET G0 G1 G2 G3 G4 G5 G6 G7 G8 G9 G10

The *character set* parameter selects a character set for the plotter to use when it receives DM/PL Text commands. The ten character sets are (G0) ASCII, (G1) mathematics, (G2) German, (G3) French, (G4) Swedish, (G5) Norwegian/Danish, (G6) Spanish, (G7) Italian, (G8) Japanese (Kata Kana), and (G9) Greek. (Character set G10 defaults to G0.) The character sets are illustrated in Appendix C.

14) AUTO-PEN CAPPING 15 30 60 120 240 480 DISABLE (sec)

The *auto-pen capping* feature is designed to prolong the lives of pens used on a plotter with the optional multi-pen changer accessory. This parameter specifies six different time limits (in seconds) for inactivity before the plotter beeps and automatically returns a pen in use to its stall. For example, if *120* is selected and the plotter is processing a program, it will beep and then automatically return a pen to its stall any time a 120 second break occurs in the processing. After a pen is returned, the pen holder parks in front of that stall and waits for additional plot codes. The plotter will not beep and automatically return a pen to its stall during periods of inactivity if *DISABLE* is specified. This parameter has no effect if the multi-pen changer is not installed on the plotter. (The time limit countdown is suspended during flashing LED error conditions.)

15) BAUD RATE 300 600 1200 2400 4800 9600 (baud)

The *baud rate* parameter enables you to select different operating baud rates for your plotter. Be sure this selection matches your computer and software selection.

16) UART PARITY BIT 8=0 BIT 8=1 EVEN ODD

The *uart parity* parameter selects the byte format and parity type. *BIT 8=1* specifies no parity, eight data bits, with bit number eight equal to a one. *BIT 8=0* specifies no parity, eight data bits, with bit eight equal to a zero. *EVEN* specifies seven data bits with even parity as the eighth bit, and *ODD* specifies seven data bits with odd parity as the eighth bit. Be sure this selection matches your computer and software selection.

17) HANDSHAKE RTS/DTR TOGGLE ALWAYS HIGH

The *handshake RTS/DTR* parameter controls the plotter's RS-232-C connector pins 4 (RTS) and 20 (DTR). (The plotter's RS-232-C interface requirements are explained in Section 1.9.) If your computer requires a constant high signal level at these two pins, select the *ALWAYS HIGH* option. If your computer uses these two pins for handshaking, select the *TOGGLE* option.

18) PASS-THROUGH PORT TOGGLE ALWAYS ON

The *pass-through port* parameter enables you to control the plotter's pass-through port option with your software. (The pass-through port feature is discussed in Section 1.9.1). If *TOGGLE* is specified, the pass-through port is disabled when the plotter is selected, but can be turned on by sending a DM/PL Pass-Through Port Enable (X) command (see your DM/PL manual). The plotter can then be deselected and reselected to disable the port.

19) NUMBER OF PENS 1 2 3 4 5 6

The *number of pens* parameter specifies how many pens are installed in the plotter. If your plotter is a single-pen unit, this parameter has no effect. If your plotter is equipped with the multi-pen changer accessory, use the parameter options to specify how many pens you are using in the pen changer. This parameter has no effect if the multi-pen changer is not installed on the plotter.

20) ZERO CHARACTER PLAIN SLASH DOTTED

The *zero character* parameter enables you to select three different types of zero text characters. If *PLAIN* is specified, zero characters are plotted without a center slash or dot. If the *SLASH* option is specified, zero characters are plotted with a center slash. The *DOTTED* option produces zero characters that have a center dot.

21) COMM ERRORS IGNORED REPORTED

The *comm errors* parameter enables the plotter to use its control panel LEDs to report communication errors. The LED codes are explained in Apppendix A. This parameter is usually activated by selecting *reported* only when attempting to debug a communication link between the plotter and a host computer. After a link is established, this parameter can be disabled by selecting *ignored.* If the communication error routine is used, be sure the computer program does not use automatic baud rate selection (auto-baud). Otherwise, auto-baud will trigger baud rate error codes as it attempts to match baud rates.

2.4.6 Exiting Menu Mode

To exit menu mode, press the SCALE UR key. As the plotter leaves menu mode, it will draw a box around the selected options and then plot the message listed below.

MENU EXIT: parameters saved

If a system error prevents the parameters from being saved, the message listed below will appear and service is required (see Section 3.3).

MENU EXIT: parameters not saved

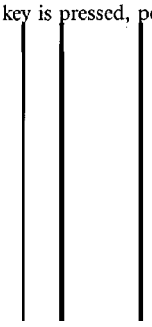
NOTE

It is recommended that you keep a copy of the selected menu parameters with your plotter documentation. The menu parameters help our service personnel isolate suspected problems if you request technical assistance over the service toll-free phone numbers (see Section 3.3).

2.4.7 Temporary Velocity Settings

The temporary velocity function enables you to change the pen down velocity and toggle the constant velocity option during plotting activities without having to access the menu.

If the plotter is operating in remote mode with the menu English units selected and the ENTER key is pressed, pen down velocities of 4, 8, and 16 inches per second can



The ▼ key specifies maximum velocity for either English or metric units. To return to the menu-selected velocity, press the ENTER key, and then the CLIP LL key.

The constant velocity option can be toggled on and off by pressing the ENTER key, and then the SCALE LL key.

The temporary control entries are shown in Figure 2-3.

