DMP-40V

OPERATION MANUAL

****

0188

MI9009

DISCLAIMER OF USE

Houston Instrument DMP-40V Cutters produce high-quality design outlines when used in accordance to the instruction manual. These cutters are not intended for any other use.

No customer serviceable repairs within this instrument. All repairs are to be made by qualified factory-trained technicians.

NOTICE

 Please address all questions, comments, or suggestions concerning this and other Houston Instrument manuals to:

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GENERAL INFORMATION AND OPERATION

1.1 INTRODUCTION

The Houston Instrument DMP-40V cutter provides you with the means to produce computer-generated graphic images on sheet vinyl media. The DMP-40V can also be fitted with ball-point pens and paper media to enable you to create low-cost previews of your ideas for new graphic designs.

1.2 SPECIFICATIONS

PLOTTER CUTTER HARDWARE

DIMENSIONS

Overall Height	200 mm (7,8 inch)
Width	665 mm (26 inch)
Depth	250 mm (9,8 inch)
Net Weight	6,6 kg (14,5 pounds)

MEDIA

Types : paper : for use with pen

rubylith

vinyl film :

ex. 3M Scotchcal 3650
3M Scotchcal 3690
3M Scotchcal 100/CAD film
3M Controltac 180, 170, 155

Sizes : width min 400 mm (15,7 inch)
max 420 mm (16,5 inch)

tickness : 0,05 mm (0.002 inch) to
0,10 mm (0.004 inch)

Hold down system : pinch roller

Maximum cutting size : 330 mm width

PEN

ball point

KNIFE

coated tungsten carbide
angle : 36° or 45 °
lifetime : min 5000 m cutting length

PERFORMANCE

SPEED DMPL(V) Command programmable V1 : 0,7 inch/sec
V2 : 1,5 inch/sec
V3 : 2,0 inch/sec axial

ADDRESSABLE RESOLUTION

selectable : 0,1 mm
0,001 inch
0,005 inch

MECHANICAL RESOLUTION

0,06 mm (0,0025")

POWER REQUIREMENTS

14 Volt AC Transformer unit supplied with plotter
50-60 Hz
40 VA
Power mains : 220 V - 7%

MECHANICAL - ELECTRICAL DATA

DRIVER stepper motor

INTERFACE asynchronous serial RS232C

I/O PORT CONNECTOR standard male DB-25P
pin configuration : pin 2 transmit
pin 3 receive
pin 7 ground
pin 4 + 20 handshake

MATING CONNECTOR

standard female DB-25S (not included with instrument)

BYTE FORMAT

8 bits, no parity, 2 stop bits

BAUD RATE

300, 600, 1200, 2400, 4800 or 9600
(factory set for 9600 baud)

FIRMWARE

DM/PL (TM) compatible
Special commands to control the knife
- Knife rotation (N) command : Nnnn
- Knife Blade Threshold (B) command : Bnnn
- Knife Blade Home (K) command : K

ENVIRONMENTAL RANGE

- Operating temperature : 0 - 35° C (32-95° F)
- Relative humidity : 30 - 80% (non condensing)

1.3 REAR PANEL CONTROL COMPONENTS

This section describes the functions of the DMP-40V rear panel control components. The components are illustrated in Figure 1-1.

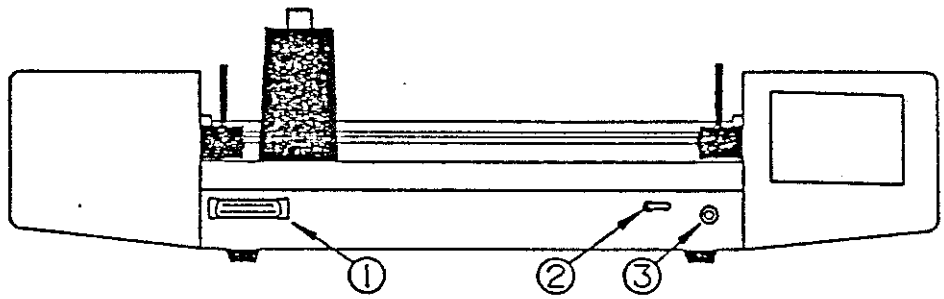

FIGURE 1-1. REAR VIEW OF DMP-40V

1 DATA PORT CONNECTOR: The DB-25P data port connector allows the DMP-40V to be connected to and controlled by a host computer. Interface instructions are explained in Section 1.8.

