

## SECTION 1 GENERAL INFORMATION

### 1.1 INTRODUCTION

The Houston Instrument DMP-61 and DMP-62 digital plotters are the perfect answers for multi-size media plotting applications. Besides having high speed, intelligence, and durability, the DMP-60 series plotters enable you to plot on a wide variety of standard English and metric size charts.

This manual uses the term *plotter* when it provides general information about both models. The specific model terms *DMP-61* or *DMP-62* are used if information pertains only to that particular model. This manual also uses the term *menu* when it provides general information about both the DM/PL and HPGL menu. The specific menu terms *DM/PL menu* or *HPGL menu* are used if information pertains only to that particular menu.

A few of the features you'll find on your plotter are:

- DM/PL software protocol,
- HPGL 758X emulation language which enables the DMP-61 to emulate the Hewlett-Packard™ model 7580B plotter and the DMP-62 to emulate the Hewlett-Packard model 7585B plotter,
- Serial RS-232-C interface capabilities,
- Membrane control panel switches,
- English or metric scaling,
- A wide variety of chart size selections,
- 0.001 inch, 0.005 inch, 0.1 mm, or 0.025 mm user-addressable resolution,

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- A menu mode, which enables you to select the plotter's DM/PL and HPGL power-up configuration,
- An extensive customer confidence test capability,
- Window and scaling capabilities for manipulating the size, location, or appearance of a plot,
- Plotter report capabilities,
- Multiple sets of character styles and fonts which can be produced in many different sizes, rotated to any slope, and printed in italics,
- A wide variety of axial plotting speeds which can be selected in either English or metric measures. Each selected velocity can be regulated at all angles with the constant velocity feature.

This manual provides:

- Instructions on how to set up and manually operate the plotter in local mode,
- Specifications to help you interface your plotter with your computer system,
- Descriptions of your plotter's DM/PL and HPGL 758X emulation language software capabilities.

### 1.2 SPECIFICATIONS

The plotter's specifications are listed in Table 1-1.

**TABLE 1-1. DMP-60 SERIES SPECIFICATIONS**

<b>ITEM</b>	<b>DESCRIPTION</b>
<i>Plotter</i>	
DMP-61 Overall Height (including stand)	42 inches (1067 mm)
DMP-61 Width (including stand)	41 inches (1041 mm)
DMP-61 Depth (including stand)	21.75 inches (552.5 mm)
DMP-61 Weight (without stand)	30 pounds (13.6 kg)
DMP-61 Stand Weight	22 pounds (9.9 kg)
DMP-62 Overall Height (including stand)	51 inches (1295 mm)
DMP-62 Width (including stand)	52 inches (1321 mm)
DMP-62 Depth (including stand)	27.25 inches (692.2 mm)
DMP-62 Weight (without stand)	38 pounds (17.2 kg)
DMP-62 Stand Weight	30 pounds (13.6 kg)

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TABLE 1-1. DMP-60 SERIES SPECIFICATIONS (Continued)

ITEM	DESCRIPTION
<i>Performance</i>	
Accuracy	On single-matte polyester (3 mil) at 18° to 30° C, 0.2% of move or 0.010 inch (0.254 mm), whichever is greater
DMP-61 Pen Up/Down Plotting Speed	1 to 32 ips axial maximum (selectable)
DMP-62 Pen Up/Down Plotting Speed	1 to 24 ips axial maximum (selectable)
DMP-61 Pen Up/Down Acceleration	0.5 g, 1 g, 2 g, 3 g, or 4 g
DMP-62 Pen Up/Down Acceleration	0.5 g, 1 g, or 2 g
Addressable Resolution	0.001 inch, 0.005 inch, 0.1 mm, or 0.025 mm
Repeatability (Same Pen)	±0.002 inch (0.050 mm)

**TABLE 1-1. DMP-60 SERIES SPECIFICATIONS (Continued)**

<b>ITEM</b>	<b>DESCRIPTION</b>
<i>Plotting Materials</i>	
Recommended Chart and Pen Type Combinations	H.I.-Frost and water-based hard nib or disposable stainless steel drafting pens  Matte film and tungsten tip drafting pens and disposable drafting pens  Vellum and disposable stainless steel, tungsten tip, or disposable drafting pens
DMP-61 Chart Sizes	Engineering A, B, C, and D Architectural A, B, C, and D DIN A4, A3, A2, and A1 Oversize DIN A4, A3, A2, and A1
DMP-62 Chart Sizes	Engineering A, B, C, D, E, and F Architectural A, B, C, D, E, F, and architectural 30 × 42 inches DIN A4, A3, A2, A1, A0, and B1 Oversize DIN A4, A3, A2, A1 and A0
Maximum Plot Areas	See Table 1-9

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TABLE 1-1. DMP-60 SERIES SPECIFICATIONS (Continued)

ITEM	DESCRIPTION
<i>Interface</i>	
Interface Capability	Asynchronous serial RS-232-C
Plotter I/O Connector	Rear panel RS-232-C DB-25P
Mating Connector	RS-232-C DB-25S
Transmit Data Format (From Plotter)	7 data bits, 1 parity bit (selectable), 2 or more stop bits
Receive Data Format (To Plotter)	7 data bits, 1 parity bit (selectable), 1 or more stop bits
Baud Rate	300, 600, 1200, 2400, 4800, or 9600
Buffer	16K (standard), 1M (optional)
Firmware	DM/PL and HPGL 758X emulation language

**TABLE 1-1. DMP-60 SERIES SPECIFICATIONS (Continued)**

<b>ITEM</b>		<b>DESCRIPTION</b>
<i>Environmental</i>		
Operating Temperature		40° to 95° F (5° to 35° C)
Operating Relative Humidity		20% to 95% (non-condensing)
Storage Temperature		14° to 140° F (-10° to 60° C)
Storage Relative Humidity		5% to 95% (non-condensing)
<b>NOMINAL LINE</b>	<b>MIN/MAX LINE</b>	<b>FUSE</b>
100 Vac	89-108 Vac	1 Amp, Slo-Blo
120 Vac	108-130 Vac	1 Amp, Slo-Blo
220 Vac	197-238 Vac	0.5 Amp, Slo-Blo
240 Vac	216-260 Vac	0.5 Amp, Slo-Blo
48-62 Hz, single-phase, 85 VA max.		

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## 1.2.1 Supplies

The DMP-60 series plotter is a precision instrument designed to produce professional high-quality output. Its performance and plot quality are determined by the pens, inks, and media that you choose to use.

A wide variety of plotter supplies are available on the market. Unfortunately, the quality of those supplies varies. Houston Instrument has extensively researched and tested its approved line of pens, inks, and media. Use of these supplies allows your plotter to operate at peak performance.

The following supplies and accessories are recommended for use on your plotter and are available from Houston Instrument or from your local distributor. For listings of recommended pen type and media combinations for your plotter, see Paragraphs 1.2 and 1.2.1.1, and *The Perfect Plot!* (part number MI-1098), which is supplied with your plotter.

**TABLE 1-2. DMP-60 PLOTTER ACCESSORIES**

MP-60 Multi-Pen Changer Accessory
SCAN-CAD™ Model 128A Scanner Accessory
One-Megabyte Extended Buffer Board
Kanji Character Set Board

**TABLE 1-3. DMP-60 PLOTTER DOCUMENTATION**

PART NUMBER	DESCRIPTION
MI-1110	DMP-60 Series Plotter Operation Manual†
MI-1044	DM/PL Command Language Manual‡
MI-1116	DMP-60 Series Plotter Service Manual‡

†Supplied with plotter purchase.

‡Optional.

**TABLE 1-4. DMP-60 PLOTTING MEDIA**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QUANTITY</b>
<i>A Size/Engineering Media</i>		
MC-3244	Vellum†	50 sheets
MC-3191	Vellum	50 sheets
MC-3230	H.I.-Vintage (Presentation Bond)	50 sheets
MC-3229	Clear Coated Film	10 sheets
MC-3098	Clear Film	100 sheets
<i>B Size/Engineering Media</i>		
MC-3245	Vellum†	50 sheets
MC-3192	Vellum	50 sheets
MC-3231	H.I.-Vintage (Presentation Bond)	50 sheets
MC-3195	Clear Film	50 sheets
<i>C Size/Engineering Media</i>		
MC-3222	H.I.-Frost Paper (Opaque Bond)	50 sheets
MC-3201	Matte Film	50 sheets
MC-3176	Vellum	50 sheets
<i>C Size/Architectural Media</i>		
MC-3204	Matte Film	50 sheets
<i>D Size/Engineering Media</i>		
MC-3221	H.I.-Frost Paper (Opaque Bond)	50 sheets
MC-3202	Matte Film	50 sheets
MC-3175	Vellum	50 sheets
MC-3269	Translucent Bond	150 sheets
<i>D Size/Architectural Media</i>		
MC-3220	H.I.-Frost Paper (Opaque Bond)	50 sheets
MC-3203	Matte Film	50 sheets
MC-3187	Vellum	50 sheets
MC-3270	Translucent Bond	150 sheets

†This vellum is approved for use with any type of H.I.-approved drafting pen and may be plotted on both sides.