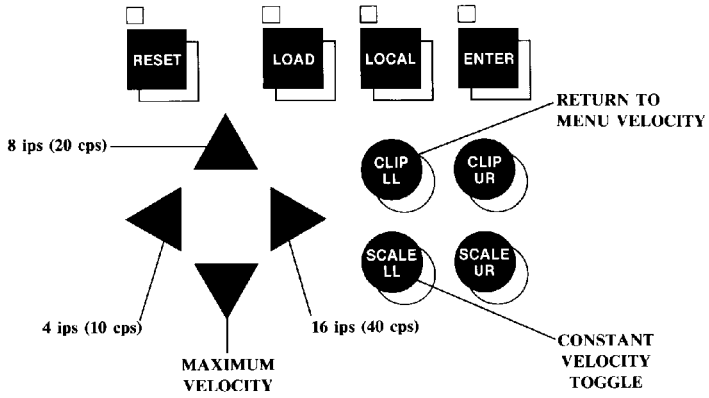


Figure 2-3.
TEMPORARY CONTROL PANEL ENTRIES

The following procedure explains how to specify a temporary velocity setting on a plotter operating at a menu velocity or DM/PL V command velocity of, for example, 12 ips.

1. During a plot program, you decide to try a complex plot design at a slower rate of velocity of 2 ips.

2. Just before the plotter processes the portion of the program which contains the design, press the ENTER key. (The ENTER indicator will illuminate and the plotter will stop processing data.)

3. Press the ◄ key for 2 ips (see Figure 2-3). After the key is pressed, the plotter automatically returns to remote mode and continues processing. (The plotter may have internally pre-processed one or two vector moves at the original velocity before the ENTER was pressed in step 2. If so, the plotter will plot those vectors at the original velocity before the 2 ips selection goes into effect.)

4. After the plotter draws the design at 2 ips, press the ENTER key again. Plotting can be resumed at menu velocity (12 ips) by pressing the CLIP LL key (see Figure 2-3).

2.5 WINDOW MODE

Window mode enables you to specify different window and scale box limits. To place the plotter in this mode, you must first specify local mode (press and release the LOCAL key) and then specify window mode by pressing and releasing the ENTER key. (The LOCAL and ENTER indicators will illuminate.)

The plotter automatically returns to local mode after a new limit is specified. If an

After the limits have been correctly set, return the plotter to remote mode by pressing LOCAL. (The LOCAL and ENTER indicators are both off when the plotter is in remote mode.)

NOTE

Two sets of windows and viewports are maintained in the plotter. One set is the DM/PL Window (W) command and the other set is the control panel settings. They are mathematically combined by the plotter to allow any DM/PL plot code to plot within an area specified at the control panel.

Effectively, the control panel clip and scale settings allow you to define the plotter's plotting surface. At power up, the default control panel settings allow a 1:1 mapping ratio of DM/PL to the chart size presently installed. By altering the control panel settings, you can plot, scale, window, and/or mirror your DM/PL plot anywhere on the chart surface.

2.5.1 Window, Scale Box, and Viewport Functions

As you become more familiar with your plotter, and the complexity of your plots increases, you will discover many useful applications for the plotter's window and scaling capabilities. These functions enable you to select any subpart of a plot design, change its size and/or height-to-length (aspect) ratio if desired, and then plot it separately on the same chart or a different chart. This section first provides a functional overview of the window, scale box, and viewport features, and then explains how to use them. A mirror image of a plot is also possible by using the window functions. This is explained later in this section.

The Window . . .

The subpart of a plot design that is selected to be replotted is called a *window plot.* A window plot is created by specifying an imaginary rectangle around a subpart using two points, called the *lower left (LL) and the upper right (UR) window corner points* (see Figure 2-4). The lines of the imaginary rectangle are called *window limits.* Only the plot codes within the specified window limits are processed by the plotter when the program is rerun; thus, only the subpart (window plot) appears on the chart.

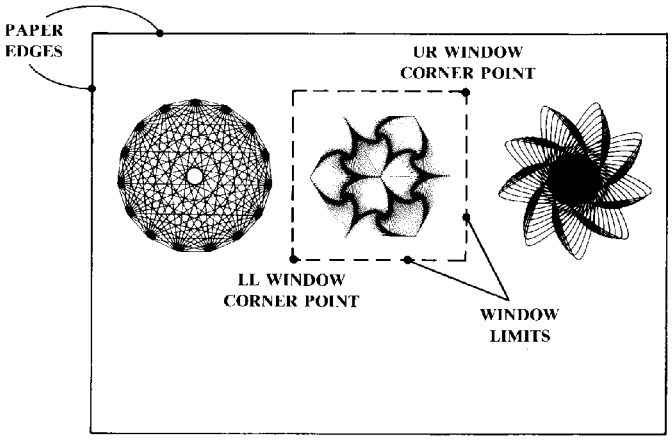


Figure 2-4

The Scale Box . . .

If a subpart of a plot design is selected as a window plot and then the program is rerun, the subpart will be plotted at the same size as it appeared in the full plot design. However, if you want the subpart plotted at a larger or smaller size, or with a different height-to-width ratio (aspect) for a special visual effect, you can specify these changes with the *scale box* function before rerunning the program.

Like the window, the scale box is an imaginary rectangle which must be specified by two points called the *lower left (LL) and the upper right (UR) scale box corner points.* The lines of the imaginary rectangle are called *scale box limits.* If a scale box rectangle is specified after a window rectangle is placed around a subpart, the plotter will process the plot data defined by the window *at the size specified by the scale box rectangle.*

For example, if a scale box rectangle is specified the same length as the Figure 2-4 window, but three times the height, the subpart plot will appear stretched in the vertical direction when the program is rerun (see Figure 2-5a). If the scale box rectangle is specified the same height as the window, but three times the length, the subpart plot will appear stretched in the horizontal direction (see Figure 2-5b). If the scale box rectangle is specified three times the height and the length of the window rectangle, the subpart plot will appear three times as large (see Figure 2-5c).

It is also possible to plot a design upside-down by reversing the lower left and the upper right corner points of the scale box.

