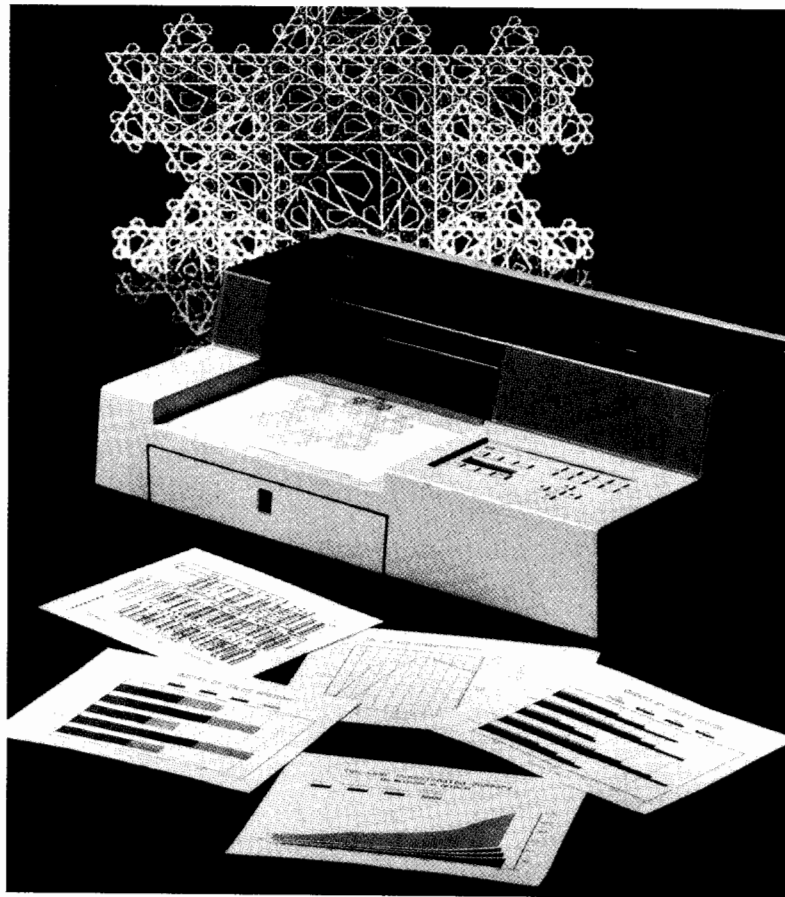


OPERATION AND INTERCONNECTION MANUAL

HP 7550A
Graphics Plotter

RS-232-C/CCITT V.24



©1984 by Hewlett-Packard Company
16399 W. Bernardo Drive, San Diego, CA 92127-1899

HP Computer Museum

www.hpmuseum.net

For research and education purposes only.

How to Use the HP 7550 Documentation

All HP 7550 plotters are shipped with the following three documents.

- **Operation and Interconnection Manual** (Part No. 07550-90002). This is the manual you are reading now. It contains detailed operating information such as how to load paper and pens, how to use the front-panel function keys, and how to obtain quality plots using proper pen/media combinations. It also describes how to connect your computer and plotter.
- **Interfacing and Programming Manual** (Part No. 07550-90001). The Interfacing and Programming manual contains complete explanations of the plotter's graphics and interfacing instructions. It begins with discussions of various programming languages and how to use them with the plotter's instruction set, HP-GL (Hewlett-Packard Graphics Language). It also explains some fundamental plotting concepts to help get you started.
- **Pocket Guide** (Part No. 07550-90003). The Pocket Guide is a convenient reference list of all HP-GL and device-control instructions, along with their parameters.

The following paragraphs describe how you can use these documents, based on your expertise.

For First Encounters with the HP 7550

If you have just received your plotter, read the first three chapters of this manual. These chapters describe initial inspection and explain the front-panel function keys. Next, look for your computer in Chapter 6 and verify communication between your computer and plotter. If you are using a purchased graphics software package, be sure to follow any special instructions provided in the documentation accompanying the software.

Now you can use your graphics software, or you can program the plotter yourself. If you plan to write programs for the plotter, read the following two paragraphs.

For First Encounters with HP-GL

If you have never written programs in HP-GL, begin with the first chapter of the Interfacing and Programming Manual. This chapter will help you decide whether to program with your computer's graphics statements/routines or with HP-GL. The second chapter explains some basic plotting concepts, and the remaining chapters present the HP-GL instructions. The examples given with the instructions will help you learn how the instructions work.

For Experienced HP-GL Programmers

If you are an experienced HP-GL programmer, you might find the Pocket Guide or the instruction summary in Appendix D of the Interfacing and Programming Manual most helpful. Also, look through the manual to learn about the new instructions not found in earlier plotters — for example, the polygon instructions, area-fill instructions, replot instructions, and expanded character sets and character-designing capabilities. If you are interested in the differences in syntax between this and other HP plotters, read Chapter 3 in the Interfacing and Programming Manual.

Table of Contents

How to Use HP 7550 Documentation	i
For First Encounters with the HP 7550	i
For First Encounters with HP-GL	i
For Experienced HP-GL Programmers	ii
 Chapter 1: Owner's Information	1-1
Introduction	1-1
Understanding Manual Conventions	1-2
Initial Inspection and Accessories Inventory	1-2
Accessories Supplied	1-3
Accessories Available	1-4
Input Power Requirements	1-8
Power Options	1-9
Line Voltage Selection	1-9
Fuse Protection	1-9
Grounding Requirements	1-10
Power Cord	1-10
 Chapter 2: Meet the Plotter	2-1
Front-Panel Controls and Indicators	2-1
Rear-Panel Connectors	2-4
Operator Maintenance	2-5
General Cleaning	2-5
Pen Carousel Cleaning	2-6
Grit Wheel Cleaning	2-6
Pen Holder Cleaning	2-7
Shipment	2-8
 Chapter 3: Operating the Plotter	3-1
The Pen Carousel	3-1
Loading Pens and Carousels	3-3
Loading the Digitizing Sight	3-4
Your Carousel Questions Answered	3-6
Turning the Plotter On	3-8
The Plotting Medium	3-9
Loading the Plotting Medium	3-9
Manual Media Loading/Unloading	3-12
Automatic Paper Loading/Unloading	3-13
Clearing Paper Misfeeds	3-14
Front-Panel Operations	3-15
Level 1, Display 1	3-15
Level 1, Display 2	3-18
Level 1, Display 3	3-20

Table of Contents (Continued)

Level 1, Display 4	3-25
Level 2 Overview	3-30
Level 2, Display 5	3-31
Level 2, Display 6: Serial Sublevel	3-33
Level 2, Display 7: Data Compatability Sublevel	3-41
 Chapter 4: Selecting Media, Pens, and Ink	4-1
What Kind of Output Do You Need?	4-1
Understanding Media	4-2
Chart Paper	4-2
Gloss Presentation Paper	4-2
Overhead Transparency Film	4-3
Vellum	4-3
Double-Matte Polyester Film	4-3
Sheet Squareness	4-4
Effect of the Environment on Media	4-4
Understanding Pens and Inks	4-4
Fiber-Tip Pens	4-5
Roller-Ball Pens	4-5
Drafting Pens	4-6
Ink	4-7
Combining Pens and Media	4-7
Purchasing Supplies	4-11
Your Pen and Media Questions Answered	4-11
 Chapter 5: Symptoms and Solutions	5-1
 Chapter 6: Plotter Interconnection	6-1
Introduction	6-1
What If My Computer Isn't Listed?	6-1
What If My System Configuration Is Different?	6-2
I've Done Everything You Said and It Still Doesn't Work	6-3
General Instructions	6-4
Step 1 — Connect Equipment	6-4
Step 2 — Establish Interface Conditions	6-4
Step 3 — Verify Communication	6-5
Computer: HP 120, HP 125 (HP-IB)	6-6
Computer: HP 150 (HP-IB)	6-7
Computer: HP 150 (RS-232-C)	6-9
Computer: HP 3000 (RS-232-C)	6-11
Computer: HP 9000, Series 200 (HP-IB)	6-13
Computer: HP 9000, Series 500 (HP-IB)	6-15

Table of Contents (Continued)

Computer: HP 9000, Series 500 (RS-232-C)	6-17
Computer: Apple II Plus or IIe (RS-232-C)	6-19
Computer: Apple /// (RS-232-C)	6-21
Computer: DEC VAX (RS-232-C)	6-23
Computer: IBM Personal Computer (RS-232-C)	6-25
 Appendix A: Using Drafting Pens	 A-1
Cleaning the Drafting Pen	A-2
Storing the Drafting Pen	A-3
Filling the Drafting Pen with Ink	A-3
Ink Flow	A-5
Rate of Ink Flow	A-5
Pen Force	A-5
Ink Viscosity	A-6
Media Absorbency	A-6
 Appendix B: Reference Material	 B-1
Conditions You Can Store in the Plotter's Nonvolatile Memory	B-1
Plotter Default Conditions	B-2
Additional Default Conditions:	B-3
Conditions Not Affected	B-4
Front-Panel Hierarchy	B-5
Front-Panel Error Messages	B-5
Cable Information	B-6
 Glossary	 G-1
 Subject Index	 SI-1

Apple II Plus, IIe, and Apple /// are products of Apple Computer Inc. DEC VAX is a product of Digital Equipment Corp. IBM PC is a product of International Business Machines Corp.



Chapter 1

Owner's Information

Introduction

This manual contains general information to familiarize you with the capabilities and operation of the HP 7550 graphics plotter. The HP 7550 graphics plotter is equipped with a Hewlett-Packard Interface Bus (HP-IB), which conforms to ANSI/IEEE 488-1978 specifications, and two RS-232-C/CCITT V.24 interface ports. Both interfaces use the Hewlett-Packard Graphics Language (HP-GL) for control of plotter graphics capabilities. Unless specifically noted, all information in this manual pertains to both interfaces.