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TABLE 1-4. DMP-60 PLOTTING MEDIA (Continued)

PART NUMBER	DESCRIPTION	QUANTITY
<i>E Size/Architectural Media</i>		
MC-3242	Matte Film	25 sheets
MC-3241	Vellum	25 sheets
MC-3243	H.I.-Frost Paper (Opaque Bond)	50 sheets
30 × 42 inches		
Architectural Media		
MC-3256	Matte Film	25 sheets
MC-3254	Vellum	25 sheets
MC-3258	H.I.-Frost Paper (Opaque Bond)	50 sheets
707 mm × 1000 mm		
(B1) Media		
MC-3257	Matte Film	25 sheets
MC-3255	Vellum	25 sheets
MC-3259	H.I.-Frost Paper (Opaque Bond)	50 sheets

TABLE 1-5. PENS AND PEN ACCESSORIES

PART NUMBER	DESCRIPTION
<i>Stainless Steel Drafting Pens (Disposable)</i>	
MA-15	Adaptor for Disposable Drafting Pen
MP-729*	Red, fine point (0.35 mm)
MP-730*	Blue, fine point (0.35 mm)
MP-731*	Black, fine point (0.35 mm)
MP-732*	Green, fine point (0.35 mm)
MP-774*	Violet, fine point (0.35 mm)
MP-775*	Turquoise, fine point (0.35 mm)
MP-776*	Magenta, fine point (0.35 mm)
MP-737*	Red, broad point (0.70 mm)
MP-738*	Blue, broad point (0.70 mm)
MP-739*	Black, broad point (0.70 mm)
MP-740*	Green, broad point (0.70 mm)
MP-781*	Violet, broad point (0.70 mm)
MP-782*	Turquoise, broad point (0.70 mm)
MP-783*	Magenta, broad point (0.70 mm)
* Adaptor MA-15 not included	
<i>Stainless Steel Drafting Pen Kits (Disposable)</i>	
PK-8097	Kit includes: one 0.35 mm black, one 0.35 mm red, one 0.35 mm blue, one 0.35 mm green, one MA-15 pen adaptor, and four caps
PK-8103	Kit includes: one each of black, red, blue, green, violet, turquoise, and magenta in fine and broad points; 14 each MA-15 adaptors; and 14 each caps

**TABLE 1-5. PENS AND PEN ACCESSORIES (Continued)**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>
<i><u>Tungsten Drafting Pens for Film and Vellum (Disposable)</u></i>	
PK-8171	Kit includes: four 0.25 mm black, one MA-15 pen adaptor, and four caps
PK-8172	Kit includes: four 0.35 mm black, one MA-15 pen adaptor, and four caps
PK-8173	Kit includes: four 0.50 mm black, one MA-15 pen adaptor, and four caps
PK-8174	Kit includes: four 0.70 mm black, one MA-15 pen adaptor, and four caps
PK-8175	Kit includes: four 0.35 mm red, one MA-15 pen adaptor, and four caps
PK-8176	Kit includes: four 0.50 mm red, one MA-15 pen adaptor, and four caps
PK-8177	Kit includes: four 0.50 mm blue, one MA-15 pen adaptor, and four caps
PK-8178	Kit includes: four 0.70 mm green, one MA-15 pen adaptor, and four caps
<i><u>Tungsten Tip Drafting Pens (Refillable)</u></i>	
MP-602	Mounting adaptor and pen body without pen tip
MP-659	Tungsten drafting pen tip (0.35 mm)
MP-660	Tungsten drafting pen tip (0.50 mm)
MP-661	Tungsten drafting pen tip (0.70 mm)

TABLE 1-5. PENS AND PEN ACCESSORIES (Continued)

PART NUMBER	DESCRIPTION
<i>Drafting Ink (One Ounce Bottles)</i>	
MI-117	Blue (slow drying)
MI-118	Red (slow drying)
MI-119	Green (slow drying)
MI-121	Blue (fast drying)
MI-122	Red (fast drying)
MI-123	Green (fast drying)
MI-288	Black (all purpose)
<i>Water-Based Hard Nib Pens</i>	
MP-630	Red
MP-631	Blue
MP-632	Green
MP-633	Violet
MP-634	Brown
MP-635	Orange
MP-636	Black
MP-637	Lime Green
MP-638	Yellow
MP-639	Turquoise
<i>Water-Based Hard Nib Pen Kits</i>	
MP-640	Kit includes: one each of black, red, blue, green, violet, and orange
MP-641	Kit includes: one each of black, red, blue, green, violet, brown, lime green, and orange

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TABLE 1-5. PENS AND PEN ACCESSORIES (Continued)

PART NUMBER	DESCRIPTION
<i>Roller Ball Pens</i>	
PK-8155	Kit includes: one each of black, red, blue, and green
PK-8156	Kit includes: one each of yellow, violet, turquoise, and magenta
PK-8159	Kit includes: four black
PK-8160	Kit includes: four red
PK-8161	Kit includes: four green
PK-8162	Kit includes: four blue
PK-8163	Kit includes: four yellow
PK-8164	Kit includes: four violet
PK-8165	Kit includes: four turquoise
PK-8166	Kit includes: four magenta
PK-8168	Kit includes: four orange
PK-8169	Kit includes: four brown

**1.2.1.1 Plotter Supply Compatibility**

Houston Instrument offers a wide variety of pens and media for different types of plotting applications. Please note that not all pens may be used with all plotting materials. For best results, refer to the following chart and to *The Perfect Plot!* (part number MI-1098), which is supplied with your plotter, before ordering plotting supplies to see which plotting materials are recommended for use with any given pen type. A star (☆) in a chart column means that particular material may be used with a given pen type.

**TABLE 1-6. PLOTTER SUPPLY COMPATIBILITY CHART**

PLOTTER MATERIAL	PEN TIP TYPE			
	STAINLESS STEEL	REFILLABLE/ DISPOSABLE TUNGSTEN	HARD NIB (PLASTIC)	ROLLER BALL
Vellum	☆	☆		
Matte Film		☆		
Clear Coated Film			☆	
Translucent Bond	☆		☆	☆
H.I.-Frost	☆		☆	☆
H.I.-Vintage			☆	☆

## **1.3 FLOOR STAND ASSEMBLY**

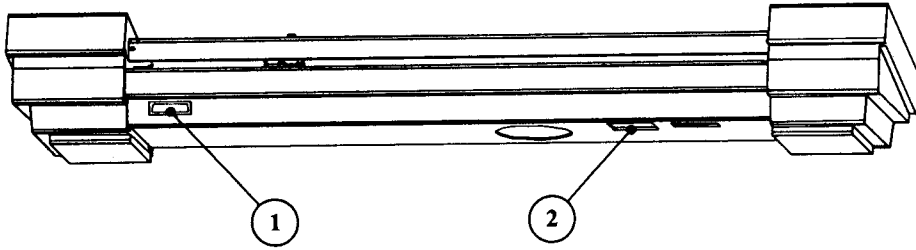
### **CAUTION**

Do not operate the plotter until after you have assembled the floor stand and attached the plotter to it. Otherwise, damage to the plotter or the plotting materials can result.

The assembly instructions for the floor stand are included in the floor stand kit. Complete the stand assembly and attach the plotter to it before proceeding with the instructions in this manual.

## **1.4 REAR AND BOTTOM PANEL COMPONENTS**

Read through the following descriptions of the rear and bottom panel controls and components and familiarize yourself with the plotter. The location of each component is illustrated in Figure 1-1.

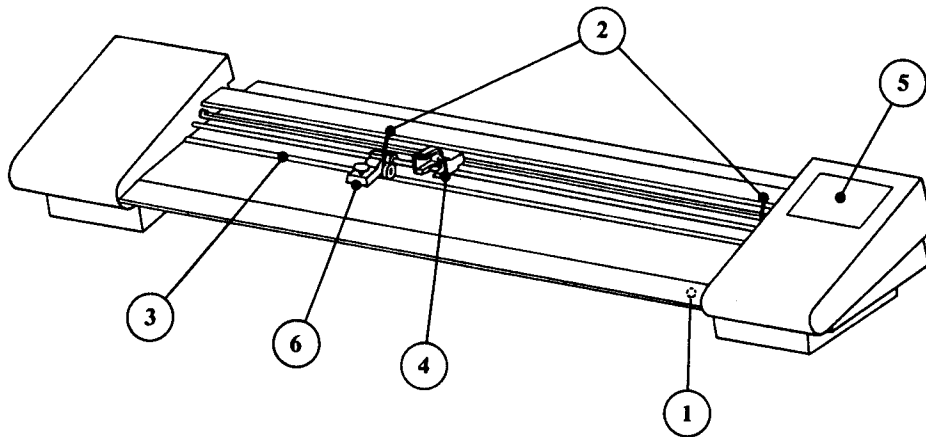


**FIGURE 1-1. REAR AND BOTTOM VIEW OF PLOTTER**

- ① **RS-232-C PORT CONNECTOR.** This DB-25P connector is the communication link between the plotter and a host computer. Interface instructions are listed in Paragraph 1.9.
  