2 POWER SWITCH: This toggle switch sets the DMP-40V power to on and off.

3 VOLTAGE INPUT JACK: This jack accepts the miniature plug from the Transformer Unit (see Section 1.5).

1.4 FRONT PANEL CONTROL COMPONENTS

This section describes the functions of the DMP-40V front panel control components. The components are illustrated in Figure 1-2.

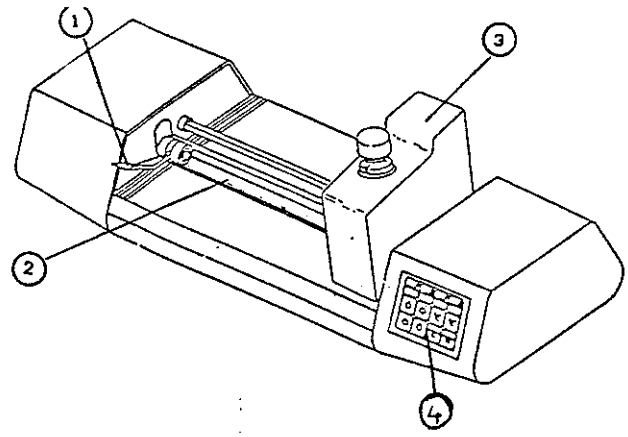

FIGURE 1-2. FRONT VIEW OF DMP-40V

1 PINCH ROLLER LEVER ARMS: The pinch lever arms are used to raise and lower the pinch rollers from the chart drive shaft during chart loading. A pinch roller/lever arm assembly is located at each end of the platen. (Chart loading is explained in Section 1.6.)

2 CHART DRIVE SHAFT: This shaft drives the chart in the x-axis direction. The drive shaft moves the chart only when the pinch rollers are lowered to the shaft.

3 BLADE ASSEMBLY UNIT: The blade assembly unit controls the movement of the DMP-40V knife blade or ball-point pen. The blade assembly is secured to the beam and moves the knife or pen in the y-axis direction.Section 1.7 explains how to install a knife blade or a pen into the blade assembly unit.

4 CONTROL PANEL: The DMP-40V Control Panel consists of 12 membrane switches and four illuminating (on/off) indicators. Only the LARGE, LOCAL, and MANUAL MOVEMENT KEY switches should be used if the DMP-40V is operated in a closed computer configuration.

1.5 POWERING UP THE DMP-40V

WARNING

> The knife blades that are used in the DMP-40V blade assembly unit are **razor sharp** and will cause personal injury if they are handled carelessly. Use extreme care when you are operating the DMP-40V and when you are installing, removing, or storing the knife blades!

Plug the Transformer Unit ac cable into any ac receptacle that has a verified earth ground and the same voltage rating specified on the transformer. Insert the miniature plug, which is on the end of the Transformer Unit dc cable, into the DMP-40V rear panel voltage input jack (see Figure 1-3). Set the DMP-40V power switch to on.

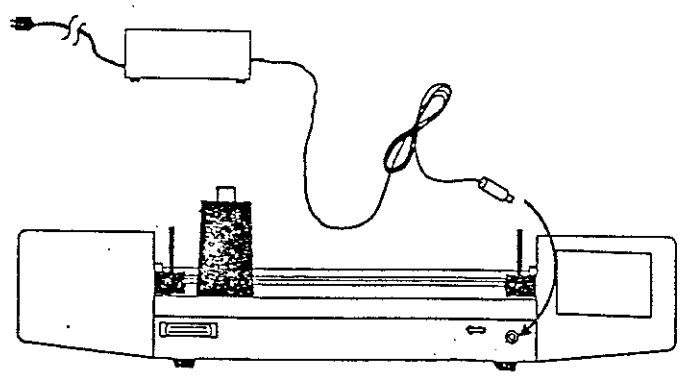

FIGURE 1-3. CONNECTING POWER TO THE DMP-40V

WARNING

The Transformer Unit that is supplied with the DMP-40V must only be used with power mains that have the same ratings.