NOTE: All information in this manual for the RS-232-C interface applies equally to the CCITT V.24 interface. For purposes of simplicity, both are referred to as RS-232-C. ■

This manual is designed to show you how to operate, but not program, the plotter. The information given will enable you to verify that your plotter has not been damaged in shipment and that it is compatible with the power available in your geographic area. It explains each control and indicator, how to make media and pen selections, and how to set up the plotter and run the built-in demonstration plot.

Additional information is given to show you how to connect the plotter with many commonly used computers. The plotter is supported on a number of HP computer systems using higher level graphics support than HP-GL. In most cases, high level graphics support is available through graphics programming ROMs or software, each of which is supported with a comprehensive user's manual which will answer most of your questions related to programming. Contact your HP sales representative or dealer regarding high level graphics support available with your HP computer.

Understanding Manual Conventions

Before reading this manual, you should understand the meaning of type styles and number representations used in text. Words typed in **SMALL, BOLDFACE TYPE** are either buttons, switches, words actually found on the plotter, or words on the plotter's front-panel display. Numbers are shown using SI (International System of Units) standards. Numbers with more than four digits are placed in groups of three, separated by a space instead of commas, counting both to the left and right of the decimal point (54 321.123 45).

Initial Inspection and Accessories Inventory

The individual parts of your plotter were thoroughly inspected before the unit was shipped to you, and the instrument should be in good operating order. Carefully inspect the plotter and accessories for any physical damage sustained in transit. Notify the nearest HP Sales and Support Office and file a claim with the carrier if the unit is received in a damaged condition.

Please check to ensure that you have received all of the items that should accompany the plotter. Refer to the table of Accessories Supplied and check that all accessories are present. If you have any difficulties with the plotter, if it is not operating properly, or if accessories are missing, contact the nearest HP Sales and Support Office.

Retain the original packing materials and carton. If the plotter must be shipped, this will save having to order new packing materials and a carton from HP.

Accessories Supplied

The following items are supplied with each HP 7550 plotter:

Item	Quantity	Part Number
Operation and Interconnection Manual	1	07550-90002
Interfacing and Programming Manual	1	07550-90001
Pocket Guide	1	07550-90003
Customer Survey Card	1	5957-2670
HP Field Repair Centers	1	5957-2658
HP Sales and Support Offices	1	5955-7441
Plotter Supplies Price List and Ordering Information	1	5953-9715
Warranty Registration Form	1	5957-2655
Warranty Overview	1	5957-2657
Power Cord (appropriate cord supplied, based on destination of plotter)	1	
Blank plotter media		
A-size (8½ × 11 in.), 50-sheet package	1	9280-0589
A-size overhead transparency film, 5-sheet package	1	
Carousels		
Fiber-tip pen carousel	1	07550-60051
Overhead-transparency pen carousel	1	07550-60050
Grit wheel brush	1	8710-1386
Fiber-tip pens		
Four-color pack, 0.3 mm line width, 1 each black, red, green, blue	1	5060-6810
Six-color pack, 0.3 mm line width, 1 each burnt orange, lime green, gold, turquoise, violet, brown	1	5060-6894
Package of 5 black pens, 0.3 mm line width	1	5060-6787

Accessories Supplied (Continued)

Item	Quantity	Part Number
Fiber-tip transparency pens		
Four-color pack, 0.3 mm line width, 1 each of black, orange, violet, brown	1	5060-6834
Four-color pack, 0.3 mm line width, 1 each of black, red, blue, green	1	5060-6818
Automatic Sheet Feed Equipment		
A-size (8½ × 11 in.) media loading tray	1	07550-60152
A4/A-size paper catcher	1	07550-40167

NOTE: Metric paper (9280-0588) and transparencies (07550-60214) ISO A4-size, 210 × 297 mm may be sent with the plotter (instead of A-size) based on the destination of the unit.

A4-size (210 × 297 mm) media loading tray (07550-60158) may be sent with the plotter (instead of A-size) based on the destination of the unit. ■

Accessories Available

The following items are available and can be purchased using the appropriate part number. Contact your HP Sales and Support Office for details or call our Direct Order telephone number: 800-538-8787 (California: 408-738-4133).

Item	Part Number
A3-size media handling kit containing: A3-size media loading tray A3/B-size media catcher A3-size plotter paper, 50-sheet package	17526A
B-size automatic media handling kit containing: B-size media loading tray A3/B-size media catcher B-size plotter paper, 50-sheet package	17525A
A-size media loading tray	07550-60152
A4-size media loading tray	07550-60158

Accessories Available (Continued)

Item	Part Number
A-size overhead transparency kit containing: A-size transparency film, 50-sheet package 16 multicolor pens	5061-7583
A4-size overhead transparency kit containing: A4-size transparency film, 50-sheet package 16 multicolor pens	5061-7584
8-pen carousels	
For fiber-tip overhead-transparency pens	07550-60050
For fiber-tip paper pens	07550-60051
For roller-ball pens	07550-60052
For drafting pens	07550-60053
Male-to-female RS-232-C/CCITT V.24 cable 25-pin, wired end-to-end, for use in remote modem environments	31391A
HP-IB (IEEE 488-1978) cable, 1 m long, RFI shielded	10833A or 45529A
HP-IB (IEEE 488-1978) cable, 2 m long, RFI shielded	10833B or 45529B
RS-422-A adapter cable to connect RS-422-A devices to the HP 7550; 5 m (16 ft.) long; 5-pin male (RS-422-A) to 25-pin female (RS-232-C)	17855A
Female-to-female RS-232-C cable, adapted for use with IBM personal computer interface; pins 1-1, 2-3, 3-2, 7-7, and computer pins 5&6 — plotter pin 20.	17655A
Male-to-female RS-232-C cable, adapted for use with HP 150 personal computer interface; pins 1-1, 2-3, 3-2, 7-7, and computer pins 5&6 — plotter pin 20.	17755A
Service Manual	07550-90000
Dust cover	07550-60210
Standard digitizing sight	09872-60066
Drafting ink, black	9260-0596
Cleaning syringe for drafting points	9282-0905
Drafting pen cleaning solution	9282-0908

Accessories Available (Continued)

Item	Part Number
Grit wheel brush	8710-1386
Transparency ink solvent	5060-6828
Pen organizer (long pens)	92177U
Pen organizer (short pens)	92177T
Blank plotter paper	
A-size (8½ × 11 in.)	
50-sheet package	9280-0589
300-sheet package	9280-0517
B-size (11 × 17 in.)	
50-sheet package	9280-0614
300-sheet package	9280-0518
A4-size (210 × 297 mm)	
50-sheet package	9280-0588
300-sheet package	9280-0519
A3-size (297 × 420 mm)	
50-sheet package	9280-0615
300-sheet package	9280-0610
Glossy presentation paper	
A-size (8½ × 11 in.), 50-sheet package	9280-0640
B-size (11 × 17 in.), 50-sheet package	9280-0641
A4-size (210 × 297 mm), 50-sheet package	9280-0642
A3-size (297 × 420 mm), 50-sheet package	9280-0643
Overhead transparency film	
A-size (8½ × 11 in.), 50-sheet package	9270-1181
A4-size (210 × 297 mm), 50-sheet package	9270-1182
Vellum	
A-size (8½ × 11 in.), 150-sheet package	9280-0601
B-size (11 × 17 in.), 150-sheet package	9280-0602
A4-size (210 × 297 mm), 150-sheet package	9280-0603
A3-size (297 × 420 mm), 150-sheet package	9280-0604
Double-matte polyester film	
A-size (8½ × 11 in.), 50-sheet package	9280-0605
B-size (11 × 17 in.), 50-sheet package	9280-0607
A4-size (210 × 297 mm), 50-sheet package	9280-0608
A3-size (297 × 420 mm), 50-sheet package	9280-0606

Accessories Available (Continued)

Item	Part Number
Fiber-tip pens	
Single-color pack (5 pens/package)	
0.3 mm, black	5060-6787
0.7 mm, black	5060-6890
0.3 mm, red	5060-6784
0.7 mm, red	5060-6893
0.3 mm, green	5060-6786
0.7 mm, green	5060-6892
0.3 mm, blue	5060-6785
0.7 mm, blue	5060-6891
Four-color pack (4 pens/package)	
0.3 mm, 1 each black, red, green, blue	5060-6810
0.7 mm, 1 each black, red, green, blue	5060-6858
Six-color pack (6 pens/package)	
0.3 mm, 1 each burnt orange, lime green, gold, turquoise, violet, brown	5060-6894
0.7 mm, 1 each burnt orange, lime green, gold, turquoise, violet, brown	5060-6895
Overhead transparency pens	
Single-color pack (5 pens/package)	
0.3 mm, black	5061-5010
0.6 mm, black	5061-5020
0.3 mm, red	5061-5012
0.6 mm, red	5061-5022
0.3 mm, green	5061-5015
0.6 mm, green	5061-5025
0.3 mm, blue	5061-5016
0.6 mm, blue	5061-5026
Four-color pack (4 pens/package)	
0.3 mm, 1 each black, red, green, blue	5060-6818
0.6 mm, 1 each black, red, green, blue	5060-6819
0.3 mm, 1 each black, orange, brown, violet	5060-6834
0.6 mm, 1 each black, orange, brown, violet	5060-6835

Accessories Available (Continued)

Item	Part Number
Roller-ball pens	
Single-color pack (4 pens/package)	
0.3 mm, black	5061-5033
0.3 mm, red	5061-5034
0.3 mm, green	5061-5035
0.3 mm, blue	5061-5036
Long body drafting pens	07580-60025
Plotter points	
0.18 mm point	9260-0742
0.25 mm point	9260-0741
0.35 mm point	9260-0588
0.50 mm point	9260-0744
0.70 mm point	9260-0579
1.00 mm point	9260-0743

Should you require additional supplies or replacements, Hewlett-Packard offers a Computer Users Catalog (5953-2450). You can obtain a copy from your local HP Sales and Support Office, or by writing:

Product Management
Hewlett-Packard
San Diego Division
16399 W. Bernardo Drive
San Diego, CA 92127-1899

Input Power Requirements

WARNING

To prevent operator injury or damage to the plotter, verify that the line voltage setting and fuse protection are correct **BEFORE** connecting the line power. Also ensure the line power cord is connected to a line power outlet that is provided with a protective earth ground contact.