- ② **AC POWER ENTRY MODULE.** The fuse, the voltage select board, and the receptacle for the ac power cord are located in the power entry module. Paragraph 1.6 explains how to power up the plotter. To convert the plotter's operating voltage, see Paragraph 5.2.

## 1.5 FRONT PANEL COMPONENTS

Read through the following descriptions of the front panel controls and components and familiarize yourself with the plotter. The location of each component is illustrated in Figure 1-2.



**FIGURE 1-2. FRONT VIEW OF PLOTTER**

- ① **POWER SWITCH.** This rocker switch sets the plotter's power to on or off. When the power is on, the "1" indicator is visible on the switch. If the power is off, the "0" indicator is visible.
- ② **PINCH ROLLER LEVER ARMS.** These two levers are used to raise and lower the pinch rollers from the chart drive shaft during media loading. (Media loading is discussed in Paragraph 1.7.)
- ③ **CHART DRIVE SHAFT.** When the plotter is operated in plot origin right (large chart format), this shaft drives the chart in the X direction. When the plotter is operated in plot origin left (small chart format), the shaft drives the chart in the Y direction. (Large and small chart formats are discussed in Paragraph 1.7.) The drive shaft moves the media only when the pinch rollers are lowered to the shaft.
- ④ **PEN HOLDER.** The pen holder is the mount for the plotter pen. The pen holder moves the pen in the Y direction when the plotter is operated in large chart format and in the X direction when the plotter is operated in the small chart format. Paragraph 1.8 explains how to install pens in the pen holder.
- ⑤ **CONTROL PANEL.** The control panel consists of 12 keys and four illuminating (on/off) LED indicators. All plotter activity must be initiated from the control panel functions. This includes initiating remote mode for computer control, local mode for manual operation of the pen and media, menu mode, and selecting window and scale box limit coordinates. Each control panel function is explained in Paragraph 2.1. The four LEDs indicate certain operating and error conditions, which are explained in Appendix A.
- ⑥ **THUMBSCREW.** When this thumbscrew is loosened, the left pinch roller assembly can be moved to a different chart size marker. When the thumbscrew is tightened, it secures the left pinch roller assembly to the platen. (Media loading is discussed in Paragraph 1.7.)

## 1.6 POWERING UP THE PLOTTER

### NOTE

**Safety Ground Installation:** An insulated grounding conductor that is identical in size, insulation material, and thickness to the grounded and ungrounded branch-circuit supply conductors except that it is green with or without one or more yellow stripes should be installed as part of the branch circuit that supplies power to the wall outlet.

The grounding conductor described above is to be grounded to earth at the electrical service equipment, or if supplied by a separately derived system, the grounding conductor should be at the supply transformer motor-generator set.

The attachment plug receptacles in the vicinity of the unit are all to be of a grounding type, and the grounding conductors serving these receptacles are to be connected to earth ground of the service equipment.

Do not attach the power cord to the plotter or to a power source until after you have determined the plotter's operating voltage setting (100, 120, 220, or 240 Vac). (See Table 1-1 for the minimum and maximum operating ranges for these voltage ratings and the required fuse ratings.)

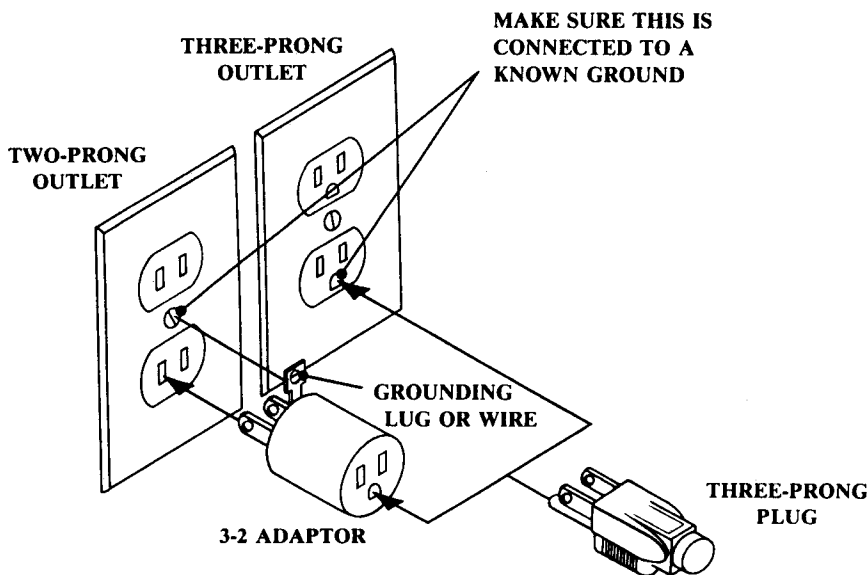
To check the voltage setting, locate the power entry module shown in Figure 1-1. Your plotter may be equipped with either of two power entry modules. The following paragraphs explain how to check the voltage settings of both types of modules.

On one type of power entry module, the cover shows four possible voltage settings (100V, 120V, 220V, or 240V). Notice that a pin will be in one of these holes, indicating the present voltage setting for the plotter. If this setting does not match the voltage available at your site, then it must be changed before powering on the plotter (see Paragraph 5.2).

The other type of module has a fuse cavity behind a clear plastic cover. Inside the cavity is a numbered (100, 120, 220, or 240) voltage select board. The number visible on the voltage select board indicates the present voltage setting of the plotter. If this setting does not match the voltage available at your site, then it must be changed before powering on the plotter (see Paragraph 5.2).

The plotter's ground circuitry protects you from electrical shock. However, this protection is effective only if the ac outlet to be used is properly grounded to earth. If the plotter is to be connected to a two-contact wall outlet, a 3/2 adaptor with grounding lug/wire may be used. This type of connection is illustrated in Figure 1-3.

Be sure to read the important safety instructions in the front of this manual before operating the plotter.



**FIGURE 1-3. GROUND CONNECTION**

### WARNING

To prevent personal injury when operating the plotter, keep your hands, hair, and clothing away from the platen and the chart drive shaft.

To power up the plotter:

1. Be sure the plotter is properly attached to its floor stand.
2. Connect one end of the power cord to the plotter's bottom panel ac receptacle, which is next to power entry module.
3. Connect the other end of the power cord to the ac power source.
4. Set the front panel power switch to ON.

### NOTE

If the plotter is powered up without a chart installed, the RESET and the LOAD LEDs will flash on and off. This indicates that no chart is installed and this is normal. If a chart is installed and the plotter is powered up, the RESET indicator will illuminate while the plotter automatically sizes the chart. After the chart is sized, the RESET indicator will turn off and the LOAD indicator will illuminate and remain on. This indicates that the plotter is in remote mode and this is normal. However, if the plotter displays any other code after it is powered up, an error may have occurred. Appendix A explains all of the possible LED codes.

Powering up the plotter causes a complete reset to occur. Complete and partial resets are explained in Paragraph 2.1.3.

## NOTE

The DMP-61 maximum pen down velocity is 32 ips. However, this velocity has been set in the menu at the factory to 24 ips to ensure best plot quality with all media/pen combinations. Refer to *The Perfect Plot!* (part number MI-1098) for more information on plot specifications for different media/pen combinations.

Read the remainder of this manual and follow its instructions before attempting to operate the plotter.

## 1.7 MEDIA LOADING

### WARNING

To prevent personal injury when operating the plotter, keep your hands, hair, and clothing away from the platen and the chart drive shaft.

The media for your plotter is packaged in airtight plastic wrapping. After opening the package, let smaller size media sit for at least 20 minutes before using and larger size media for at least one hour. This allows the media to stabilize to the surrounding humidity. (If the media is not allowed to stabilize to the environment before use, the resulting plot may have mismatched lines, line shifts, or offsets. This is a result of the media expanding and contracting during plotting.) Handle the chart by its edges only! Fingerprints leave a slight residue on the media which may cause the pens to skip over those areas.

Both plotter models have threaded holes on their platen to which the left pinch roller assembly can be moved (see Figure 1-5). The DMP-61 has eight threaded holes and the DMP-62 has 20 threaded holes. By using the menu to rotate the plot origin to the right or left, all of the positions on the DMP-61 and most of the positions on the DMP-62 can accommodate a *small* chart or a *large* chart. A small (half) chart orientation exists when the length of the pen axis is longer than the length of the chart axis. A large (full) chart orientation exists when the length of the chart axis is longer than the length of the pen axis. The menu also has an option which allows the plotter to automatically select the correct plot origin for a particular chart. The menu parameters and options are explained in Paragraph 2.4.