1.6 CHART LOADING

The DMP-40V can be loaded with either paper or vinyl charts. If chart paper is loaded and the knife blade is replaced with the ball-point pen, the DMP-40V thus becomes a pen plotter which enables you to produce low-cost paper previews of a graphic design. The pen and the paper can then be replaced with the knife blade and vinyl to produce the finished graphic design.

The LARGE Control Panel switch enables you to load charts 400 mm (15.7 inch) wide and up to 2000 mm (80 inches) long without window commands.

To load large charts, follow the procedure below.

1. Set the power switch to on. (The DMP-40V defaults to large chart format at power up.)

2. Raise each pinch roller arm to disengage the rollers from the chart drive shaft.

3. Insert the chart between the pinch rollers and the chart drive shaft and position it as shown in Figure 1-4.

4. After the chart is positioned, lower the pinch rollers to the surface of the chart by gently pushing down on the lever arms.

5. The large chart is now properly loaded.

Note : To guarantee good tracking and repeatability the media must be supported in front and rear of the machine.

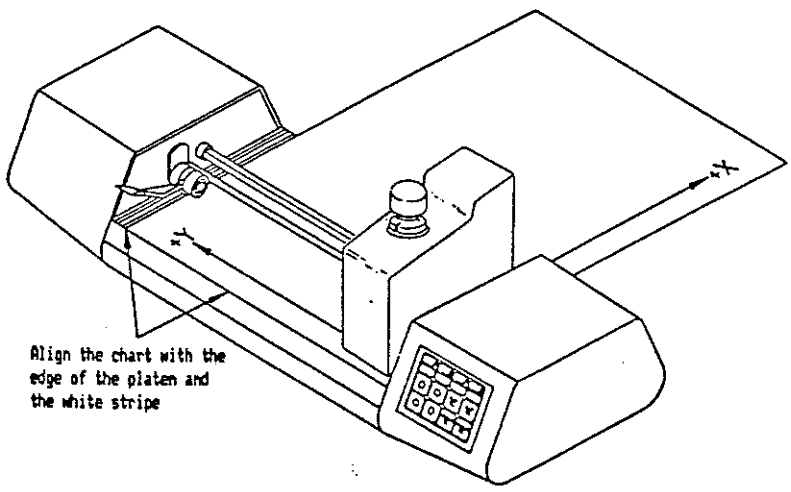

FIGURE 1-4. LOADING LARGE CHARTS

NOTE

If you use roll charts with the DMP-40V,do not allow the cutter to feed the chart from the roll. The tension caused from pulling the chart from its roll may interfere with the DMP-40V tracking.

The LARGE switch is also used to manually reset the DMP-40V.

1.7 INSTALLING BALL-POINT PENS AND KNIFE BLADES

WARNING

The knife blades that are used in the DMP-40V blade assembly unit are **razor sharp** and will cause personal injury if they are handled carelessly. Use extreme care when you are operating the DMP-40V and when you are installing, removing, or storing the knife blades!
Note that the nose piece assembly at the bottom of the blade assembly must be removed when using the ball-point (see 1.7.2)

The procedure below explains how to install a ball-point pen in the blade assembly unit.

1. Remove the depth adjustment knob from the blade assembly unit by turning it counterclockwise (see Figure 1-5).

2. Place the ball-point pen into the hollow shaft of the blade assembly unit as shown in Figure 1-5. Gently press down on the ball-point pen until it seats against the bottom of the blade assembly unit.

3. Attach the depth adjustment knob to the blade assembly unit. Turn the knob clockwise until you can see the tip of the ball-point pen emerge from the bottom of the blade assembly unit.