Power Options

The HP 7550 can be configured to operate with any of the following power sources:

Line Voltage:	100 V $\sim +5\%$, -10% 120 V $\sim +5\%$, -10% 220 V $\sim +5\%$, -10% 240 V $\sim +5\%$, -10%
Line Frequency:	48 to 66 Hz, single phase
Maximum Line Current:	1.3 A @ 100 V 1.1 A @ 120 V 600 mA @ 220 V 550 mA @ 240 V
Consumption:	100 Watts maximum

Line Voltage Selection

The HP 7550 is shipped from the factory with the line voltage set to the nominal value for the area specified as the shipment's destination. The voltage selected for the plotter is identified in the recessed window on the rear panel. The line voltage can be changed by qualified service personnel only. Line voltage selection procedures are contained in the HP 7550 Service Manual.

Fuse Protection

WARNING

To avoid the possibility of injury, disconnect the ac power cord before installing or replacing a fuse.

The HP 7550 is factory equipped with a fuse appropriate to the factory-set line voltage. To change or inspect the line fuse, turn the fuse holder on the rear panel in the direction of the arrow (counterclockwise) until the fuse holder releases. Remove the fuse holder and insert a slo-blo type T fuse which corresponds with the voltage setting. Fuse values appear below. Place the fuse holder back into the plotter, and turn the fuse holder clockwise, while pressing in, until the lock engages and the fuse remains flush with its casing.

Voltage	U.S. Fuse	European Fuse
100 V or 120 V	1.5AT(SB)/125 V	—
220 V or 240 V	0.8AT(SB)/250 V	800m/AT(SB)/250 V

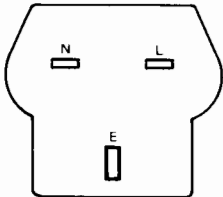
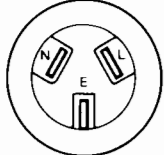
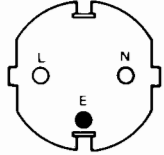

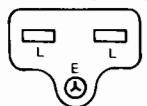
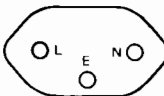
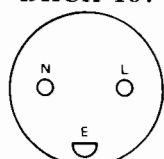
NOTE: Fuses and fuse caps appropriate to the plotter shipment destination are installed at the factory. U.S. fuses are $\frac{1}{4} \times 1\frac{1}{4}$ inches and use HP 2110-0565 fuse caps. European fuses are 5×20 millimetres and use HP 2110-0567 fuse caps. ■

Grounding Requirements

To protect operating personnel, the plotter must be properly grounded. The plotter is equipped with a three-conductor power cable which, when connected to an appropriate power outlet, grounds the plotter. To preserve this protection feature, do not operate the plotter from a line power outlet which has no ground connection.

Power Cord

Power cords with different plugs are available for the plotter. The cord packaged with each plotter depends upon its destination. The power cords supplied by HP have a standard female plug which mates with the power-input socket in the plotter. The polarities of the male plugs shown in the accompanying chart are matched to the line power outlets used in the indicated areas. If the plotter has the wrong power cord for the area, please contact your local HP Sales and Support Office.

		Option No.
BS 1363A 	HP Part Number 8120-1351; 250 V, 13 A, 1 ϕ plug rating. For use in United Kingdom, Cyprus, Nigeria, Zimbabwe, Singapore.	900
AS C112 	HP Part Number 8120-1369; 250 V, 10 A, 1 ϕ plug rating. For use in Australia, New Zealand.	901
CEE 7-VII 	HP Part Number 8120-1689; 250 V, 10/16 A, 1 ϕ plug rating. For use in East and West Europe, Saudi Arabia, Egypt, South Africa, India.	902
NEMA 5-15P 	HP Part Number 8120-1378; 125 V, 15 A, 1 ϕ plug rating. For use in Canada, Japan, Mexico, Philippines, Taiwan, UL approved in United States.	903
NEMA 6-15P 	HP Part Number 8120-0698; 250 V, 15 A, 1 ϕ plug rating. For use in Canada, UL approved in United States.	904
SEV 1011 	HP Part Number 8120-2104; 250 V, 10 A, 1 ϕ plug rating. For use in Switzerland.	906
DHCK-107 	HP Part Number 8120-2956; 250 V, 10 A, 1 ϕ plug rating. For use in Denmark.	912

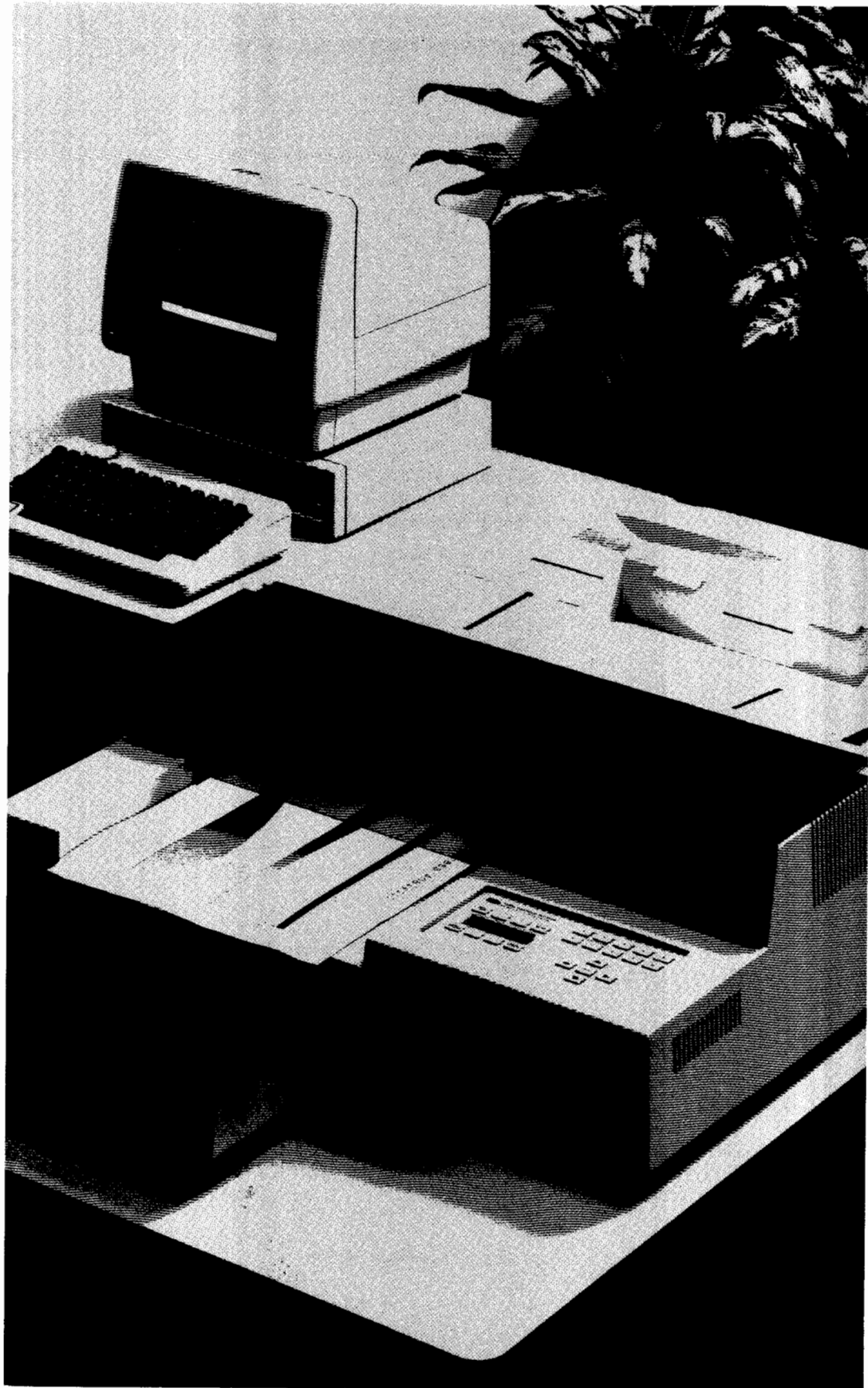
NOTE: All plugs are viewed from connector end.