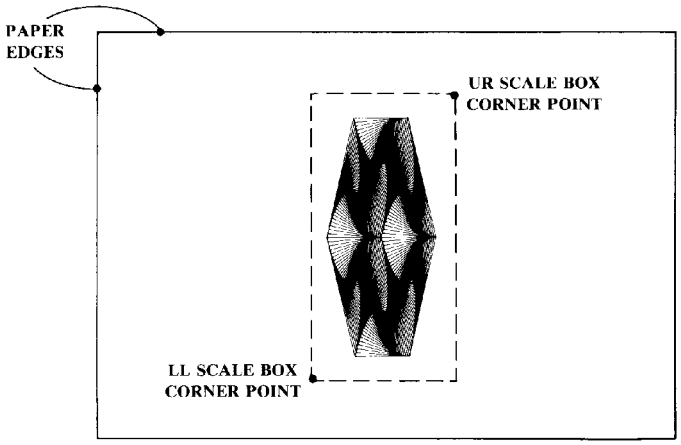


Figure 2-5a.
A SCALE BOX THREE TIMES THE HEIGHT OF THE WINDOW

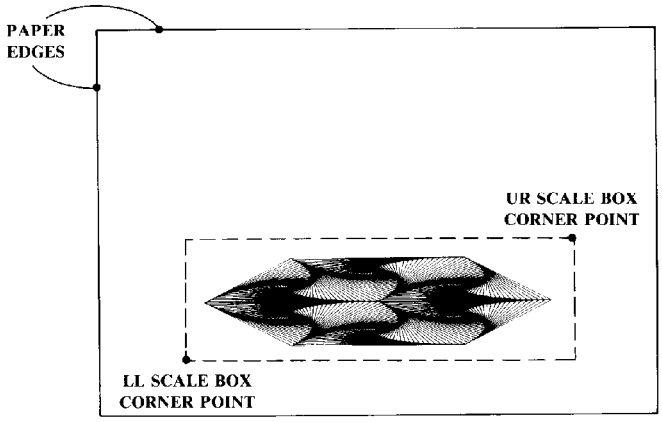


Figure 2-5b.
A SCALE BOX THREE TIMES THE LENGTH OF THE WINDOW

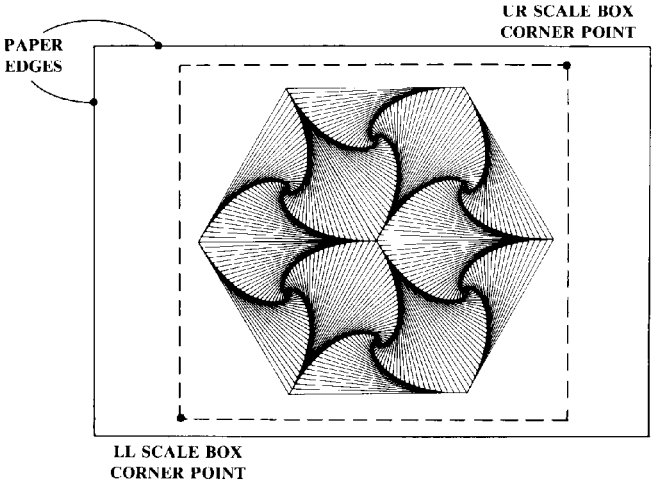


Figure 2-5c.
A SCALE BOX THREE TIMES THE HEIGHT/LENGTH OF THE WINDOW

The Viewport . . .

Finally, you have to decide *where* on the chart to place the new subpart plot, or select a *viewport.* This is done by specifying where the lower left corner of the new plot is to be. Since the size and the shape for the new plot have already been determined by the scale box rectangle, picking a point where you want the lower left corner of the scale box area to appear will tell the plotter just where to draw the new plot.

The point that selects the viewport area is specified by the present position of the pen holder. By moving the pen holder to a point *below and to the left of which* you want the new plot of the subpart to appear, you determine the location for the new plot when the program is rerun.

Clipping . . .

In plotter terminology, the entire sequence of using the window, scale box, and viewport functions on a plot design is called *clipping,* and a plot design that results from clipping is called a *clip.*

When the plotter is commanded to draw a clip from a plot design or during the actual processing of the clip, the pen may pause for various lengths of time. The reason for the pause is that when window limits are specified, the plotter still receives the plot codes for the entire plot design but draws only the data for the plot that was placed inside the limits.

If the data for the window plot is not at the beginning of the software program, the pen must wait until that portion of the program is received by the plotter. If the plotter is processing window data and receives plot codes that require the pen to travel outside the limits, the pen will process up to the limit and then pause. Plotting activity is resumed when the plotter receives additional data within the window.

The window and scale box limits default to the entire plotting area if the plotter is reset or powered down. The limits are not affected by using the LOAD key to install media.

To better explain how to set the limits for each function and then use them in sequence to clip a plot design, this manual provides actual clipping exercises in Sections 2.5.2, 2.5.3, and 2.5.4.

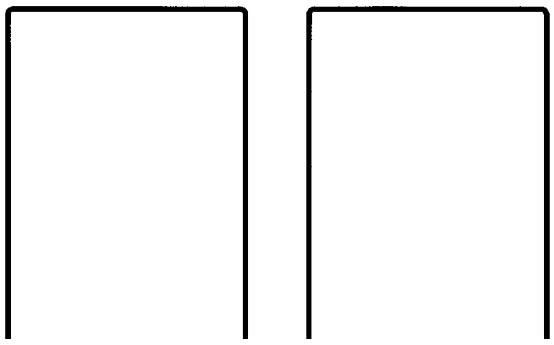
These exercises do not require computer assistance as all activity is initiated from the plotter's control panel. The exercises use the customer confidence test plot design to illustrate the clipping procedures. Before proceeding with these exercises, be sure you have the plotter's power switch set to on, a clean chart and a pen installed, and for convenience, the menu *plot origin* parameter set to the *auto* option.