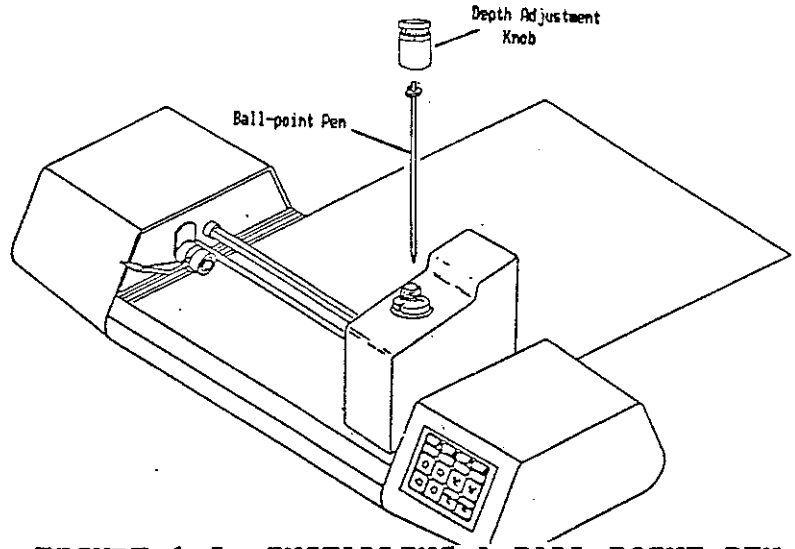

FIGURE 1-5. INSTALLING A BALL-POINT PEN

The procedure below explains how to install a knife blade in the blade assembly unit. Note that the nose piece assembly has to be installed before installing the knife blade (see 1.7.2).

1. Remove the depth adjustment knob from the blade assembly unit by turning it counterclockwise (see Figure 1-6).

2. Place the knife into the hollow shaft of the blade assembly unit as shown in Figure 1-6. Align the key on the shaft of the knife with the groove on the blade assembly unit and then gently press down on the knife until it seats against the bottom of the blade assembly unit.

3. Attach the depth adjustment knob to the blade assembly unit by turning it clockwise until it is finger-tight. **Do not operate the cutter until after you have adjusted the knife to its proper cutting depth as explained in Section 1.7.1.**