## NOTE

The DMP-62 has five threaded holes on the platen which can be used to load oversized or undersized nonstandard media. These holes are positions 11, 13, 15, 17, and 19. (The threaded hole positions are referenced from right-to-left in this section.) These platen holes may also be used to improve the tracking of standard media which may have contracted due to certain environmental conditions. (Use hole positions 12, 14, 16, 18, and 20 for standard media.) If media is stored or used in any area having a low humidity and low temperature environment, such as an air-controlled computer mainframe area, the media will contract. If these holes are used for standard media, it is important to note the following considerations:

- The plot area of that media will be slightly reduced,
- If the plotting software expects a standard media size, the resulting plot may be clipped.

The DMP-61 standard chart sizes for each threaded hole position are listed in Table 1-7. Table 1-8 lists the standard chart sizes for the DMP-62. (Also listed in Table 1-8 are the five DMP-62 threaded hole positions for media that has contracted.) Note that the threaded hole positions are referenced from right-to-left in this section. The maximum plot areas for the charts are listed in Table 1-9.

## NOTE

For proper operation, use only media that is flat and does not curl.

**TABLE 1-7. DMP-61 STANDARD CHART SIZES**

<b>THREADED HOLE POSITION</b>	<b>LEFT PLOT ORIGIN (Small Chart)</b>	<b>RIGHT PLOT ORIGIN (Large Chart)</b>
Position 1 (Engineering A — B)	Engineering A 8.5 inches × 11 inches	Engineering B 11 inches × 17 inches
Position 2 (A4 — A3 DIN)	A4 DIN 210 mm × 297 mm	A3 DIN 297 mm × 420 mm
Position 3 (Architectural A — B)	Architectural A 9 inches × 12 inches	Architectural B 12 inches × 18 inches
Position 4 (Oversize A4 — A3)	Oversize A4 240 mm × 330 mm	Oversize A3 330 mm × 450 mm
Position 5 (Engineering C — D)	Engineering C 17 inches × 22 inches	Engineering D 22 inches × 34 inches
Position 6 (A2 — A1 DIN)	A2 DIN 420 mm × 594 mm	A1 DIN 594 mm × 841 mm
Position 7 (Architectural C — D)	Architectural C 18 inches × 24 inches	Architectural D 24 inches × 36 inches
Position 8 (Oversize A2 — A1)	A2 Oversize 450 mm × 625 mm	A1 Oversize 625 mm × 880 mm

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TABLE 1-8. DMP-62 STANDARD CHART SIZES

THREADED HOLE POSITION	LEFT PLOT ORIGIN (Small Chart)	RIGHT PLOT ORIGIN (Large Chart)
Position 1 (Engineering A — B)	Engineering A 8.5 inches × 11 inches	Engineering B 11 inches × 17 inches
Position 2 (A4 — A3 DIN)	A4 DIN 210 mm × 297 mm	A3 DIN 297 mm × 420 mm
Position 3 (Architectural A — B)	Architectural A 9 inches × 12 inches	Architectural B 12 inches × 18 inches
Position 4 (Oversize A4 — A3)	Oversize A4 240 mm × 330 mm	Oversize A3 330 mm × 450 mm
Position 5 (Engineering C — D)	Engineering C 17 inches × 22 inches	Engineering D 22 inches × 34 inches
Position 6 (A2 — A1 DIN)	A2 DIN 420 mm × 594 mm	A1 DIN 594 mm × 841 mm
Position 7 (Architectural C — D)	Architectural C 18 inches × 24 inches	Architectural D 24 inches × 36 inches
Position 8 (Oversize A2 — A1)	A2 Oversize 450 mm × 625 mm	A1 Oversize 625 mm × 880 mm
Position 9 (B1 DIN)	---	B1 DIN 707 mm × 1000 mm
Position 10 (Architectural/Engineering F)	Architectural/Engineering F 28 inches × 40 inches	---

**TABLE 1-8. DMP-62 STANDARD CHART SIZES (Continued)**

<b>THREADED HOLE POSITION</b>	<b>LEFT PLOT ORIGIN (Small Chart)</b>	<b>RIGHT PLOT ORIGIN (Large Chart)</b>
Position 11 (Contracted Architectural 30 × 42)	---	Architectural 30/42 30 inches × 42 inches
Position 12 (Standard Architectural 30 × 42)	---	Architectural 30/42 30 inches × 42 inches
Position 13 (Contracted A0 DIN)	---	A0 DIN 841 mm × 1189 mm
Position 14 (Standard A0 DIN)	---	A0 DIN 841 mm × 1189 mm
Position 15 (Contracted Engineering E)	---	Engineering E 34 inches × 44 inches
Position 16 (Standard Engineering E)	---	Engineering E 34 inches × 44 inches
Position 17 (Contracted Oversize A0)	---	Oversize A0 880 mm × 1230 mm
Position 18 (Standard Oversize A0)	---	Oversize A0 880 mm × 1230 mm
Position 19 (Contracted Architectural E)	---	Architectural E 36 inches × 48 inches
Position 20 (Standard Architectural E)	---	Architectural E 36 inches × 48 inches

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The following procedure explains how to install charts. The **RESET** and **LOAD LED** indicators will flash on and off during this procedure. This signal indicates that the plotter is out of media. After the chart is properly inserted and then loaded by pressing the **RESET** or the **LOAD** key, the signal will stop.

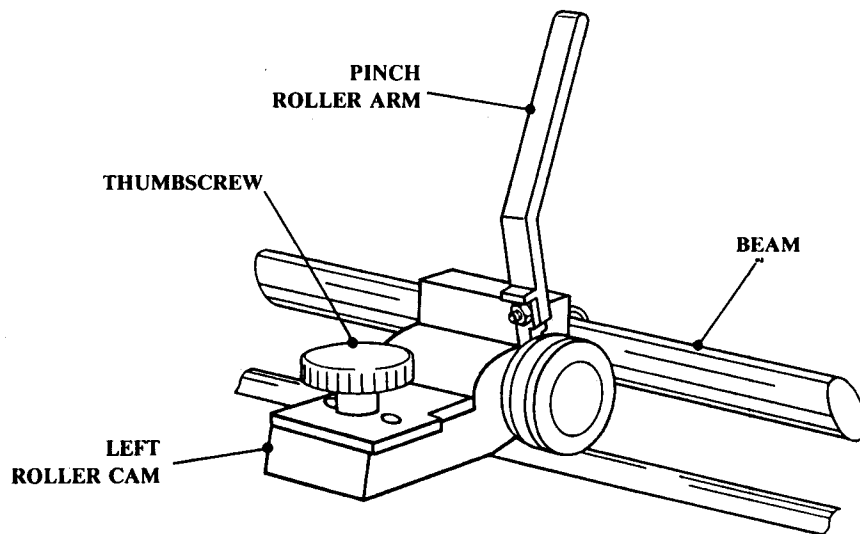
### **NOTE**

The plotter uses vacuum to keep the center area of the media clear of the pen. The vacuum motor is activated by the plotter's power switch.

1. Raise the pinch roller arm of the left pinch roller assembly. Loosen the thumbscrew on top of the left pinch roller assembly by turning it counterclockwise until the pinch roller assembly can slide freely on the beam (see Figure 1-4).

### **CAUTION**

Be sure to raise the left pinch roller assembly from the drum before moving the roller assembly to a different threaded hole position. Otherwise, the friction of the drum may create a flat spot on the roller wheel.

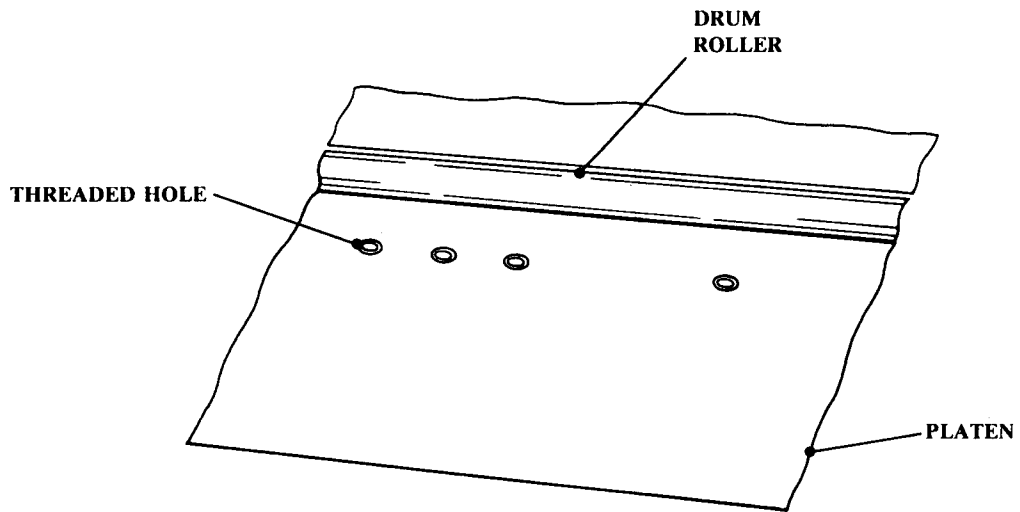


**FIGURE 1-4. LEFT PINCH ROLLER ASSEMBLY THUMBSCREW**

2. Slide the left pinch roller assembly to the desired threaded hole position. Be sure that the thumbscrew is aligned with the threaded hole, and then tighten the thumbscrew in the threaded hole by turning it clockwise until it is finger-tight.