2.5.2 Auto Clipping

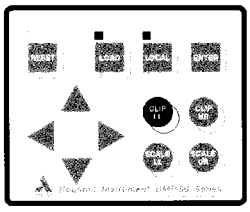
The auto clipping function enables you to clip a subpart from a plot design with the window, and then reproduce it at its original size and aspect without having to scale it. This feature saves time in operations where scaling is not required. The following procedure explains how to specify new lower left (LL) and upper right (UR) corner points for the window for auto clipping.

1. Press LOCAL for manual control of the plotter, and then initiate the customer confidence test routine by pressing the ▲ and ▼ keys simultaneously. After the plotter draws the customer confidence test design, press LOCAL to return the plotter to manual control.

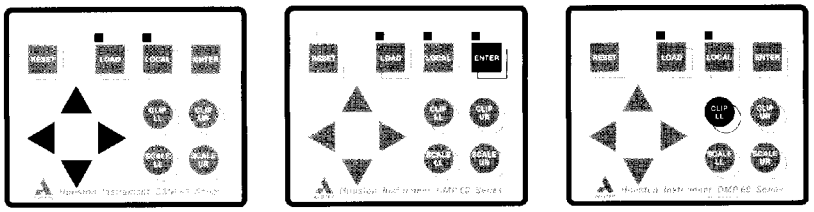
2. This step explains how to see where the present window limits are located. The pen holder moves to the present lower left corner of the window if CLIP LL is pressed. The pen moves to the present upper right corner of the window if CLIP UR is pressed.



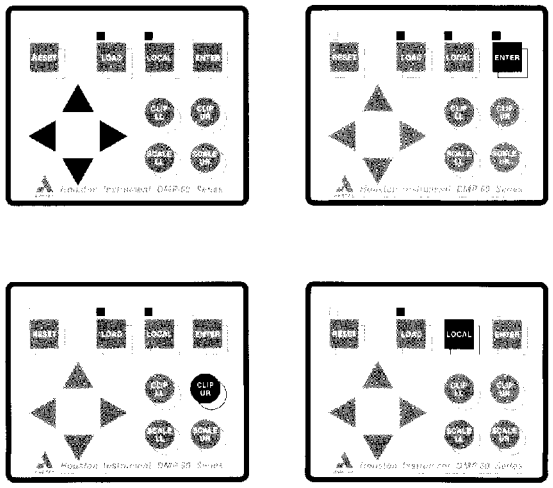
Return the pen holder to the lower left corner by pressing CLIP LL. Notice that the pen holder travels the outline of the window as it moves from corner to corner and that the present window limits enclose the entire plotting area.



3. The objective of this step is to clip the circle/arc design from the test plot with the window. Use the MANUAL MOVEMENT KEYS to move the pen holder to the position of the lower left window marker illustrated in Figure 2-6. After the pen holder is positioned, specify this location as the new lower left corner point of the window by pressing ENTER (the LED indicator will illuminate), and then CLIP LL. (After CLIP LL is pressed, the ENTER indicator will turn off.)



Next, use the MANUAL MOVEMENT KEYS to move the pen holder to the position of the upper right window marker illustrated in Figure 2-6. After the pen holder is positioned, specify this location as the new upper right corner point of the window by pressing ENTER (the LED indicator will illuminate), and then CLIP UR. (After CLIP UR is pressed, the ENTER indicator will turn off.) Register the corner points by pressing the LOCAL key (the LOCAL indicator will turn off).



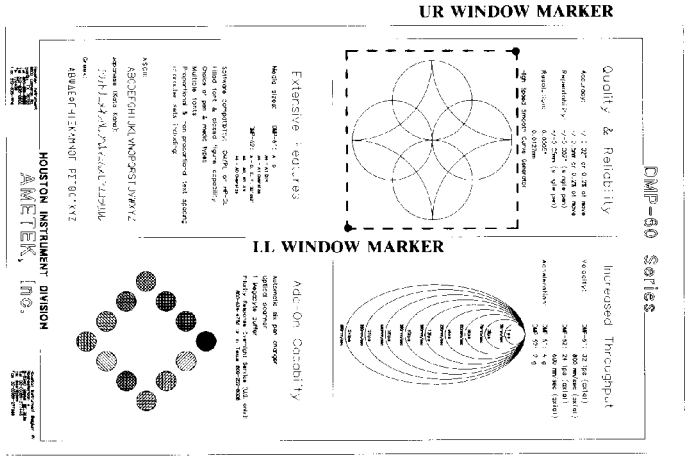


Figure 2-6.
LOWER LEFT/UPPER RIGHT WINDOW MARKERS

4. The new window corner points are now set. Press the LOCAL key for local mode. Jog the pen holder around the new window limits by pressing CLIP LL, then CLIP UR, and then CLIP LL again. The pen holder should travel the outline of the circle/arc design.

5. In this step, you will reproduce the design that was clipped in step 3. *Do not* press RESET until after the plotter has drawn the clip design or the new window limits will default to full page.

Insert a clean chart of the same size at load position. (Load position is where the edge of the media is aligned with the front edge of the platen as shown in Figures 1-7 and 1-8.) Press the LOAD key to properly load the new sheet. After the plotter positions the media, press the LOCAL key for local mode.

Use the MANUAL MOVEMENT KEYS to move the pen holder to the position of the viewport marker illustrated in Figure 2-7. (This is the point below and to the left of which the plotter draws the plot design.) After the pen is positioned, initiate the customer confidence test routine by pressing the ▲ and the ▼ keys simultaneously. (The plotter will pause before and during the customer confidence test plot. As explained in Section 2.6.1, pen pause is normal when clipping plot designs.) The only design the plotter draws during this customer confidence test is the clipped circle/arc design.