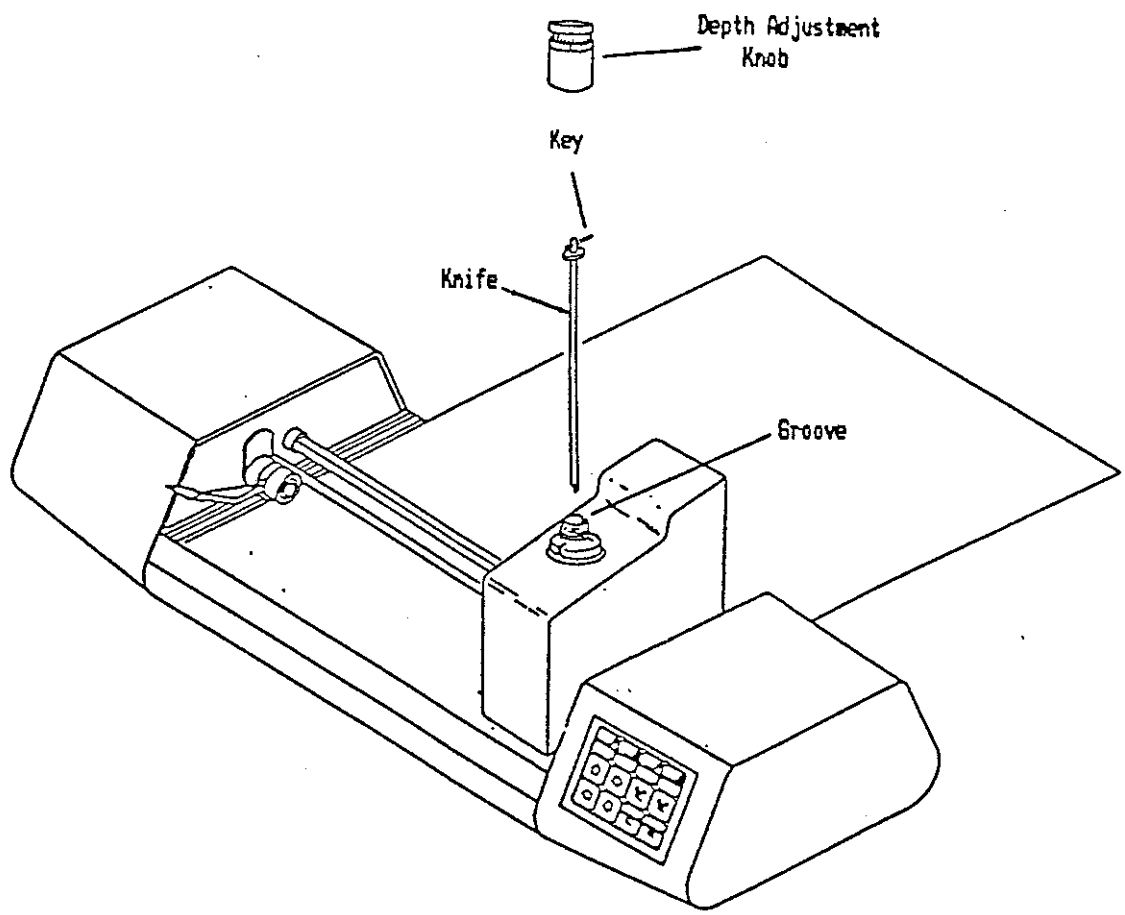

FIGURE 1-6. INSTALLING A KNIFE BLADE

1.7.1 Adjusting the Depth of the Knife Blade

After a knife blade has been installed, it must be adjusted to its proper cutting depth. The following procedure explains how to make this adjustment.

1. Install a sheet of vinyl into the DMP-40V as described in Section 1.6.

2. After installing the knife blade into the blade assembly unit as described in Section 1.7, slowly turn the depth adjustment knob counterclockwise or clockwise until **the tip of the knife** is flush with the bottom of the blade assembly unit. (The tip of the blade should barely be visible from the bottom of the blade assembly unit.)

3. Initiate the Self-Test routine by pressing the LOCAL switch on the Control Panel, and then pressing [⇧] and [⇩] simultaneously.

4. After the DMP-40V completes its Self-Test routine, remove the vinyl sheet and check the quality of the cut of the Self-Test design. To increase the depth of the cut, slightly turn the depth adjustment knob clockwise. To decrease its depth, turn the adjustment knob counterclockwise. (Each calibration increment on the knob represents 0,01 mm (0.0004 inch.)

NOTE

The Self-Test plot can be temporarily halted by pressing the LOCAL switch on the Control Panel.To resume the test plot, press LOCAL again.

1.7.2. Removing and installing the nose piece assembly (with nose piece tool).

NOTE

When using the ball-point pen, the nose piece assembly must be removed. In all other cases the nose piece assembly must be installed.

Removing :

1. Turn the power off.

2. Remove the knife blade assembly (when installed) as explained in section 1.7.

3. Move the cutter head to the middle of the instrument.

4. Position the nose piece tool in line with the drive shaft. Turn the adjustment knob so that it is in line with the nose piece tool. Push gently against the nose piece tool until it clips out of the blade assembly.

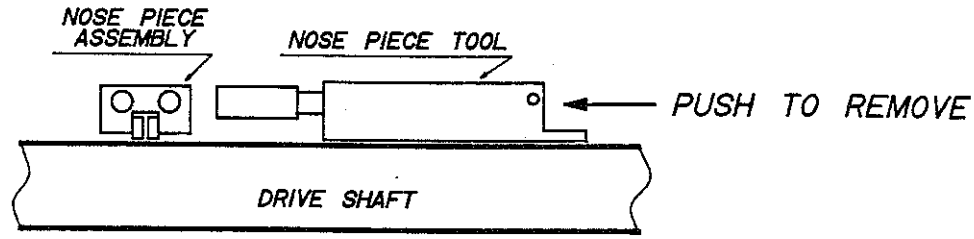

FIGURE 1-7. REMOVING THE NOSE PIECE ASSEMBLY

Installing :

1. Turn the power off.

2. Remove the ball point pen (when installed) as explained in section 1.7

3. Move the cutter head to the middle of the instrument

4. Clip the nose piece assembly in the nose piece tool as shown in figure 1-8.

5. Position the nose piece tool with installed assembly in line with the drive shaft as shown in figure 1-8.

6. Turn the adjustment knob so that the slot of the nose piece holder is in line with the nose piece tool. Now push gently the shaft of the nose piece in the direction of the head, until it hits the stop.