**CAUTION**

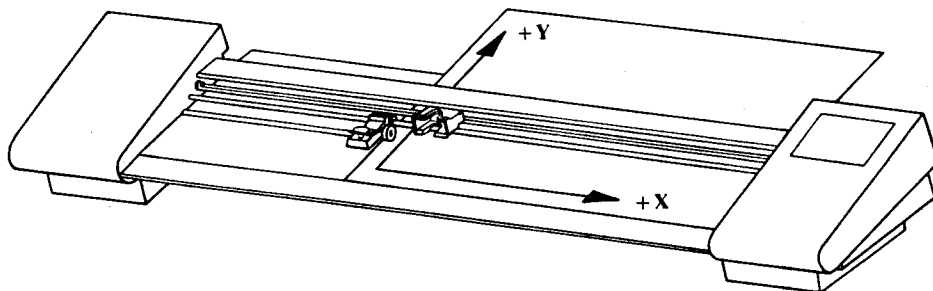
Be sure that the thumbscrew is aligned with the threaded hole before tightening the thumbscrew. Otherwise, the thumbscrew may strip the threads of the platen hole.



**FIGURE 1-5. THREADED HOLES ON PLATEN**

3. Raise the pinch roller arm of the right pinch roller assembly. Refer to Tables 1-7 or 1-8 to determine if the chart size you are loading requires small chart (left plot origin) or large chart (right plot origin) format. If small chart format is required, insert the media as shown in Figure 1-6. If large chart format is required, insert the media as shown in Figure 1-7.

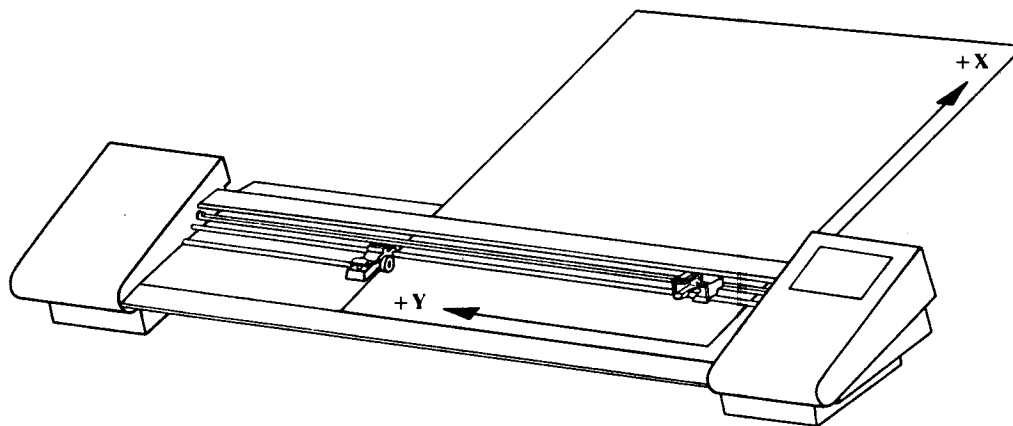




**This example shows size C media loaded (left pinch roller assembly in position 5 and the pen holder at left plot origin).**

**Align the edge of the chart with the groove on the platen and the white line on the right side of the platen.**

**FIGURE 1-6. LOADING SMALL CHARTS**



**This example shows size D media loaded (left pinch roller assembly in position 5 and the pen holder at right plot origin).**

**Align the edge of the chart with the groove on the platen and the white line on the right side of the platen.**

**FIGURE 1-7. LOADING LARGE CHARTS**

4. Align the right edge of the chart with the inside of the white line on the right side of the plotter and align the front edge of the chart with the groove on the front of the plotter. Then close both pinch roller arms. (Appendix D lists environmental considerations for the plotting media.)
5. Press the **LOAD** key. The plotter is set at the factory to automatically select the correct plot origin for the chart installed. It does this by first moving the pen holder to the right until it locates the right stop and then to the left until it locates the left stop. The pen holder then returns to the right side of the pen bar. The media is then moved forward until its rear edge is detected by the platen sensor, and is then returned to the load position. If the plotter senses that a chart is longer than it is wide, it automatically selects right plot origin, or large chart format. If it senses that the chart is wider than it is long, it selects left plot origin, or small chart format. (A left plot origin or a right plot origin can be manually specified in the menu to override the automatic chart size feature, if desired.)
6. The media is now properly loaded, and the **RESET** indicator will turn off and the **LOAD** indicator will illuminate.

The left pinch roller assembly can be moved to change media sizes at any time except when the plotter is drawing a plot, operating in menu mode (see Paragraph 2.4), or operating in Manufacturing Setup Mode (MSM) (see Appendix B). If the chart size is changed by more than one-quarter inch, the plotter will automatically reset when the **RESET** or the **LOAD** key is pressed.

Table 1-9 lists the maximum plotting area for each standard chart size.

**TABLE 1-9. MAXIMUM PLOTTING AREAS**

<b>CHART SIZE</b>	<b>PLOT AREA</b>	<b>PLOT ORIGIN</b>
Architectural A	7.8 × 10.8 inches	Left
Architectural B	10.8 × 16.8 inches	Right
Architectural C	16.8 × 22.8 inches	Left
Architectural D	22.8 × 34.8 inches	Right
Contracted Architectural E	34.5 × 46.5 inches	Right
Architectural E	34.8 × 46.8 inches	Right
Architectural F	26.8 × 38.8 inches	Right
Contracted Architectural 30 × 42 inches	28.5 × 40.5 inches	Right
Architectural 30 × 42 inches	28.8 × 40.8 inches	Right
Engineering A	7.3 × 9.8 inches	Left
Engineering B	9.8 × 15.8 inches	Right
Engineering C	15.8 × 20.8 inches	Left
Engineering D	20.8 × 32.8 inches	Right
Contracted Engineering E	32.5 × 42.5 inches	Right

**TABLE 1-9. MAXIMUM PLOTTING AREAS (Continued)**

<b>CHART SIZE</b>	<b>PLOT AREA</b>	<b>PLOT ORIGIN</b>
Engineering E	32.8 × 42.8 inches	Right
Engineering F	26.8 × 38.8 inches	Right
DIN A4	179 × 266 mm	Left
DIN A3	266 × 389 mm	Right
DIN A2	389 × 563 mm	Left
DIN A1	563 × 810 mm	Right
Contracted DIN A0	802 × 1150 mm	Right
DIN A0	810 × 1158 mm	Right
DIN B1	676 × 969 mm	Right
Oversize A4	209 × 299 mm	Left
Oversize A3	299 × 419 mm	Right
Oversize A2	419 × 594 mm	Left
Oversize A1	594 × 849 mm	Right
Contracted Oversize A0	841 × 1191 mm	Right
Oversize A0	849 × 1199 mm	Right

All standard and nonstandard chart sizes have the same margin area between the maximum plotting area and the edges of the chart (see Figure 1-8). Note that the left and right margin areas may not be exactly the same on both sides but the sum of both margins always equals 1.2 inches (30 mm). Where the chart is loaded determines the amount of margin area on each side of the chart. The sum of the top and bottom margins also equals 1.2 inches (30 mm).

The DMP-60 also enables you to cut a standard sheet of chart media into a nonstandard size and plot on it. The only restrictions for using nonstandard chart sizes are:

- The right-to-left length of the chart along the platen must be a standard size. The right edge of the chart must be aligned with the inside of the white line on the right side of the plotter and the front edge of the chart must be aligned with the groove on the front of the plotter.
- The front-to-back length of the chart must be greater than 8 inches (203 mm) and less than 50 inches (1270 mm) to ensure proper tracking.
- The margin between the maximum plot area and the edges of the chart are the same as the margins on standard chart sizes.