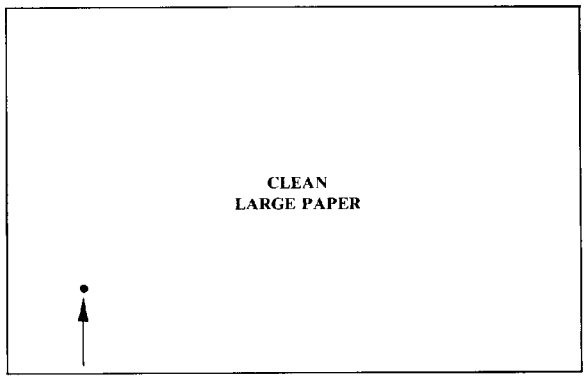


Figure 2-7.
VIEWPORT MARKER

2.5.3 Scaling

This section shows you how to change the size and aspect of a plot design using the scale box. The plot design used in the following procedure is the customer confidence test plot.

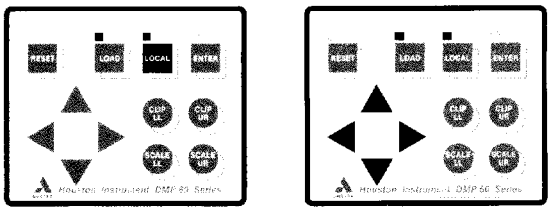
1. Insert a clean sheet of large chart media in the plotter and position it at the load position.

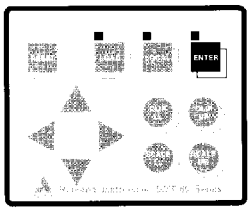
2. Press RESET. This causes the window limits that were set in the previous section to default to maximum range.

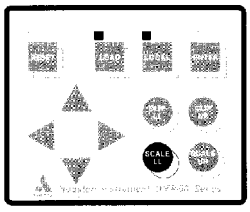
3. Press LOCAL. Initiate the customer confidence test routine by pressing the ▲ and ▼ keys simultaneously.

4. Because the plotter was reset in step 2, the plotter has maximum window limits. This means that the plotter will scale the entire page, which includes the customer confidence test plot design, to the dimensions of the scale box.

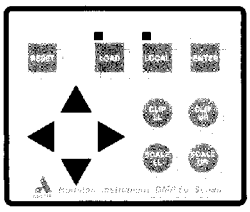
   Just for fun, let's grossly exaggerate the aspect of the design with scale box limits so you'll see the full power and potential of this feature. Press LOCAL, and then use the MANUAL MOVEMENT KEYS to move the pen holder to the location specified by the lower left scale box marker shown in Figure 2-8. After the pen holder is positioned, specify this point as the lower left corner of the scale box by pressing ENTER and then SCALE LL. (The ENTER indicator will illuminate when ENTER is pressed and will turn off when SCALE LL is pressed.)

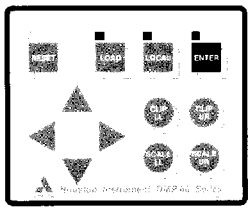


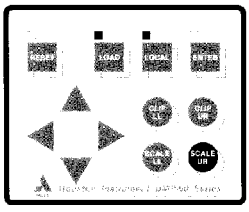


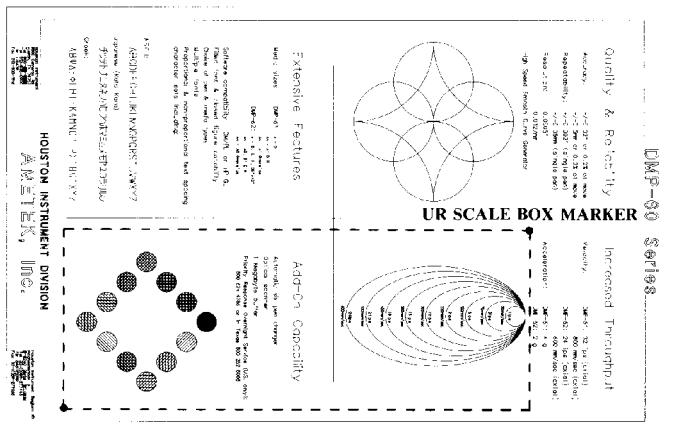


Next, use the MANUAL MOVEMENT KEYS to move the pen holder to the location specified by the upper right scale box marker shown in Figure 2-8. After the pen holder is positioned, specify this point as the upper right scale box corner by pressing ENTER and then SCALE UR. (Again, the ENTER indicator will illuminate when ENTER is pressed and will turn off when SCALE UR is pressed.) Register the corner points by pressing the LOCAL key (the LOCAL indicator will turn off).









UR SCALE BOX MARKER

LL SCALE BOX MARKER

Figure 2-8.
LOWER LEFT/UPPER RIGHT SCALE BOX MARKERS

5. Remove the media and replace it with a clean sheet of the same size or use the backside of the used sheet. Load the media at the load position, and then press the LOAD key to properly install the media.

   Press the LOCAL key for local mode. Use the MANUAL MOVEMENT KEYS to move the pen holder to the location of the viewport marker shown in Figure 2-7. Initiate the customer confidence test routine by pressing the ▲ and the ▼ keys simultaneously. The resulting plot design will look similar to the illustration shown in Figure 2-9.