7. Make sure that the nose piece assembly is well positioned in its holder (eventually press down the adjustment knob)

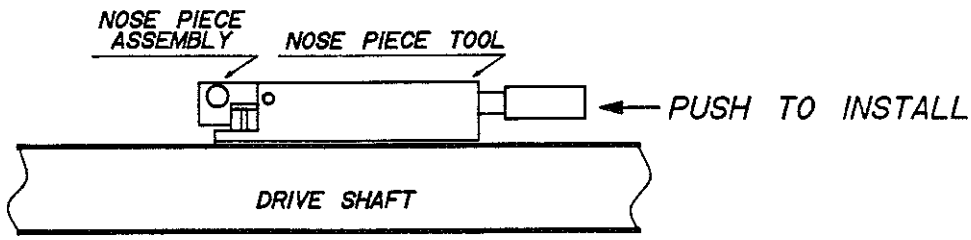

FIGURE 1-8 : INSTALLING THE NOSE PIECE ASSEMBLY

1.8 COMPUTER INTERFACE

The DMP-40V is equipped with a rear panel I/O data connector, which allows all cutting activity to be controlled from your computer. Follow the instructions below to connect the data cable to the DMP-40V and the computer.

1. Turn the power off to both the DMP-40V and computer.

2. Refer to your computer owner's manual for possible warnings or recommendations from its manufacturer concerning the connection of external devices to their equipment.

3. Connect one end of the cable to the DMP-40V rear panel I/O connector and the other end to a communication port connector on your computer.

4. Power up the DMP-40V and the computer.

The DMP-40V power up default communication set up is 9600 baud, seven data bits, two stop bits, no parity with bit number eight set to zero. The DMP-40V connector pins and signal names are provided in Table 1-1.

TABLE 1-1. DMP-40V RS-232-C CONNECTOR SIGNALS (DTE)

PIN NUMBER AND SIGNAL NAME	SIGNAL DIRECTION
PIN 1 -- Chassis ground	Common
PIN 2 -- Transmit data (TD)	From DMP-40V
PIN 3 -- Receive data (RD)	To DMP-40V
PIN 4 -- Request To Send (RTS)*	From DMP-40V
PIN 7 -- Signal ground	Common
PIN 20 -- Data Terminal Ready (DTR)*	From DMP-40V

* PINS 4 and 20 are internally jumpered.

1.9 LOCAL OPERATION

The DMP-40V can be placed in local mode by pressing the LOCAL switch on the Control Panel. (The LOCAL LED indicator illuminates when the DMP-40V is in local mode.)

If the DMP-40V is placed in local mode, the blade assembly and chart can be manually moved by using the ↑, →, ↓, and ← switches.

A DMP-40V Self-Test can also be initiated if the cutter is placed in local mode. To initiate the Self-Test routine, press the ↑ and ↓ switches simultaneously.

To return the DMP-40V to computer control, press the LOCAL switch again. (The LOCAL LED indicator turns off when the cutter is placed in remote mode.)

SECTION 2
=========
OPERATOR MAINTENANCE

2.1 Miscellaneous Maintenance

The DMP-40V has several sliding surfaces. These are made of smooth metals and plastic so that they are essentially friction free and require no lubricants. These will, however, collect dust and lint which will adversely influence the performance of the DMP-40V. Keep the cutter as clean as possible by using a dust cover. When necessary, clean the unit with a soft cloth dampened with isopropyl alcohol or mild detergent. (Do not use abrasives.)

To clean the unit, use a clean cloth dipped in a concentrated solution of soap and water; squeeze out excess water and then scrub the affected surface. Do not use any aerosol cleaners, such as TV contact cleaner, household wall cleaners, or anything containing a solvent; these may damage certain components.

2.1.1 Cleaning Friction Drive Wheels

The friction drive wheel area of the drum can become clogged with accumulated residue from the media. This can cause slippage of the cutting material between the drive drum and the pinch rollers, resulting in inaccurate design cuts.

The following procedure explains how to clean the friction drive wheels when necessary. Note that the special cleaning strips (part number DMP40-303) are available from your Houston Instrument product distributor.