L = Line or Active Conductor (also called "live" or "hot")

N = Neutral or Identified Conductor

E = Earth or Safety Ground

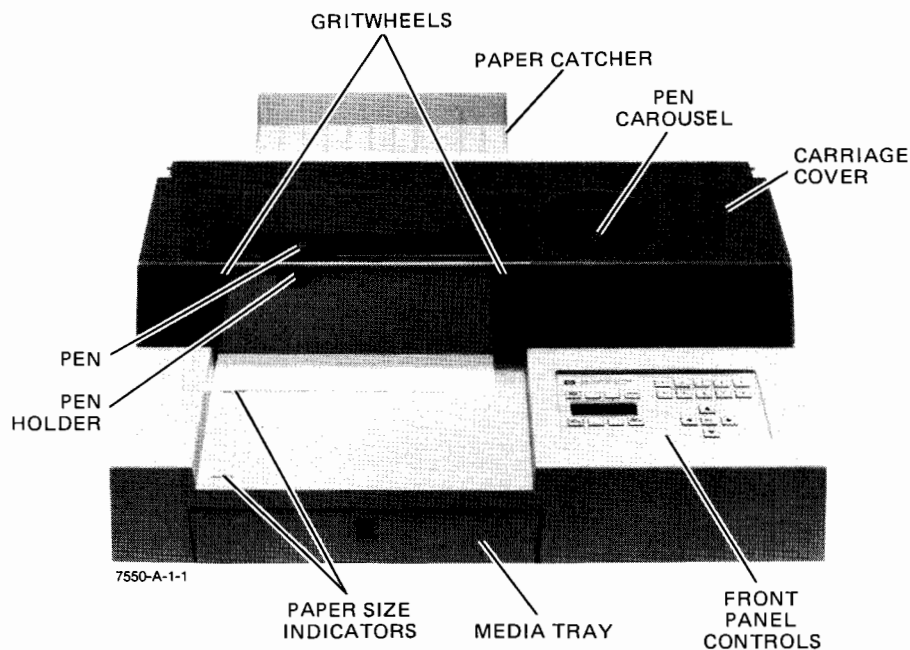
Power Cord Configurations



Chapter 2

Meet the Plotter

This chapter briefly describes the HP 7550's controls and their functions, and general maintenance procedures. The following illustration shows the locations of the major operating features.

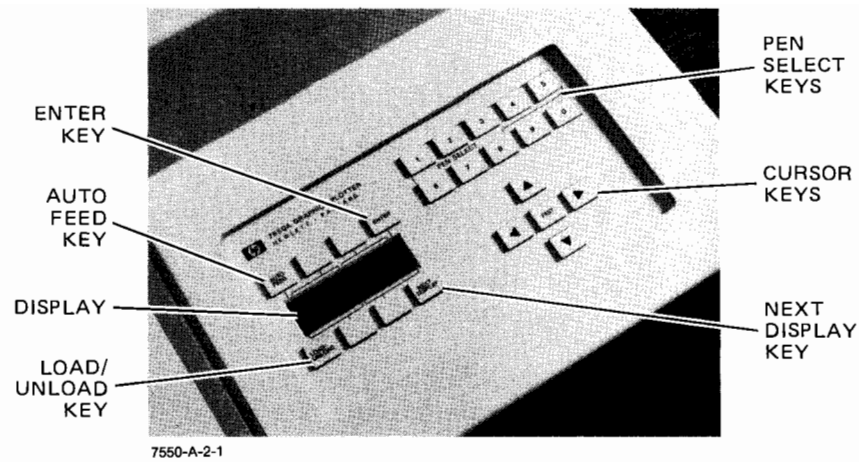


Meet the Plotter

Major Feature Locations

Front-Panel Controls and Indicators

The front-panel controls are divided into three areas: the keys surrounding the display; the numbered keys; and the five cursor keys in the lower-right corner of the front-panel control area. Refer to the photograph on the next page.



7550-A-2-1

Front Panel



AUTO FEED — The **AUTO FEED** button is used to select the method of feeding media into the plotter. Refer to Loading the Plotting Medium in Chapter 3, for details.



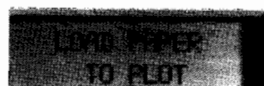
LOAD/UNLOAD — The **LOAD/UNLOAD** key is used to load sheets from the media loading tray when in automatic feed mode, and to load and unload media manually. Refer to Loading the Plotting Medium in Chapter 3, for details.



NEXT DISPLAY — The **NEXT DISPLAY** key is used to get to the next display of front-panel options. Used in sequence with the **ENTER** key to move to Display 5 and from Level 1 to Level 2. Refer to Chapter 3 for details.



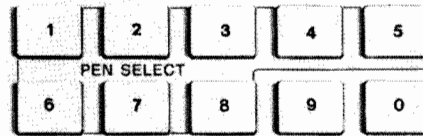
ENTER — The **ENTER** key is used to implement a new state or enter numerical input. Used in sequence with the **NEXT DISPLAY** key to move to Display 5 and between Level 1 and Level 2. Refer to Front-Panel Operations in Chapter 3, for details.



DISPLAY — The display indicates which display the plotter is in; displays error messages, displays operation messages, and asks for input. Refer to Front-Panel Operations in Chapter 3, for details.

NOTE: The plotter will display the message: **LOWER COVER PRESS ENTER** and ignore all instructions until the cover is lowered and the **ENTER** key is pressed. ■

PEN SELECT



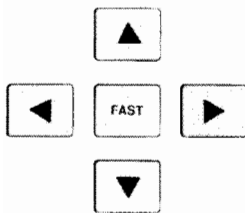
If you press a **PEN SELECT** key (the keys numbered 1-8), the plotter will store its current pen and select the correspondingly numbered pen from the carousel. If a plot is in progress when the **PEN SELECT** key is pressed, plotting is stopped until the pen holder retrieves the selected pen and returns to its previous location. Each time a pen selection is made, the old pen is stored in the carousel position from which it came, or into the lowest-numbered empty position if its original carousel position is now filled. After the new pen is retrieved, the pen holder returns to its previous location. If you select a position in the carousel that is empty, a new pen will not be retrieved.

To return a pen to the carousel, without retrieving a new pen, press **ENTER** and then the number of an empty carousel position.

The pen select keys, including the 0 and 9 keys, can be used to designate the desired number of replots. See the section titled Replot in Chapter 3, for details.

Cursor Keys — The five cursor keys are used to move the pen within the plotting limits as follows:

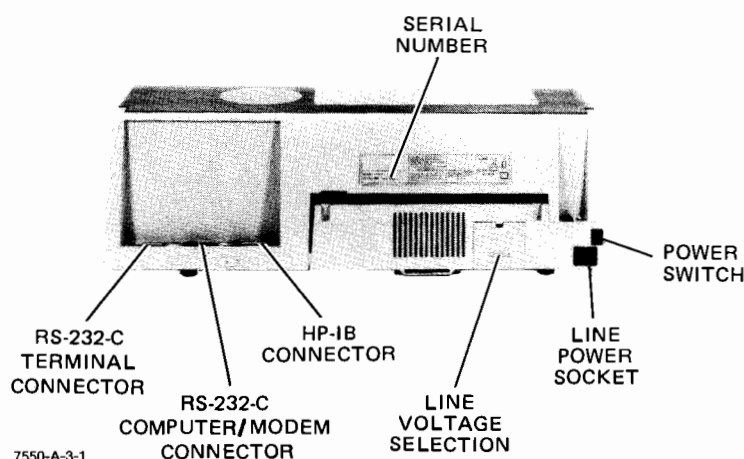
- Pressing a cursor key moves the pen in the direction of the arrow.
- Pressing two adjacent cursor keys moves the pen diagonally between the two arrow directions.



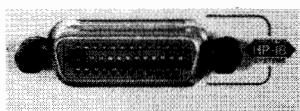
- When **FAST** is pressed together with any cursor key, the speed of pen movement is sixteen times greater.
- Pressing **FAST** by itself pauses plotting while the key is held down. This is not recommended, as it can affect the outcome of your plot.
- Pressing **FAST** while turning on the plotter sets the plotter to its factory default state. See Appendix B for a summary of default conditions.

NOTE: Pressing any cursor key during plotting will cause the plotting to stop and the pen to perform the appropriate motion. Plotting will resume at the new location when the cursor key is released. ■

Rear-Panel Connectors

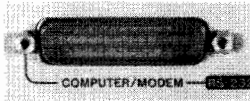


Rear Panel

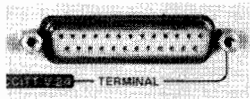


Interface connectors — There are three interface connectors: one labeled **HP-IB**, and two RS-232-C/CCITT V.24 connectors labeled **COMPUTER/MODEM** and **TERMINAL**.

This 24-pin HP-IB connector is used to connect the plotter to a host computer or other HP-IB device.



This RS-232-C/CCITT V.24 compatible, 25-pin male connector is used to connect the plotter to a host computer, a modem, or RS-232-C DCE I/F.



This RS-232-C/CCITT V.24 compatible, 25-pin female connector is used to connect the plotter to a terminal or RS-232-C DTE I/F.



This is the line power fuse (refer to Fuse Protection in Chapter 1).



This rocker switch turns the plotter on and off.



This is the line power socket (refer to Power Cord in Chapter 1).

Meet the Plotter

Operator Maintenance

There are no operator-serviceable parts inside the HP 7550 plotter. Maintenance which can be performed by the operator is limited to maintaining the appearance of the plotter. All other maintenance must be performed by qualified service personnel. Refer to the Shipment paragraph, later in this chapter, for instructions on how to obtain servicing assistance.

General Cleaning

WARNING

Disconnect the plotter from the power source prior to performing any maintenance. **DO NOT** allow water to run onto electrical components and circuits or through openings in the enclosure as this may create a shock hazard.

Thorough cleaning should be performed periodically. Cleaning intervals are determined by the type of operation, local air contamination, and climatic conditions. Cleaning procedures should include the following:

1. Blow away dust accumulation (with compressed air, if available).

2. Clean the outer surface of the plotter with a damp sponge or cloth. Use a mild cleaning solution if necessary, followed by water to rinse off any residue. Wipe dry after cleaning.

NOTE: To prevent scratching, do not use abrasive cleaners on the plastic carriage cover or on the outer surface of the plotter. In addition, some “mild” detergents might cause the paint to blister because they contain chemicals that strip water-based paints. For this reason, it is recommended that you use a soft cloth dampened with a 50-50 solution of isopropyl alcohol and water. Then rinse off any residue with water and dry with a soft, lint-free cloth. ■

Pen Carousel Cleaning

Clean the pen carousel periodically to remove ink, lint, or dust deposits. Wipe out the pen caps with a cotton swab moistened with alcohol or pen cleaning solution, as shown. Allow the carousel to dry thoroughly before inserting pens.