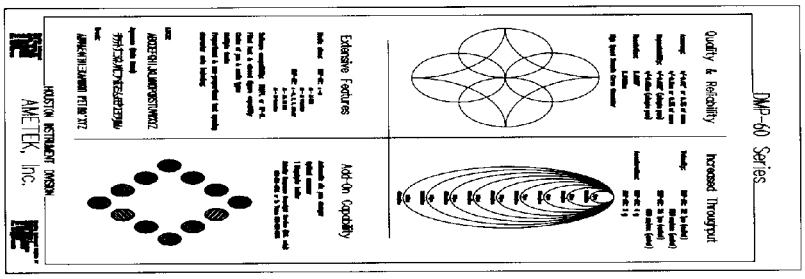


Figure 2-9.
THE SCALED CUSTOMER CONFIDENCE TEST PLOT DESIGN

2.5.4 Auto Aspect

Your plotter has an internally-programmed "auto aspect" feature which ensures a common aspect ratio between an original plot design and its scaled version. This feature is useful during scaling operations that require critical aspect reproductions. The auto aspect feature eliminates possible aspect discrepancies which may occur if locations for new scale box corner points are simply estimated.

For your convenience, there are two ways to scale a plot design using the auto aspect function. But before explaining how to use this feature, the theory of auto aspect must be discussed first. If a lower left and an upper right corner point for a scale box are specified *on the same axis,* the plotter will automatically calculate the axis not specified and draw a perfectly proportioned, scaled reproduction of the original plot design. (The two points can be specified on either the x- or the y-axis.) The length of the line formed by the two points determines the size of the scaled design.

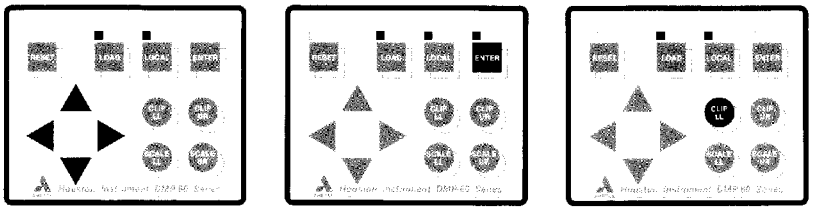
The following procedures explain how to scale plot designs using the auto scale function.

1. Insert a clean sheet of large chart media in the plotter and position it at the load position.

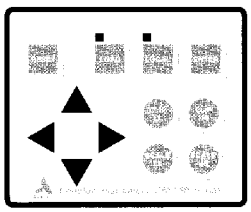
2. Press RESET. This causes the window and scale box limits that were set in the previous section to default to maximum page.

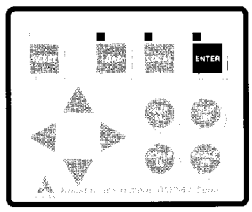
3. Press LOCAL for manual control of the plotter, and then initiate the customer confidence test routine by pressing ▲ and ▼ simultaneously. After the routine completes, press LOCAL again for manual control.

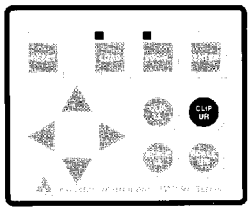
4. In this exercise, you will clip the diamond/circle design from the plot design with the window, and then use the auto aspect function to reproduce it at the original aspect but at a larger size. Use the MANUAL MOVEMENT KEYS to move the pen holder to the location indicated by the lower left window marker shown in the illustration in Figure 2-10. After the pen holder is positioned, specify this point as the new lower left corner of the window by pressing ENTER and then CLIP LL.

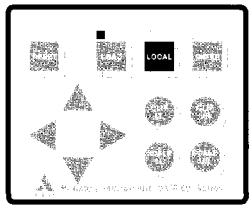


Next, use the MANUAL MOVEMENT KEYS to move the pen holder to the location indicated by the upper right window marker shown in the illustration in Figure 2-10. After the pen holder is positioned, specify this point as the new upper right corner of the window by pressing ENTER and then CLIP UR. Press the LOCAL key and the diamond/circle design is now clipped from the plot by the window.









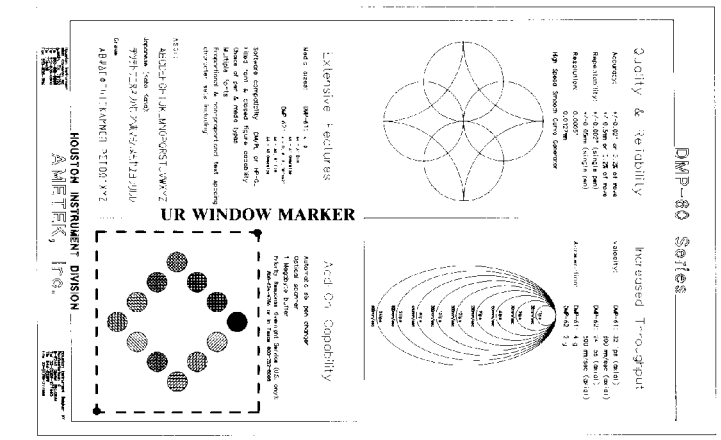
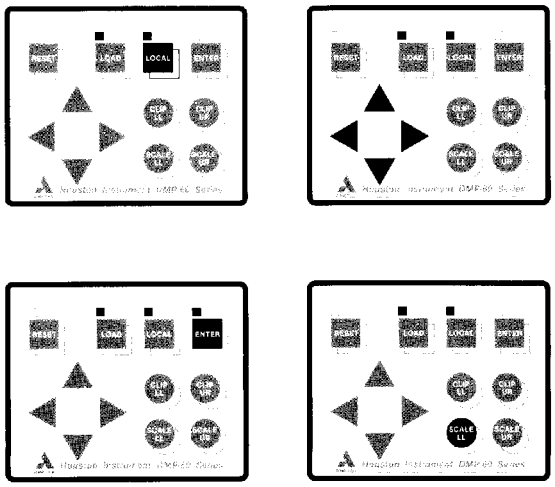