1. Remove the cutting material from the unit.

2. Place the DMP-40V in local mode by pressing LOCAL.

3. Remove the protective liner from the cleaning strip.

4. Open the right pinch roller arm.

5. Place the cleaning strip between the pinch roller and the drive drum, with the tacky side of the cleaning strip toward the friction drive wheel as shown in Figure 1-7.

6. Using the ↑ and ↓ switches on the Control Panel, slew the cleaning strip back forth several times until all residue is removed from the friction drive wheel.

7. Open the right pinch roller arm and remove the cleaning strip.

8. Repeat steps four through seven for the left friction drive wheel.

9. Residue can be removed from the cleaning strip by washing it in cold water. Thoroughly dry the cleaning strip and replace its protective lining.

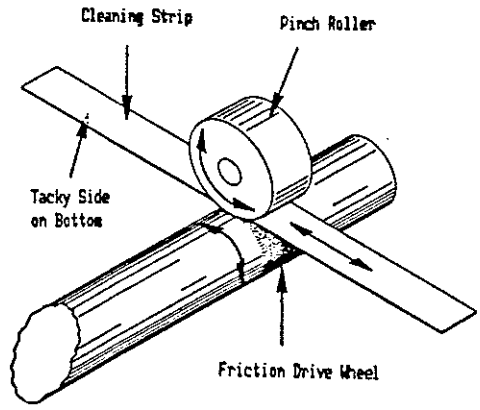

FIGURE 2-1. CLEANING FRICTION DRIVE WHEELS

2.1.2 Cleaning the nose piece assembly

The nose piece assembly can become clogged with accumulated residue from cutting materials. This can cause bad or insufficient quality of your cutted sign or logo. The following procedure explains how to clean the nose piece assembly when necessary :

Cleaning :

1) Turn the power off.

2) Remove the knife blade assembly

3) Remove the nose piece assembly as described in 1.7.2

4) Clean the nose piece assembly with a brush so that all dirt (glue, pieces of vinyl) are removed between the small rollers. (If needed use a small pick)

SECTION 3
DM/PL COMMAND SPECIFICATIONS

3.1 INTRODUCTION

The DMP-40 series commands are listed in Section 3.2. These commands should be used only as a quick reference. A full description of each command is provided in the DM/PL Command Language Manual (MI-1044).

Section 3.3 lists and describes DM/PL commands that are special to the DMP-40V. These commands control the action of the DMP-40V knife assembly unit.

3.2 DM/PL COMMAND DESCRIPTIONS (DMP-40 SERIES)

The following list of DM/PL commands are supported by DMP-40 series plotters.

Plotter Select Commands:

Mode One Select

```
;:
```

Mode Two Select

```
;:Ipc d,  or  ;:I(nn nn nn nn)pc d,
```

pc is your computer's prompt code and d is the delay time. (nn nn nn nn) are optional prompt code specifiers.

Plotter Deselect

```
@
```

Plot Setup Commands:

Set Velocity

```
Vn,
```

n selects the velocity:
1 selects 1 ips
2 selects 1,5 ips
3 selects 2,0 ips

Set Window/Viewport Limits

W wxll,wyll,wxur,wyur,vpxll,vpyll,vpxur,vpyur,

wxll,wyll is the window x,y lower left coordinate.
wxur,wyur is the window x,y upper right coordinate.
vpxll,vpyll is the viewport x,y lower left coordinate.
vpxur,vpyur is the viewport x,y upper right coordinate.

The window and viewport coordinates can be any number between - 32,767 and + 32,767 except vpyur , which cannot exceed pen beam axis. vpyur coordinate must be as follows:

If the resolution is 0.005 inch, vpyur max.=2600.
If the resolution is 0.001 inch, vpyur max.=13000.
If the resolution is 0.1 mm, vpyur max.=3300.

Small Chart

EH

Large Chart

EF

(Mode Two) Prompt Enable

EBnn,

nn is your two-digit hexadecimal prompt enable character.

End of Text

ETnn,

nn is your two-digit hexadecimal end of text character.