7550-A-4-1

Grit Wheel Cleaning

Cleaning the grit wheels is limited to removing dust from between the particles of grit to ensure that paper engagement is not impaired. Remove dust as follows:

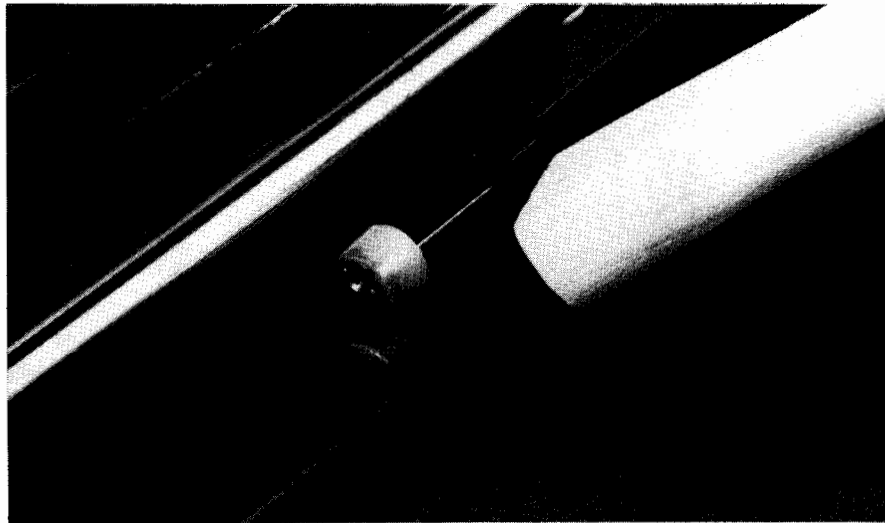
1. Turn off the power switch.
2. Raise the clear plastic carriage cover to gain access to the grit wheels.

3. Push the pen holder against the left wall of the plotter to raise the pinch wheels.

CAUTION

Using any brush other than the one supplied with the plotter may damage the grit surface on the wheel. Cleaning solutions may dissolve the adhesive which secures the grit particles to the wheels.

4. Turn the power switch back on.
5. Press the down arrow (↓) cursor key to slowly rotate the grit wheel. While the grit wheel is rotating, brush dust from the grit surface using the brush supplied with the plotter.



7550-A-5-1

Cleaning the Grit Wheels

Pen Holder Cleaning

The pen holder should be cleaned periodically and whenever the plotter fails to select pens properly. Insert your finger or a cotton swab into the pen holder and wipe accumulated dust from the two ridges on the inside-front portion of the pen claw. Wipe dust from pens and discard any pens that show signs of wear (excessive roughness) above or below the pen collar.

Shipment

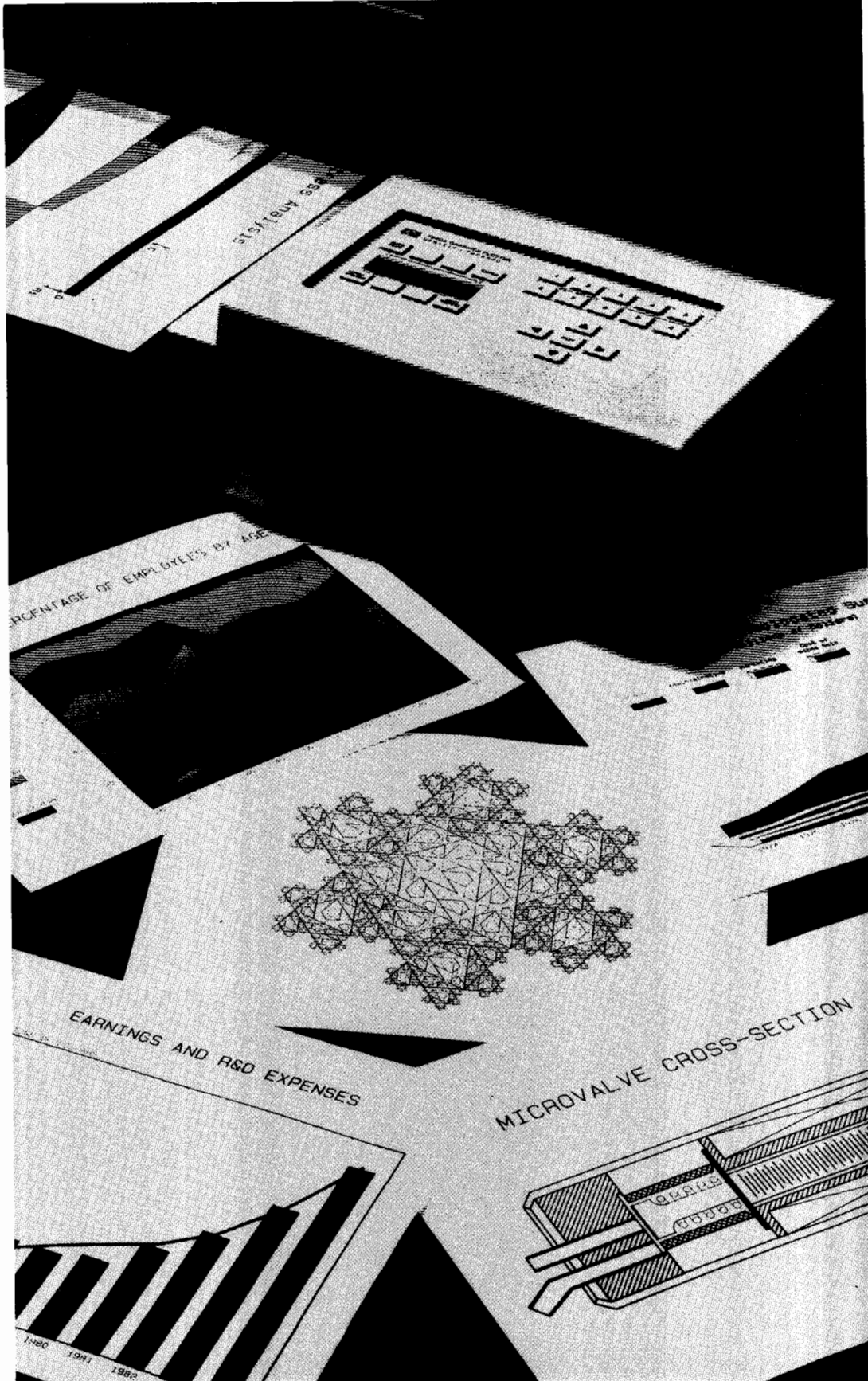
When the plotter is to be shipped, pack it in a protective carton. Keep the original packing materials and shipping carton for this purpose. If not available, packing materials and a carton may be ordered through your local Hewlett-Packard Sales and Support Office.

If your plotter is being returned to Hewlett-Packard for service, contact your nearest HP Field Repair Center for complete shipping instructions. In countries without Field Repair Centers, contact your HP Sales and Support Office. You can help assure effective servicing of your plotter by following these guidelines:

1. Refer to Chapter 6, Symptoms and Solutions, to determine if repair is required and, if possible, identify the defective area.
2. If you determine that repair is required, you will need to include the following items when your plotter is returned for service.
 - a. A description of the configuration exactly as it was at the time of malfunction, including the computer model number, interface, and other accessories that were in use when the malfunction occurred.
 - b. A brief description of malfunction symptoms for service personnel.
 - c. Plots or any other materials that help illustrate the problem area.
 - d. If purchased through an HP dealer, a copy of the sales slip or other proof of purchase to establish the warranty coverage period.
 - e. Serial number of your plotter (located on rear panel).
3. Include your name and address. Also include the telephone number where you may be reached during the day.
4. Do not include the power cord or other operating accessories with your plotter, unless the problem relates to an accessory.

Notes

Meet the Plotter



Chapter 3

Operating the Plotter

The accessories available for the plotter include four pen carousels, four types of pens (paper, transparency, roller-ball, and drafting), and five types of media (chart paper, glossy presentation paper, overhead transparency film, vellum, and double-matte polyester film). This chapter discusses how to load pens and media into the plotter and begin plotting.

The Pen Carousel

There is a special carousel for each pen type used with your HP 7550 plotter, as shown below. Each carousel is marked with a symbol associated with its pen type. From left to right, the symbol designations are:



Drafting



Roller-ball

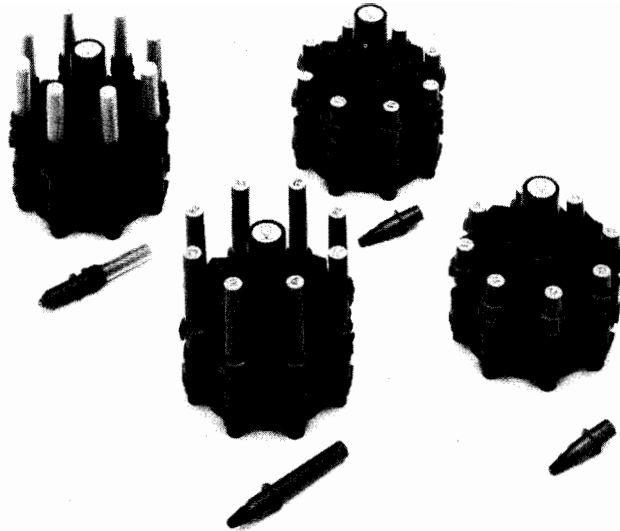


Paper



Transparency

The carousels and pens types are shown on the next page, in the same order.