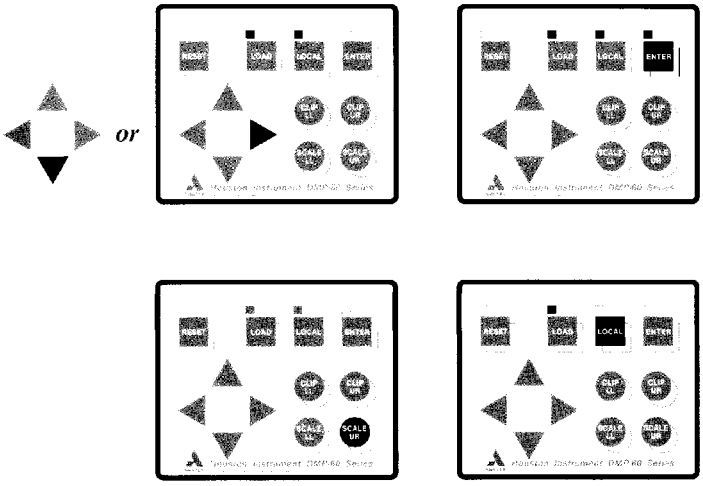
Figure 2-10.
LOWER LEFT/UPPER RIGHT WINDOW MARKERS

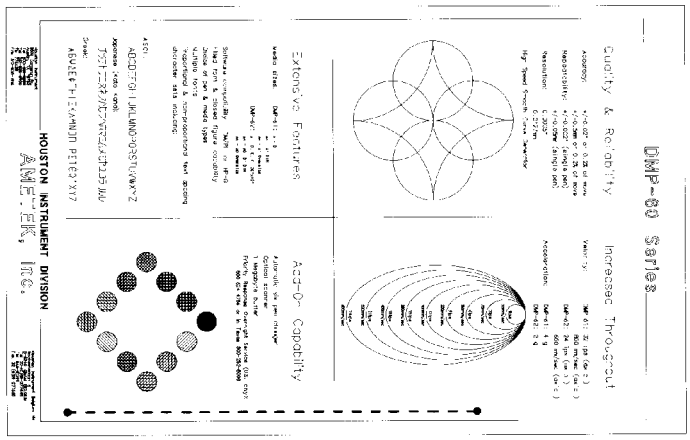
5. Next, you will use the auto aspect feature to "show" the plotter what size you want the reproduction of the clipped diamond/circle design to be.

Press LOCAL for manual control, and use the MANUAL MOVEMENT KEYS to move the pen holder to the location indicated by the lower left scale box marker shown in the illustration in Figure 2-11. After the pen holder is positioned, specify its location as the new lower left scale box corner by pressing ENTER and then SCALE LL.



Next, if you have large chart format media installed, use only the ▼ key to drive the chart forward until the position of the upper right scale box marker shown in Figure 2-11 is underneath the pen. If you have small chart format media installed, use only the ► key to drive the pen holder to the upper right scale box marker. Specify this location as the new upper right scale box corner by pressing ENTER and then SCALE UR. Press the LOCAL key to register the scale box points. The distance between these two points specifies the length of the x-axis for the reproduction of the clipped design. The height of the y-axis, which in this case determines the design's aspect, is automatically calculated by the plotter.





LL SCALE BOX MARKER UR SCALE BOX MARKER

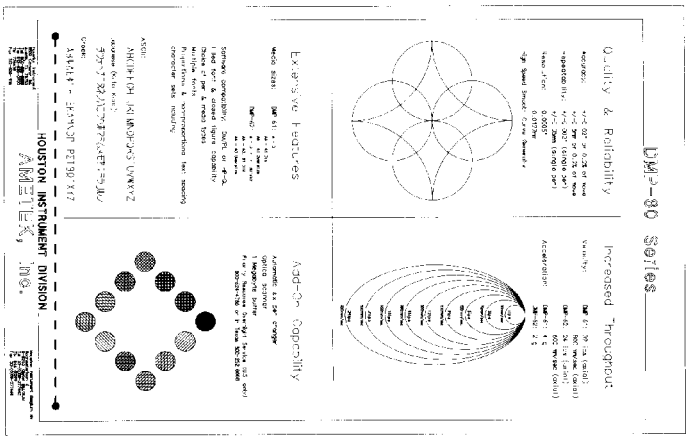
Figure 2-11.
LOWER LEFT/UPPER RIGHT SCALE BOX MARKERS FOR AUTO ASPECT

6. Remove the media and replace it with a clean sheet of the same size or use the backside of the used sheet. Load the chart at the load position, and then press the LOAD key to properly install the media.

7. Press the LOCAL key for manual control and use the MANUAL MOVEMENT KEYS to move the pen holder to the location of the viewport marker shown in Figure 2-7. After the pen holder is positioned, initiate the customer confidence test routine by pressing the ▲ and ▼ keys simultaneously. The plotter will draw a large diamond/circle design which will have identical aspect dimensions as

In the last procedure, you were shown how to use the auto aspect function by specifying points along the x-axis. Repeat the procedure again, but this time, specify y-axis points for auto aspect by using the lower left and upper right scale box markers shown in Figure 2-12 instead of the ones in Figure 2-11 when specifying the scale box corners in step 5. If you have large chart format media installed, use the ◄ key instead of the ▼ key to move from the lower left scale box corner to the upper right scale box corner. If you have small chart format media installed, use the ▲ key instead of the ► key to move from the lower left scale box corner to the upper right scale box corner.