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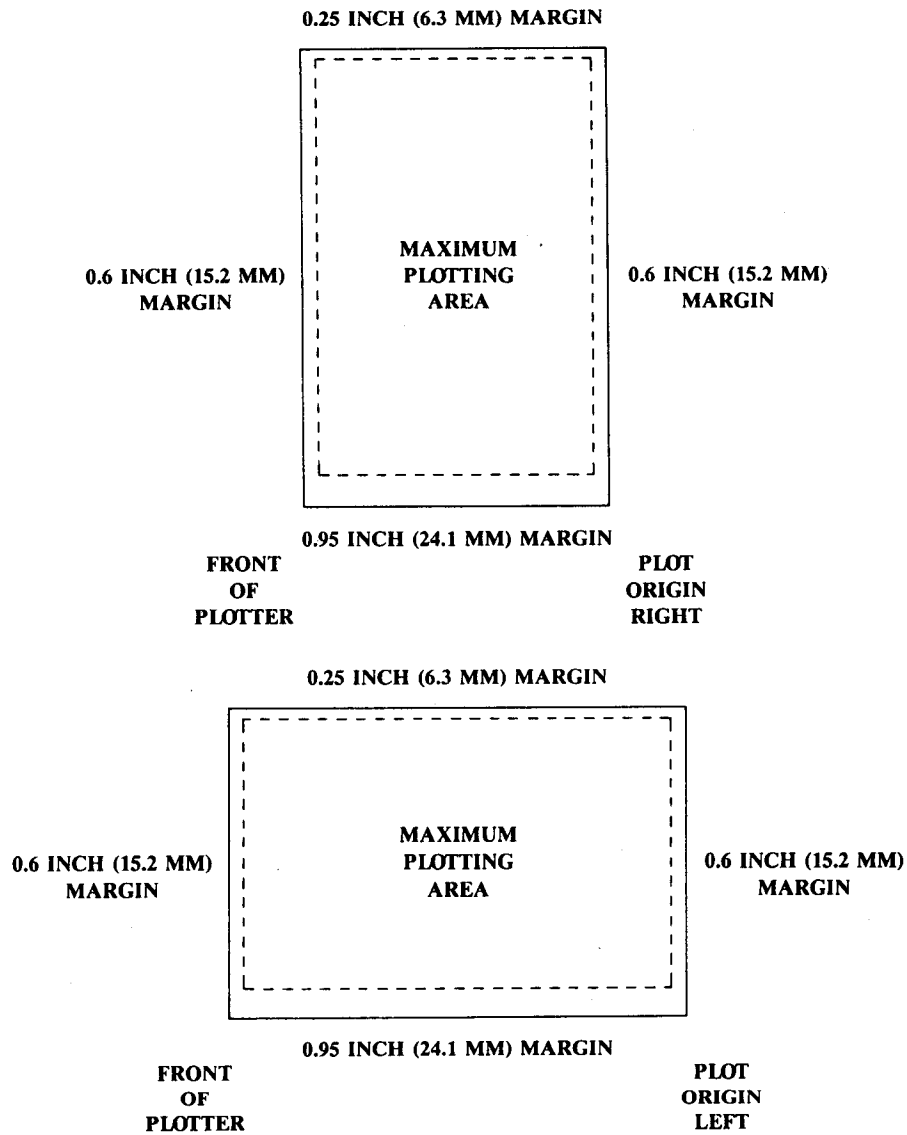


FIGURE 1-8. CHART MARGINS

## 1.8 PENS

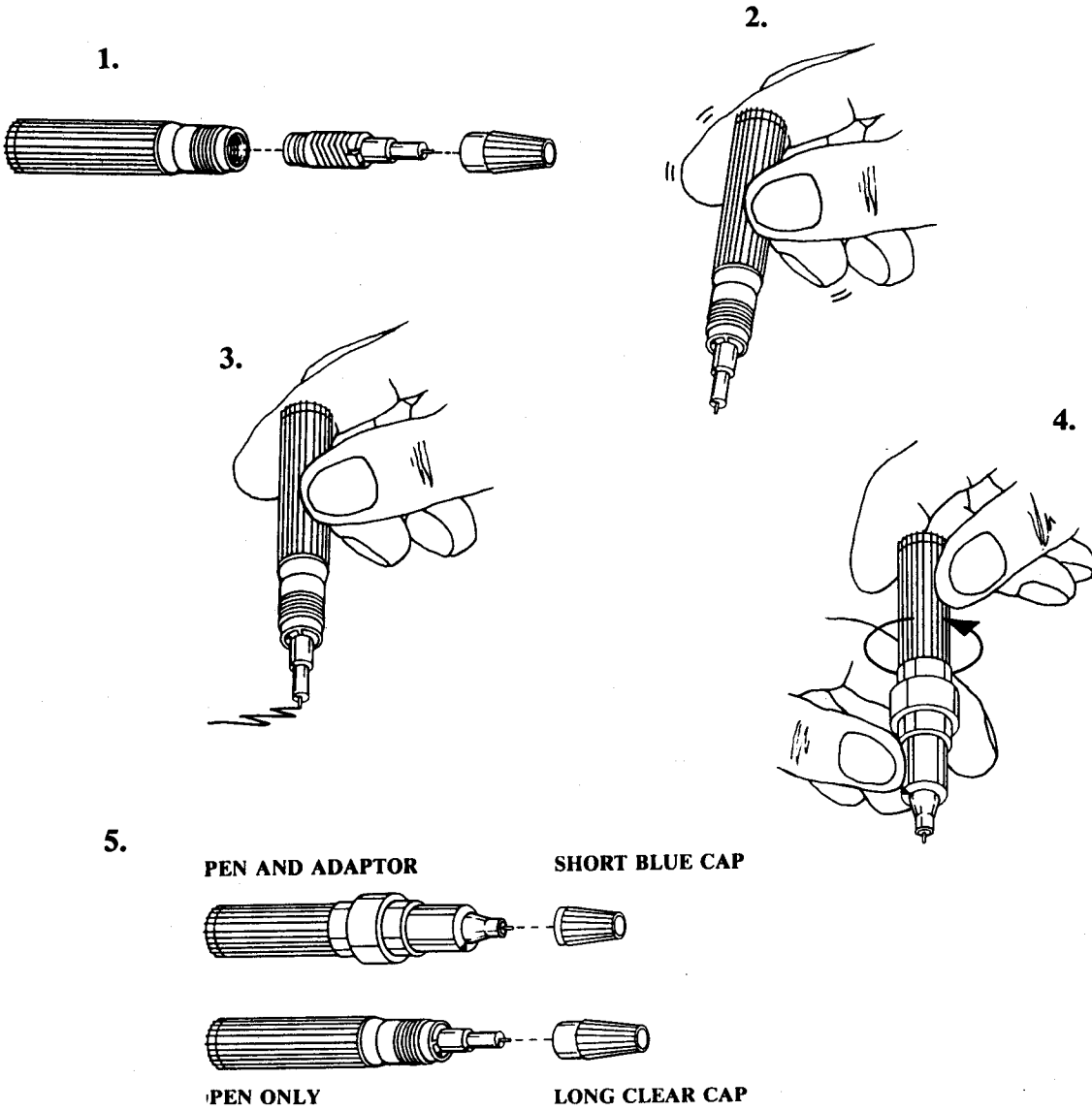
The pens that are supplied with your plotter are disposable stainless steel technical drafting pens specially designed for your plotter. A variety of pen tip sizes and other plotting accessories are listed in Paragraph 1.2.1.

The following procedure explains how to install and use disposable stainless steel and tungsten tip technical drafting pens.

1. Insert a pen tip into each ink cartridge and then place a cap on each pen. To use a pen for the first time, press downward on the pen cap to push the nib into the body of the ink cartridge to break its seal. See Figure 1-9.
2. After the seal is broken, the ink will slowly drain between the ribs of the pen tip and the ink cartridge. If the ink does not appear, activate the pen again as described in step 1. Remove and save the pen cap.
3. Hand draw on scrap H.I.-Frost (opaque bond) or vellum to verify its operation.
4. Screw the pens into the adaptors (the pens only fit into the adaptors the correct way). The pens are ready for use.
5. When a pen is not in use, cap and store it in the storage box in a vertical position (pen tip up). Use the short blue pen cap if the pen is in the adaptor. Use the long clear pen cap if the pen is not in the adaptor. Before using the pen again, sharply tap the pen body (not the tip) on a hard surface to restart the flow of ink.

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**FIGURE 1-9.**  
**DISPOSABLE STAINLESS STEEL OR TUNGSTEN DRAFTING PEN**



## **1.8.1 Pen Care**

The following paragraphs describe the simple pen care requirements for the plotter pens.

All plotter pen types must be capped when not in actual use. If the plotter has the optional multi-pen changer accessory installed, disposable and refillable drafting pens may be stored in the pen stalls. (Hard nib and roller ball pens are not capped in the pen changer unit.) For long-term storage, you may also store the pens by removing them from the pen stalls, capping them with the provided caps, and sealing them in a plastic bag. Drafting pens that have been unused for a few days should be checked for ink flow before use, whether they have been individually capped or stored in a pen stall.

### **1.8.1.1 Hard Nib and Roller Ball Pens**

The hard nib and roller ball pens are disposable pens that have no particular care requirements other than to keep them capped when they are not in actual use. (These pens are not capped in the optional multi-pen changer accessory.) Test the pen on a piece of scrap plotting material to verify operation.

A hard nib pen with dried ink can sometimes be saved by dipping the pen point in water, then rubbing the point on scrap media to restart ink flow.

### **1.8.1.2 Disposable Stainless Steel and Tungsten Drafting Pens**

The stainless steel and tungsten drafting pens are disposable technical pens that have no particular care requirements other than to keep them capped when they are not in actual use or they are not stored in the optional multi-pen changer accessory. Cap the pen with the short blue cap if the pen is inserted in an adaptor as described in Paragraph 1.8. Otherwise, cap the pen with the long clear cap.

You must first activate the pens before using them for the first time. This is explained in Paragraph 1.8.