7550-A-6-1

Although all pens will fit into all carousels, it is important to use the correct pen carousel when plotting for two reasons. First, each type of pen tip requires a specific pen cap design to prevent ink from drying while the pen is stored in the carousel. Second, the pen carousel determines default values for the plotter's speed and force, each of which affect plot quality. These default values, listed in the following table, are set by the plotter whenever you change the carousel type by inserting a different carousel. When you insert a carousel properly, the carousel will make one complete revolution and will then return pen one to the starting position; during this initialization sequence, the plotter senses the carousel type and sets the appropriate default values.

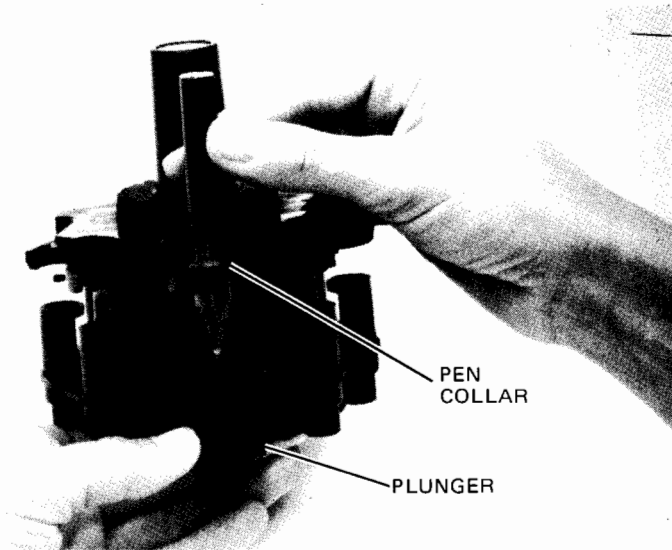
Carousel Default Values

Carousel Type	Force		Speed cm/s
	Grams	Displayed Value	
Paper	24	2	50
Roller-Ball	51	6	60
Drafting	15	1	15
Transparency	24	2	10

Loading Pens and Carousels

Start with either paper or transparency pens for your first plotting effort and select the appropriately labeled pen carousel. If you choose paper pens, use a sheet of chart paper for your first drawing; if you choose transparency pens, use a sheet of overhead transparency film or glossy presentation paper. The following procedures also apply to drafting pens, roller-ball pens, and their carousels.

1. Select the pen type and pen colors to be loaded into each position of the carousel. Any number of pen positions may be used.
2. Check that the carousel type corresponds to the pen type.
3. Remove the pens from their packages. Uncap and load each pen into the carousel, following these steps; refer to the photograph below.
 - a. Holding the carousel in one hand, place your thumb on either side of the plunger.
 - b. Press the plunger completely down and hold.
 - c. Slip the pen collar over the pen-holding jaws and slowly release the plunger.



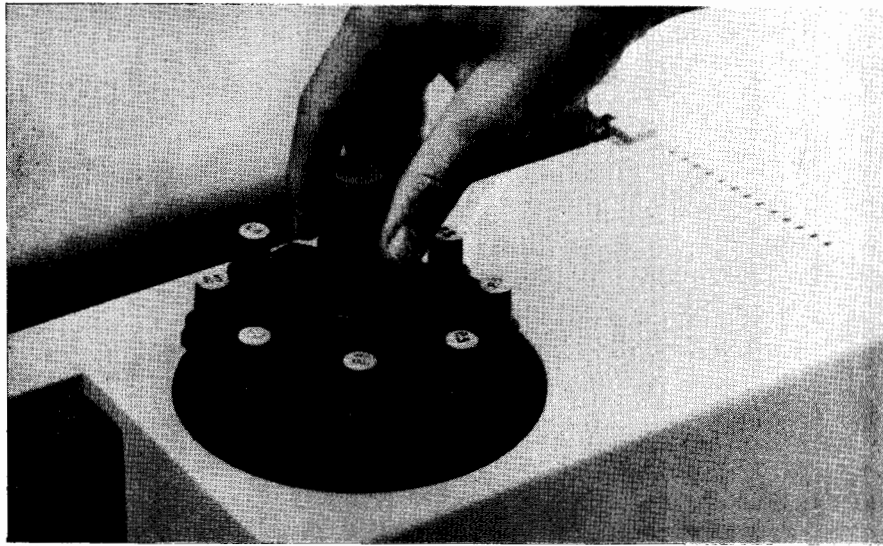
7550-A-7-1

Operating the Plotter

CAUTION

Be sure that the pen is positioned correctly in the carousel. If a pen is not positioned properly, the carousel will revolve and display the message: **LOWER COVER PRESS ENTER**. If this happens, remove the carousel and reposition any pens that are not positioned correctly. Now lower the cover and press **ENTER**. The plotter will initialize when all pens have been correctly loaded.

4. Set the carousel over the spindle in the plotter. No force is required. The carousel will seat during the initialization sequence. After the cover is lowered and the **ENTER** key is pressed, the carousel will make one revolution and return pen one to the starting position. Refer to the photograph below.



7550-A-8-1

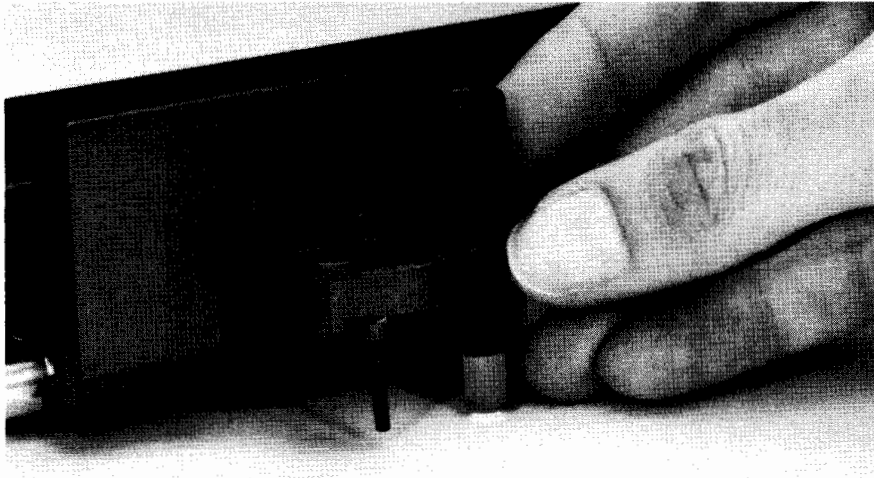
5. To remove the carousel, lift it straight up.

NOTE: If the carousel happens to seat and fall into alignment when set over the spindle, the initialization sequence will automatically begin when the cover is lowered. ■

Loading the Digitizing Sight

The digitizing sight can be loaded either into any of the carousels or directly into the pen holder. Load the digitizing sight by following the above procedure for loading a pen.

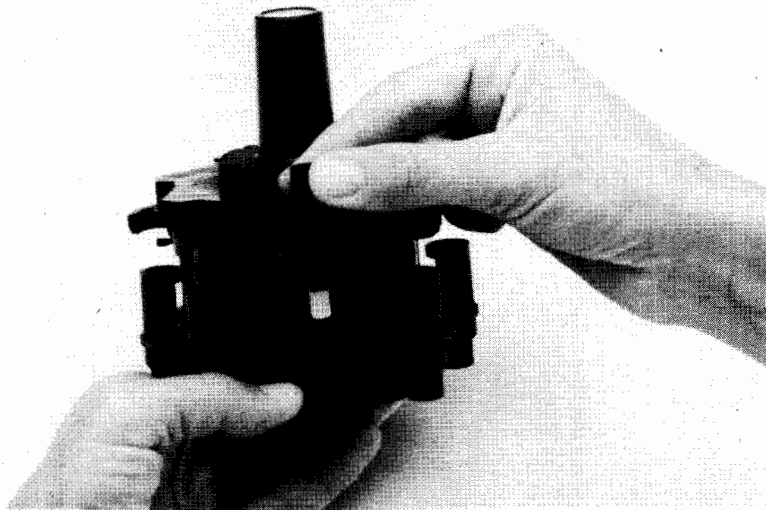
If you load the digitizing sight into the pen holder, insert the collar into the groove on the front part of the pen holder. Refer to the following photograph.



7550-A-9-1

NOTE: Use the standard digitizing sight only (HP 09872-60066). ■

The photograph below shows the digitizing sight being loaded directly into the pen carousel. This is not recommended because ink might be transferred onto the tip of the digitizing sight.



7550-A-10-1

Your Carousel Questions Answered

What Happens If the Carousel Is Removed While Plotting?

It will not hurt the plotter if the carousel is removed while a drawing is underway, but it will halt the progress of the plot. The plotter cannot operate until the pen carousel has been reinserted, the cover has been closed, and the **ENTER** key has been pressed (in response to the prompt on the display). If there is no paper loaded and no carousel installed, the plotter will display the message: **PUT IN CAROUSEL**.

With a drafting-pen or transparency pen carousel in place, the plotter automatically returns the pen in the pen holder to the carousel if it is unused for 15 seconds. With a paper or roller-ball carousel, the pen is put away if unused for 65 seconds. Without a carousel in place, the pen remains exposed to the drying effects of the air unless manually removed and capped.

NOTE: You can programmatically turn off the automatic pen operations, including pen put-away, by using the AP instruction. Refer to Chapter 10 of your Interfacing and Programming Manual for additional information on this HP-GL instruction. ■

If a carousel is inserted or the cover is lifted while plotting, the plotter stops drawing and tells you to lower the cover and press **ENTER** in order to perform the initialization routine. This routine determines what type of carousel is loaded and sets default values for that carousel type if the type differs from the last type that was installed. The plotter then continues drawing.

How Can I Be Sure the Carousel Is Seated Properly and Aligned in the Plotter?

Since the carousel slips snugly into place, you will probably know by touch if it is not seated properly. If the carousel does not begin to rotate in the initialization process, or if it rotates continuously, remove and try again. If the carousel rotates continuously, remove it and check to see that each pen is properly loaded. After the initialization process, you can ensure that it is properly loaded by selecting a pen; the plotter will pick the correct pen if the carousel is seated properly.