UR SCALE BOX MARKER



LL SCALE BOX MARKER

Figure 2-12.
LOWER LEFT/UPPER RIGHT (Y-AXIS) SCALE BOX MARKERS

2.5.5 Mirror Image Plots

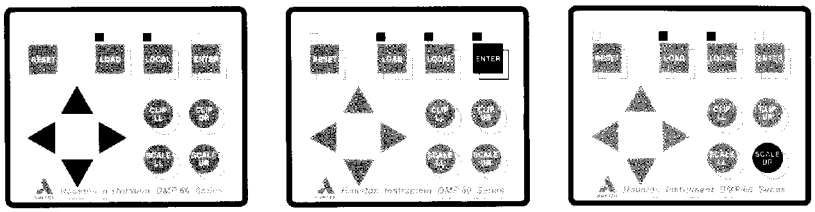
This section explains how to create a mirror image of a plot design.

1. Insert a clean sheet of large chart media in the plotter and position it at the load position.

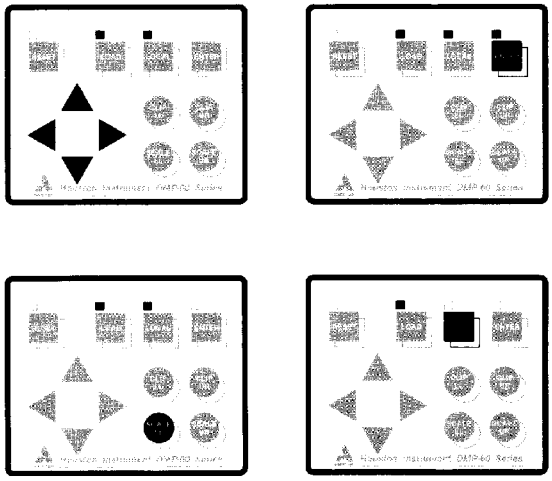
2. Press RESET. This causes the window and scale box limits that were set in the previous section to default to maximum page.

3. Press LOCAL for manual control of the plotter, and then initiate the customer confidence test routine by pressing ▲ and ▼ simultaneously. After the routine completes, press LOCAL again for manual control.

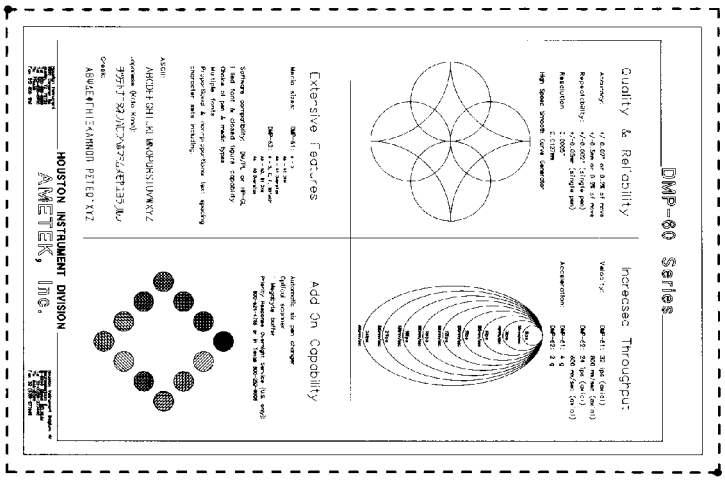
4. Use the MANUAL MOVEMENT KEYS to move the pen holder to the position of the upper right scale box marker illustrated in Figure 2-13. After the pen holder is positioned, specify this location as the upper right scale box point by pressing ENTER, and then SCALE UR.



Next, use the MANUAL MOVEMENT KEYS to move the pen holder to the position of the lower left scale box marker illustrated in Figure 2-13. After the pen holder is positioned, specify this location as the lower left scale box point by pressing ENTER, and then SCALE LL. Register the corner points by pressing the LOCAL key.



UR SCALE BOX MARKER



LL SCALE BOX MARKER

Figure 2-13.
SCALE BOX MARKERS TO CREATE MIRROR IMAGE PLOTS

5. Insert a clean sheet of media of the same size at load position. Press the LOAD key to properly load the new sheet. After the plotter positions the chart, press the LOCAL key for local mode.

6. Initiate the customer confidence test routine by pressing the ▲ and the ▼ keys simultaneously. The resulting plot design will be a mirror image of the customer confidence test plot (see Figure 2-14).

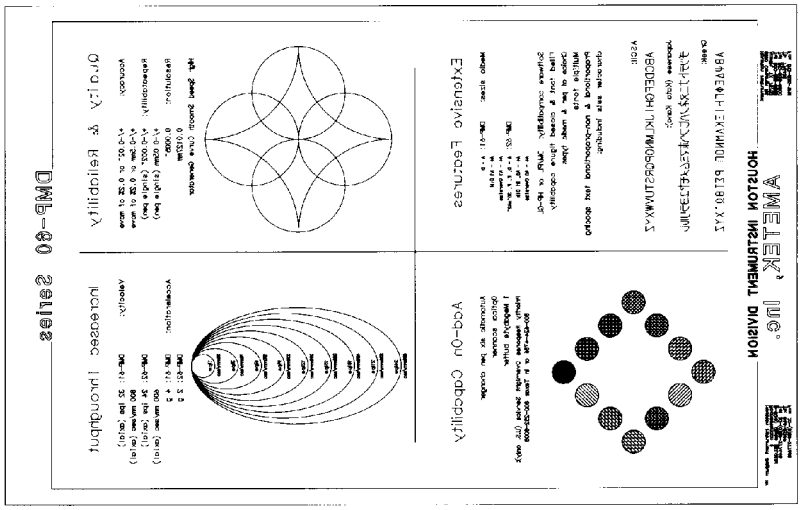


Figure 2-14.
MIRROR IMAGE OF THE CUSTOMER CONFIDENCE TEST PLOT