The disposable drafting pens work equally well on matte film and vellum at high acceleration and velocity rates. Since there is pen tip wear, it is recommended that the pens be used on one type of media for the life of the pen. If you use both matte film and vellum, use one pen set for film and one set for vellum to obtain the best plot quality and to prevent damage to the media.

There are no special cleaning requirements for these pens. A pen with dried ink can often be restarted by holding the pen point upward and sharply tapping the reservoir against a hard surface several times. Capping a dried pen for a few days may allow the ink to dissolve the clog. Also, these pens can often be restarted by dipping the pen point in water or an ultrasonic cleaner, then rubbing the point on scrap plotting media.

### 1.8.1.3 Refillable Tungsten Pen

The tungsten pens are refillable technical pens for plots on vellum or film. Refer to Figure 1-10. These pens should be capped when not in actual use. The pens are automatically capped when installed in the stable assembly of the multi-pen changer accessory. Like any technical drawing pen, these pens must be occasionally cleaned and filled with ink for proper operation.

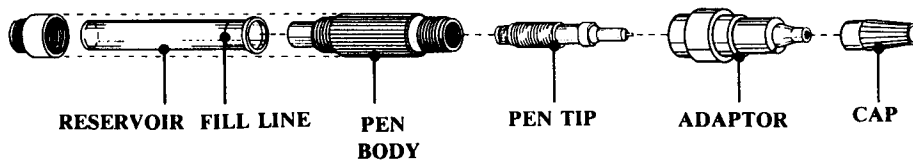
To fill the pen, remove the pen reservoir and add ink, up to the fill line as shown in Figure 1-10. For best results, do not fill past this line. Also note that these pens should be refilled before the reservoir is empty. To start the flow of ink, turn the pen point downward and gently tap the top of the reservoir. Test the pen on a piece of scrap plotting material to verify operation. Then install an adaptor on the pen body for use in the plotter. Never shake the pen as this may cause the ink to clog the air vents and prevent the flow of ink.

#### CAUTION

If the pen tip is taken apart, be very careful not to bend the cleaning wire inside the tip.

For best results, remove the ink reservoir and thoroughly clean the pen tip after each use using an ultrasonic drafting pen cleaner and solution. Wash the reservoir in tap water. Then thoroughly dry the parts and reassemble the pen. Pen care products are available from any drafting supply store. Note that you should thoroughly clean a pen if you plan to use another ink color in it.

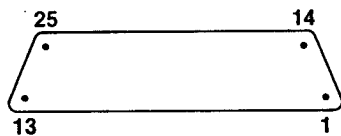
A tungsten pen with dried ink can sometimes be restarted by dipping the pen point in water or denatured alcohol, then rubbing the point on scrap plotting media.



**FIGURE 1-10. REFILLABLE TUNGSTEN PEN**

## 1.9 SERIAL RS-232-C INTERFACE

The serial RS-232-C interface enables the plotter to be connected to and controlled by an RS-232-C-compatible host computer system. The plotter is equipped with a standard RS-232-C DB-25P connector on its rear panel (see Figures 1-1 and 1-11) and requires a standard RS-232-C DB-25S mating connector.



**FIGURE 1-11. REAR PANEL RS-232-C CONNECTOR**

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The plotter's RS-232-C circuitry is considered as DTE type equipment, which means *the plotter always transmits data on pin 2 and receives data on pin 3*. Table 1-10 lists the active signals/pins on the plotter's RS-232-C connector and their direction of travel. Each signal is explained below.

- Transmit Data, pin 2. The plotter uses this pin to transmit data to the computer while operating in DM/PL Mode One XON/XOFF or DM/PL Mode Two or the HPGL Handshake Modes, or any DM/PL or HPGL command that sends data to the computer.
- Receive Data, pin 3. The plotter *always* receives data from the computer on this pin.
- Request To Send (RTS), pin 4, and Data Terminal Ready (DTR), pin 20. These two pins are internally connected in the plotter. This signal is used during Mode One hardware handshaking. A high signal level tells the computer that the plotter is ready for more data (the plotter buffer is not full). A low signal level tells the computer to wait until the plotter can accept more data (the buffer is full). Some computer models require a constant high signal level from these two pins. If this requirement applies to your computer, a constant high signal level at pin 4 (RTS) and pin 20 (DTR) can be specified from the menu (see Paragraph 2.4).
- Signal Ground, pin 7. Required signal ground.

**TABLE 1-10. PLOTTER'S RS-232-C CONNECTOR SIGNALS (DTE)**

PIN NUMBER AND SIGNAL NAME	SIGNAL DIRECTION
PIN 1—Chassis (earth) ground	Common
PIN 2—Transmit data (TD)	From Plotter
PIN 3—Receive data (RD)	To Plotter
PIN 4—Request To Send (RTS)*	From Plotter
PIN 7—Signal (board) ground	Common
PIN 14—Auxiliary Transmit Data†	To Plotter
PIN 16—Auxiliary Receive Data†	From Plotter
PIN 20—Data Terminal Ready (DTR)*	From Plotter

\*PINS 4 and 20 are internally jumpered, and the signal levels can be specified from the menu to either toggle or remain high.

†See Paragraph 1.9.1.

The remainder of this section includes instructions on how to fabricate data cables for various types of handshaking and how to connect them to the plotter and the computer. Read this section thoroughly even if you have purchased our factory prefabricated cables—the information may be useful in the future if you decide to replace your computer system or use the plotter on another system that has a different handshake sequence. Before attempting to connect the plotter to your system, consult the computer owner's manual and determine what your computer's interface signal requirements are. (If your software gives a cable configuration, you must use that connection.) In general, you'll need to know:

- Which RS-232-C I/O port is recommended by your computer's manufacturer for use with other external equipment?
- Is your computer considered as DCE or DTE type equipment?
- What is the cable configuration that is required by your software to perform handshaking functions?
- Does your computer/modem require Request To Send (RTS) and/or Data Terminal Ready (DTR) signal response?

### NOTE

If you have a problem interfacing the plotter and the computer (DM/PL active), activate the plotter's communication error checking routine by entering the DM/PL menu and selecting the *REPORTED* option for the *COMM ERRORS* parameter (see Paragraph 2.4). The communication error checking routine allows the plotter to detect and identify data line problems. If problems are detected, error codes are displayed on the control panel LEDs (see Appendix A). 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 unnecessary baud rate error codes as it attempts to match baud rates.

After a good communication link has been established, deactivate the communication error checking routine by selecting the *IGNORE* option for the DM/PL menu *COMM ERRORS* parameter. Although the plotter will operate with the routine activated, it is not necessary to have the routine active during normal operation.

If you did not purchase factory prefabricated data cables with your plotter, you may consider making a cable specifically for the type of handshake used by your computer and software before trying to set up a communication link using any spare RS-232-C cable that you may have. Because of the many misinterpretations of the RS-232-C "standards" in the commercial computer industry, a working cable on one system or software may prove useless on another.

Cable fabrication is inexpensive and requires very little technical skill. Your local dealer or electrical parts house can supply you with the cable wires, end connectors, and the tools you will need to construct a quality cable. When constructing a data cable, always shield each individual signal wire, as well as the entire cable, to prevent internal "cross-talk" and electrical noise from occurring. The mating connector for the plotter's rear panel connector must be an RS-232-C DB-25S connector. Your computer owner's manual will supply the type of mating connector required for your equipment. The overall length of a data cable should be limited to 15 feet (4.6 meters).

The number of signal wires required in your cable and the pin numbers on the end connector you should connect them to depends on the device type of your equipment (DCE or DTE) and the type of handshaking required. Specific interface instructions for many popular computer models are listed in Appendix E.

### WARNING

RS-232-C DB-25 connectors use pin 1 for chassis ground. Although this signal is not required for operation, its function is similar to the earth ground prong on three-contact ac plugs. Regardless of the type of cable you construct, it is highly recommended to always connect pin 1, chassis ground, at both end connectors.

Use the menu to specify baud rate and parity (see Paragraph 2.4).

Before you connect the plotter to your computer system with the data cable, check the computer owner's manual for cabling precautions from its manufacturer, and power down the plotter. Plug one end of the data cable into the computer's RS-232-C I/O port connector, and then plug the other end of the cable into the plotter's rear panel RS-232-C data connector. Power up the plotter and then the computer system.

#### 1.9.1 (RS-232-C) Pass-Through Port Feature

The pass-through port feature enables you to transmit the data received by the plotter from the host computer to an auxiliary CRT device.

To connect an auxiliary CRT device to the host computer/plotter configuration, three additional signal wires must be connected from the plotter's rear RS-232-C connector to the CRT. These signal connections are shown in Table 1-11.