Does the Plotter Know the Number and Location of Pens Installed in a Carousel?

Yes, the plotter records the number and location of pens in the carousel during the initialization routine that it performs when the carousel is inserted. This record is updated as pen exchanges are made. If there is no paper loaded and no carousel installed, the plotter will display the message: **PUT IN CAROUSEL**.

Does the Plotter Know if a Pen is in the Pen Holder?

The plotter must test one time to sense whether or not a pen is in the pen holder. This test is performed during the first pen exchange after each carousel initialization sequence. After this first check is made, the plotter knows when a pen is in the pen holder. The pen in the pen holder will be stored in the carousel stall from which it was picked. If, however, the carousel has performed an initialization routine or the pen was loaded directly into the pen holder, the pen will be stored in the lowest-numbered vacancy in the carousel. If no carousel is loaded, the plotter ignores any store request. If a carousel is loaded, but there are no vacant pen positions, the plotter will be unable to store the pen.

How Can I Use More Than One Type of Pen on the Same Drawing?

One way is to mix different types of pens in a single carousel. If you want to mix pens only occasionally, simply insert the different types of pens into the carousel and use front-panel or program controls to set suitable pen speed and force values for those pens that are not of the same type as the carousel. However, be sure to remove the different pens from the carousel after plotting, and store them properly in order to protect them from drying out. If left in the carousel, pens might dry out if they are not in the correct pen cap. This is because there are two types of pen caps that are designed to provide a seal to prevent the pens from drying out; one is for drafting pens and the other is for paper, roller-ball and transparency pens. A fiber-tip pen cap, for example, does not provide an effective seal for a drafting pen.

Another way to mix pens on a plot is to write your program to use all of one type of pen first, then pause to allow for a carousel change, and continue with the next pen type.

If your plotting application regularly requires mixing pen types on a single plot, you should customize a carousel by changing the pen caps to the correct ones needed for the different pen types.

Instructions for customizing a carousel so that different pen types are properly capped when loaded in a single carousel are as follows:

NOTE: To ensure pens will not be damaged, customize the carousel that defaults to the pen force required by the most delicate pen type to be loaded. Using the drafting pen carousel is recommended. ■

1. Determine the pen types to be loaded into each pen position of the carousel. Roller-ball, paper, and transparency pens use the same pen caps. If mixing pens on these three types only, proceed to step 5.
2. Select the carousel to be customized and pull the rubber pen cap out of each pen capping plunger that is to be loaded with pens of another type.

3. Remove the required rubber pen caps from the proper carousel.
Additional pen caps may be ordered through your HP Sales and Support Office. Store the caps in another carousel or some safe place.
4. Press each of these rubber pen caps into the pen capping plungers until they are firmly seated.
5. Load pens and carousel.
6. Set proper pen speed and force values for each pen. Refer to setting **SPEED** and **FORCE** from the front panel, in this chapter, or include the correct speed and force parameters for each pen using the VS and FS instructions in your plot program (described in Chapter 10 of your Interfacing and Programming Manual).

How Long Can Pens Remain in the Carousel without Drying Out?

Drafting pens that are properly seated in the carousel can usually remain for 24 hours without drying out. Under optimum conditions — moderate room temperature, high humidity, clean pens, and larger plotter points — drafting pens can remain in the carousel longer than 24 hours. The smallest plotter points (0.18 mm and 0.25 mm) dry out the most quickly and are not intended for general use; do not leave them in the carousel. Cleaning all plotter points at the end of each plotting session is recommended.

Fiber-tip and roller-ball pens will last at least 30 days in the carousel with the proper carousel pen caps. HP recommends, however, that you remove pens from the carousel and tightly replace their original caps if you do not plan to use them for several days. This, as well as leaving the pens in their unopened packages until ready for use, will ensure a longer pen life.

Turning the Plotter On

Turn the plotter on and load the carousel as described previously in this chapter. The plotter will initialize, rotating the carousel as soon as the power is on and the carousel has been inserted properly. During the initialization process, the plotter identifies the carousel type and the locations of the pens in the carousel, and sets the default values for pen force and speed.

Since you have not yet loaded the plotter with plotting medium, the display will read: **LOAD PAPER TO PLOT**. Plotting medium must be loaded before any action takes place on the plotter. The following paragraphs tell you how to load the plotting medium.

The Plotting Medium

The HP 7550 graphics plotter is a vector plotter which produces high quality, multicolor graphics plots on four sizes of drawing media:

ISO A4 (210×297 mm)

ANSI A (8½×11 in.)

ISO A3 (297×420 mm)

ANSI B (11×17 in.)

Media that do not conform to these sizes cannot be used on the HP 7550 plotter. The plotter displays: **PAPER LOAD FAILED** if you attempt to use the wrong size media.

The HP 7550 plotter produces distinctive graphics on the following kinds of media:

Chart Paper
Glossy Presentation Paper
Overhead Transparency Film
Vellum
Double-Matte Polyester Film

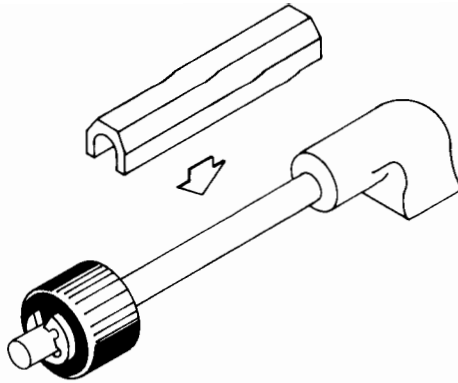
The plotter is designed to be used with HP media and pens. Use of other media may cause poor line quality. For best results, order media listed under Accessories Available, in Chapter 1.

Loading the Plotting Medium

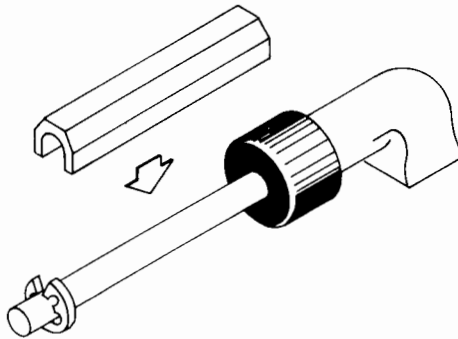
All supported media types can be loaded manually. In addition, chart paper and overhead transparency film may be loaded automatically, allowing unattended operation. Note that HP paper has a “best writing surface”. This surface will be face-up when you open a package of HP paper. Make sure this side faces up when you place it on the platen or in the media tray to obtain the best possible plotting results.

1. Check that the right-hand pinch wheel is properly positioned for the paper size being used. Your plotter is set at the factory for either A4/A3 or A/B media sizes, depending on the geographic destination of the plotter. Refer to the following illustrations.

NOTE: If necessary, snap the spacer off the shaft, slide the pinch wheel to the proper position, and snap the spacer back onto the shaft. Do not lose the spacer — it is essential to the operation of your plotter. ■

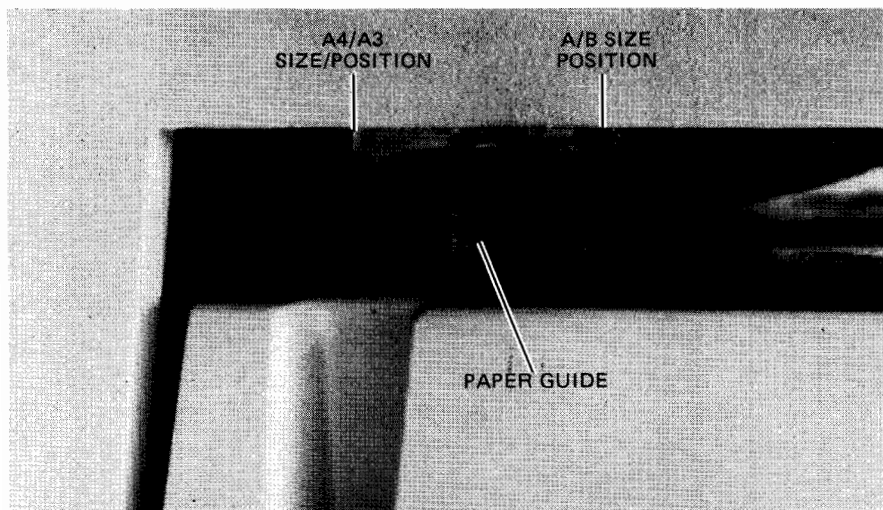


Pinch Wheel Position for A- and B-Size Paper



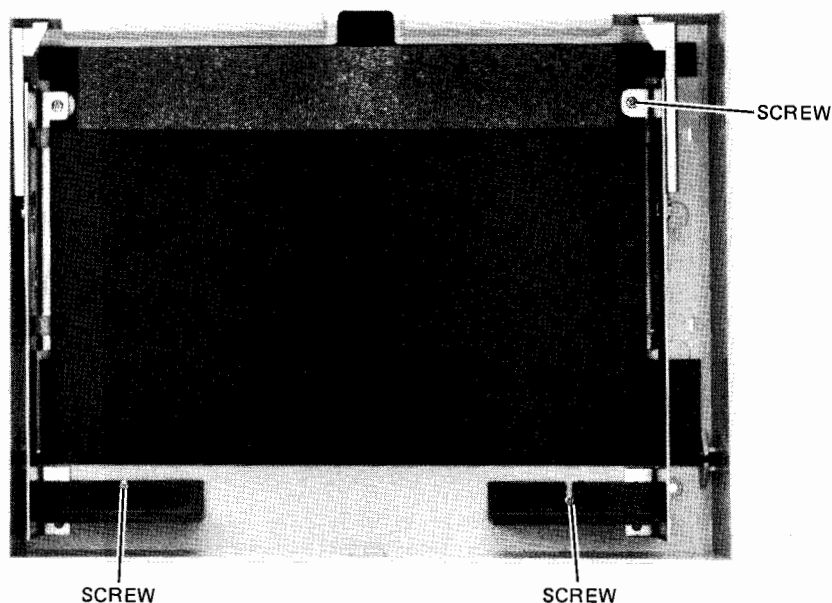
Pinch Wheel Position for A4- and A3-Size Paper

2. If necessary, adjust the right paper guide by reaching behind the plotter and pulling the paper guide out, away from the plotter. Reinsert the guide in the appropriate position and gently push it into the slot until you hear a click. Do not use excessive force. Refer to the illustration on the next page.