Addressing Commands:

Absolute Pen Positioning

A

Relative Pen Positioning

R

Coordinate Addressing

ECn,

n specifies a different resolution setting:
1 selects 0.001 inch
5 selects 0.005 inch
M selects 0.1 mm

Home Position

H

Set Plot Origin

O

Pen Control Commands:

New Pen

Pn,

n select a pen number.

Pen Down

D

Pen Up

U

Line Type Commands:

Line Type

Ln,

n selects a line type.

Move Commands:

Vector Move

x,y,

x, is any number between - 32,767 and + 32,767.
y, is any number between - 32,767 and + 32,767

Incremental Move

n

n is a incremental move code.

Text Commands:

Simple Text

Srhh text string_

r specifies rotation.
hh specifies height.
_ exits Simple Text mode.

Extended Text

S (Sn,Wn,I/NI,Gn,Xn,Yn,) (text string)_

(Sn,) specifies height/width,
(Wn,) specifies width only,
(I/NI) specifies italics or no italics,
(Gn,) specifies a character set,
(Xn,) specifies the x slope point,
(Yn,) specifies the y slope point,
_ specifies end of text mode

Curve Commands:

Circle Plot

CC x,y,r,

x,y, specifies the center point of the circle. The values can be any number between - 32,767 and + 32,767.

r, specifies the radius. The value can be any number between -32767 and 32767.

Arc Plot

CA x,y,d,

x,y, specifies the center of the circle which contains the arc. The values can be any number between - 32,767 and + 32,767.

d, specifies the size of the arc in degrees. This value must be between -360 and +360 (+ causes counterclockwise movement and - causes clockwise movement).

Ellipse Plot

CE x,y,x1,y1,x2,y2,

x,y, specifies the center point of the ellipse. The values can be any number between - 32,767 and + 32,767.

x1,y1, specifies the length of the lateral axis from the center point to the circumference. The values must be a number between -32767 and 32767.

x2,y2, specifies the height of the vertical axis from the center point to the circumference. The values must be a number between -32767 and 32767.

General Curve Plot

CG x1,y1,x2,y2,...xn,yn, CS

x1,y1,x2,y2,.... are points to be connected with the curved line.

xn,yn, determines the slope of the curved line at the last plot point.

The values for all of the x,y coordinates must be numbers between -32767 and 32767.

Marker Commands:

Marker Plot

Mhhm,

hh specifies the height of the marker,
m specifies the type of marker.

Inquiry Commands:

Report

ER

Query

Q

Plotter Control Commands:

Plotter Test

T

Plotter Reset

Z

Plot Pause

EL

UART Setup

EUnnn,

nnn, specifies the type of format for the data transmitted from the Plotter to the computer (200, 201, 206, or 222).

3.3 SPECIAL DMP-40V DM/PL COMMANDS

The following special DM/PL commands control the DMP-40V knife assembly unit.

3.3.1 Knife Rotation (N) Command

Nnnn,

nnn specifies an angle of rotation for the knife blade and is a numeric expression between 0 and 360.

The Knife Rotate (N) command causes the blade on the knife assembly unit to rotate the specified (nnn) degrees. The degree of rotation is absolute to zero degree. The knife assembly unit will raise from the cutting surface to rotate the blade only if the specified angle of rotation (nnn) is outside of the present threshold limit, which is specified by the DM/PL Threshold (B) command (see Section 3.2.2). (The blade will lift to rotate for every Knife Rotate command if the Threshold command specifier nnn is set at zero.)

3.3.2 Knife Blade Threshold (B) Command

Bnnn,

nnn specifies a threshold limit angle for the rotation of the knife blade. nnn is a numeric expression between 0 and 255.

The Threshold (B) command enables you to specify a threshold limit angle for the rotation of the blade. If the threshold angle is set at zero degree, the blade will lift from the cutting surface to rotate when it receives a Rotation (N) command. However, if the threshold angle is set, for example, at 20 degrees, the blade will not lift for rotation for N commands of 20 degrees or less. (The blade rotates to the specified angle while on the cutting surface.) All Rotation commands greater than 20 degrees, in this example, will cause the blade to lift before rotating.

3.3.3 Knife Blade Home (K) Command

K

The K command causes the knife to rotate to its home (zero degree) position. The home position is marked by the notch on the blade assembly unit.