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TABLE 1-11. RS-232-C PASS-THROUGH PORT SIGNAL CONNECTIONS

COMPUTER SIGNAL PIN (DCE)	PLOTTER SIGNAL PIN (DTE)	AUXILIARY (CRT) SIGNAL PIN (DTE)
PIN 1 (CHS GRD) TO PIN 2 (RD) TO PIN 3 (TD) TO PIN 7 (SIG GRD) TO	PIN 1 (CHS GRD) TO PIN 2 (TD) PIN 3 (RD) PIN 7 (SIG GRD) TO PIN 14 (ATD) TO PIN 16 (ARD) TO	PIN 1 (CHS GRND)   PIN 7 (GRND) PIN 2 (ATD) PIN 3 (ARD)

CHS GRD=Chassis Ground

RD=Receive data

TD=Transmit data

SIG GRD=Signal Ground

ATD=Auxiliary Transmit Data

ARD=Auxiliary Receive Data

An illustration of this type of connection is shown in Figure 1-12.

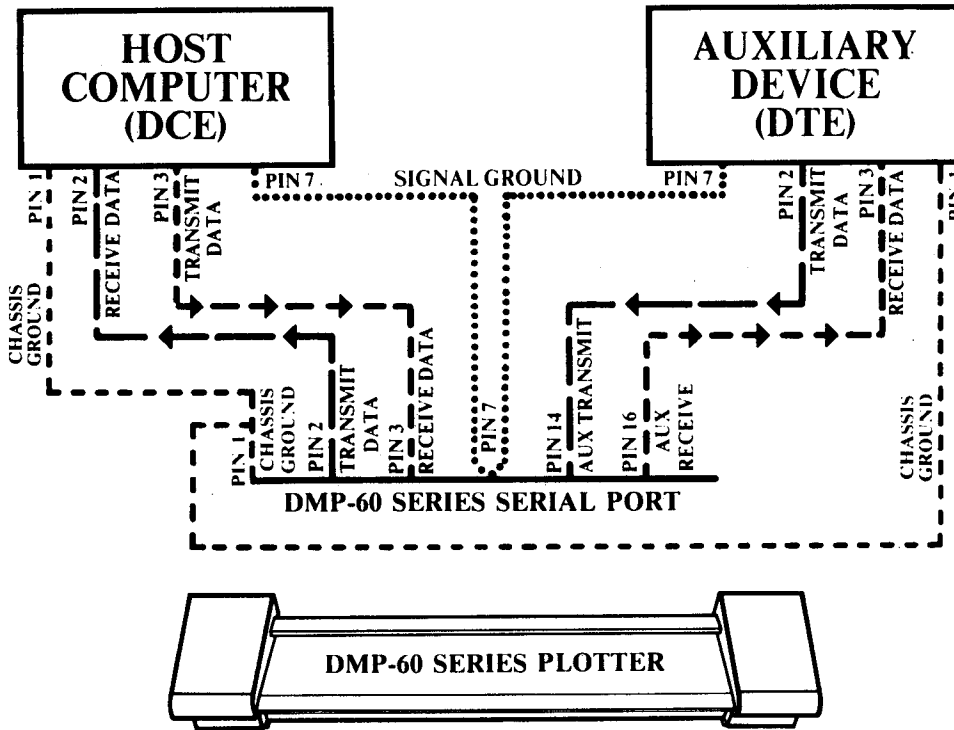


FIGURE 1-12. PASS-THROUGH PORT CONFIGURATION

After the signal connections are made, the type of control you want for the pass-through port data from the plotter (pin 16) to the CRT (pin 3) can be specified in the DM/PL menu (see Paragraph 2.5). If the *ALWAYS ON* option is selected for the *PASS-THROUGH PORT* DM/PL menu parameter, this feature will remain active. If the *TOGGLE* option is selected, this feature can be toggled on by using the DM/PL Pass-Through Port (X) command.

## CAUTION

Use only pins 14, 16, and 7 to connect an auxiliary device to the plotter. If an auxiliary device is connected to the plotter and XON/XOFF (Mode One) handshaking is used, make certain that the device connected to the plotter's pass-through port does not transmit an XON/XOFF handshake while the plotter is operating. This may cause the host computer to respond to the wrong handshake signal and transmit erroneous plot codes.

## 1.10 DM/PL DIGITIZE MODE

### NOTE

If you are operating with HPGL, refer to Section 4 for HPGL Digitize mode information.

DM/PL Digitize mode enables the plotter to transmit the x,y-coordinate of the present position of the pen to the computer for processing. This information is transmitted on pin 2 of the plotter's interface. Digitize mode must be activated by entering the DM/PL Digitize (ED) command from the computer (see the DM/PL manual).

Your computer must be programmed to receive the x,y-coordinate data, which is ASCII BCD format, from the plotter. (Consult your computer's software manual for programming instructions.) The data from the plotter consists of two, six-digit, signed<sup>1</sup> coordinates in parentheses, followed by a carriage return <CR> terminator.

The following is an example of a digitized x,y-coordinate data point:

```
( 001200, 000850) <CR>
```

After the plotter receives an ED command, it switches to local mode (the LOAD and LOCAL indicators are on) and the ENTER indicator flashes on and off. The ◀, ▲, ▶, and ▼ keys can then be used to move the pen to the location of the point to be digitized. (The CLIP LL, CLIP UR, SCALE LL, and SCALE UR keys can also be used to move the pen to the present window/scale box points.)

<sup>1</sup> A positive value is signed with a "space," and a negative value is signed with a minus ( - ) sign.

After the pen is positioned, press **ENTER**, and the plotter will transmit the position of the pen to the computer. The **ENTER** indicator will then turn off, and the plotter will beep and return to remote mode. (After the plotter enters remote mode, the pen will return to the location where it was prior to the **ED** command.) Repeat this procedure for each point to be digitized.

The following sample program demonstrates the use of the digitizing function of the plotter. The program is for an IBM PC<sup>™</sup> using BASIC.<sup>™</sup> Before running this program, use the plotter **DM/PL** menu to set 9600 baud and even parity (see Paragraph 2.5).

IBM PC:

```
20 OPEN "COM1:9600,E,7,2,CS,DS " AS #1
30 PRINT #1," ;; H"
40 FOR I = 1 TO 10
50 PRINT #1,"ED"
60 INPUT #1,X$,Y$
65 X=VAL(RIGHT$(X$,6)):Y=VAL(LEFT$(Y$,6))
70 PRINT X,Y
80 NEXT I
90 PRINT #1," Z"
100 END
```

- Line 20 — configures the serial port for input and output
- Line 30 — initializes the plotter and sends the pen to Home position
- Line 40 — FOR loop that allows ten points to be digitized
- Line 60 — inputs x- and y-coordinates from the plotter
- Line 65 — decodes x- and y-coordinates
- Line 70 — prints x- and y-coordinates to the screen
- Line 80 — NEXT statement for FOR loop in line 40
- Line 90 — software resets the plotter at the end of the buffer

### 1.11 THE ONE-MEGABYTE EXTENDED BUFFER BOARD ACCESSORY

The extended buffer board accessory enables you to expand the plotter buffer by an additional one-megabyte. When data is received at the plotter's RS-232-C port, it is automatically stored in the extended buffer if one is installed and is activated in the menu. The extended buffer board is activated for use with a desired plotting language by selecting the *ON* option of the *OPTION BOARD* parameter in either menu (see Paragraph 2.4).

To replot all of the data in the extended buffer, place the plotter in local mode by pressing the LOCAL key, and then press the ◀ and ▶ keys simultaneously. If the buffer is empty, the plotter will draw the Europlot design. The plotter will also draw the Europlot if more than one megabyte is sent to the buffer before resetting the plotter.

To plot a string of DM/PL files from the extended buffer, first clear all previous data from the buffer by pressing the RESET key. If you want each DM/PL file to be plotted on separate charts, your software must include a DM/PL End of Plot (e) command at the end of each file. (Some applications, such as multi-layered pc board plots, require different files to be plotted on the same chart. To create these types of plots, the software should not use the DM/PL End of Plot command in the plot code.)

To plot the first file in the string, press the LOCAL key and then the ◀ and ▶ keys simultaneously. After the first file is plotted, the DM/PL End of Plot command will cause the DMP-60 to stop and flash the plot command condition code on the LEDs. (The plot command condition code causes the RESET LED to flash on and off as explained in Appendix A.) After changing charts and pressing the LOAD key to load the media, press the LOCAL key to continue. The plotter will automatically size the chart and begin plotting the next plot file stopping at each End of Plot command until the buffer has been completely replotted. After the last file is plotted, the string of buffer files can then be restarted. If end of plot commands are not present, the buffer files will plot over each other. The buffer files must be plotted sequentially. For example, to plot buffer file number three, the two preceding files must be plotted first.

The extended buffer also enables you to plot one file several times without having to reload it each time from the computer. Reset the plotter to clear the buffer of all previous data. After you have loaded the file into the extended buffer, you can plot it as many times as you need by pressing LOCAL, and then ◀ and ▶ simultaneously. (Use only the LOAD key to load new media when changing charts. The RESET key will empty the extended buffer.)

To clear all data from the extended buffer, press the RESET key.

The extended buffer board RAM is checked by the plotter at each power up. If an error is detected in the RAM at power up, the LOAD and LOCAL indicators will flash on and off as shown below.

□      \*      \*      □

If a RAM error occurs, service is required (see Paragraph 5.3).