7550-A-11-1

3. If you plan to feed chart paper or overhead transparency film automatically, adjust the media loading tray to accommodate your media size, if necessary. Loosen the three screws on the floor of the paper tray with a Pozidriv screwdriver. Then lift and slide the interior walls to the appropriate position. Insert the tabs into the slots and tighten the screws. Refer to the following illustration.



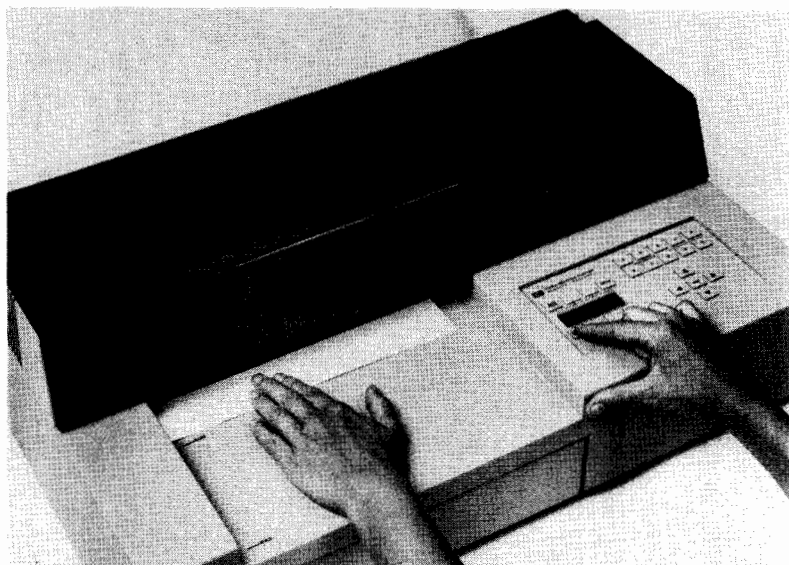
7550-A-12-1

Operating the Plotter

Manual Media Loading/Unloading

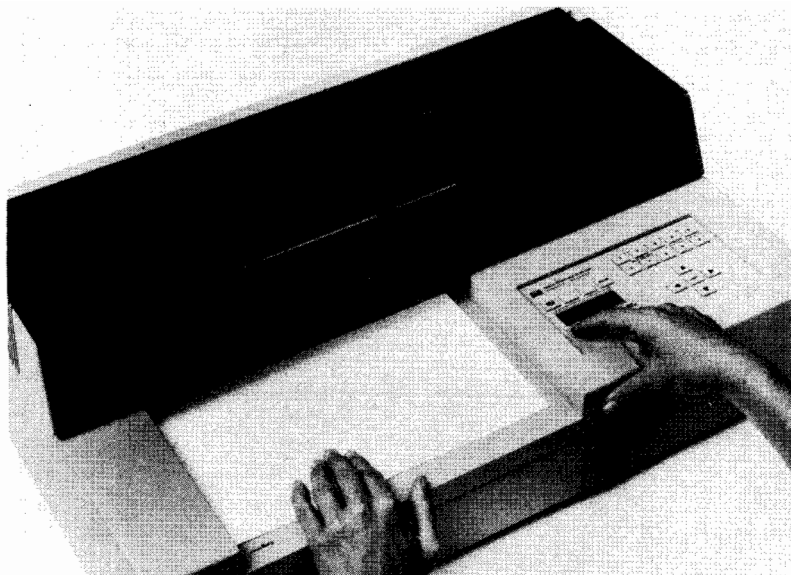
If paper is not loaded, the front-panel display will read: **LOAD PAPER TO PLOT**. If an asterisk (*) appears in the display under the **AUTO FEED** key, press the **AUTO FEED** key until the asterisk disappears to establish manual mode. Lay a sheet of plotting medium on the platen surface so the medium is against the left edge of the platen. Load transparency film with the backing sheet on the platen surface. Be sure to handle plotting medium by the edges. If you get fingerprints on the surface, the pen inks might not adhere uniformly because of the oils deposited by your fingers.

Load A- and A4-size paper with the long side horizontal, as shown in the following paragraph. Slide the plotting medium beneath the pinch wheels, using the marks on the platen labeled **A/A4**, to align the trailing edge of the medium.



7550-A-13-1

Load B- and A3-size paper with the long side vertical, as shown in the photograph on the next page. Slide the plotting medium beneath the pinch wheels, using the marks on the platen labeled **B/A3**, to align the trailing edge of the medium.



7550-A-14-1

Press the **LOAD/UNLOAD** key. The plotter will lower the pinch wheels and then sense the size of the plotting medium. If you do not slide the medium under the pinch wheels, an error message will appear in the window display: **PAPER LOAD FAILED**. If you slide A3- or B-size paper too far into the plotter it will only sense a portion of the page. Your P1 and P2 settings will be incorrect and will affect the output of your plot.

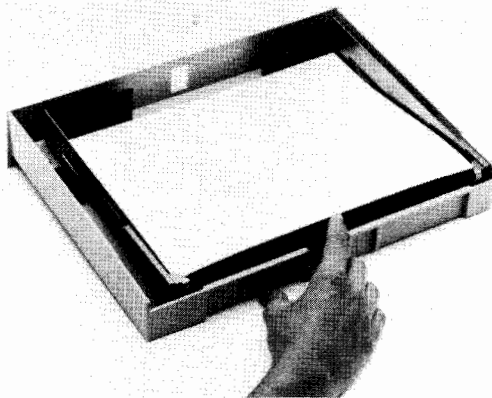
To unload the medium manually, press the **LOAD/UNLOAD** key. The pinch wheels will be raised and you can pick up the page.

Automatic Paper Loading/Unloading

Your HP 7550 graphics plotter comes with an A4/A-size media loading tray and media catcher. If you have not already done so, place the notched edge of the media catcher against the rear of the plotter. The media catcher should be lined up with the plotter's paper slot. The media loading tray is manually adjustable to accommodate A4/A- or A3/B-size media. Refer to Loading the Plotting Medium, earlier in this chapter, if you need to adjust your media tray. Additional media loading trays may be ordered; see Accessories Available, in Chapter 1.

Remember that only chart paper or overhead transparency film may be loaded in the media tray. Media should be flat and unwrinkled. Always fan the stack of paper or film before loading the tray. Now pull the loading tray out from the plotter. Depress the tab in the rear center of the tray. Load the paper into the media tray, being careful to tuck the

stack under the metal tabs in the right and left corners of the tray. Refer to the photograph below. The tray is meant to hold no more than 150 sheets of chart paper or 100 sheets of transparency film; do not overfill the tray. Now gently slide the tray into the plotter.



7550-A-15-1

Press the **AUTO FEED** key on the front panel. An asterisk (*) will appear in the upper-left corner of the display window, under the **AUTO FEED** key. Now press the **LOAD/UNLOAD** key. A single sheet will be loaded, and aligned against the left edge of the platen. The plotter will sense the media size. You are ready to begin plotting.

When the plot is finished, it will be ejected from the rear of the plotter into the media catcher, and a new sheet will be automatically loaded.

Clearing Media Misfeeds

If the automatic paper load fails, the plotter will display the message: **PAPER LOAD FAILED**. Possible causes of paper load failure are curled paper, paper with uneven edges, poor medium quality, or nonstandard size. Clear paper load failures by pulling out the media drawer, removing the piece of paper, reinserting the media drawer, and pressing the **LOAD/UNLOAD** key. If the paper is severely wrinkled in the paper slot, so that you can't remove it from the drawer, turn the machine off, move the pen carriage to the left, and pull the sheet out from the top. Repeat the loading sequence after fanning the media. If failure again results, your paper may have been warped or curled due to changes in humidity. Try turning over the stack of plotting media or replacing it with a new stack. Be aware that HP paper has a "best writing surface" — turning over the stack turns over the writing surface, and may affect writing quality. Also, load overhead transparency film with the paper side down (plotting side up).

Front-Panel Operations

The best way to become familiar with the HP 7550's front-panel operations is through practical experience. Take some time to "walk through" the display levels of the plotter and become familiar with its capabilities. Read this section for step-by-step instructions on implementing each of the various modes of the plotter through front-panel control.

The front-panel displays are organized into two levels. The first four displays — those on Level 1 — will be the ones you use most often. These four displays deal with the plot currently being drawn. Level 2 (displays 5 through 7) is used to set up interfacing conditions. You will probably only use Level 2 when you are first connecting your HP 7550 plotter to your computer or whenever you connect the plotter to a new computer. In addition, the front-panel display can report several program-related error messages. See Appendix B for a listing of the error messages relating to HP-GL and device-control instructions.

Use the **NEXT DISPLAY** key to advance from one display to the next within a level. Use the **ENTER** key to store your choices of input and new plotter states. **ENTER** and **NEXT DISPLAY** used together move you from one level to another.

Each display is used in conjunction with the four unmarked function keys that surround the display panel. Each word in the display corresponds to one of these function keys.

The diagram on the next page provides an overview of the front-panel levels and displays. Use it with the descriptions contained in this chapter, to become familiar with the plotter's capabilities.

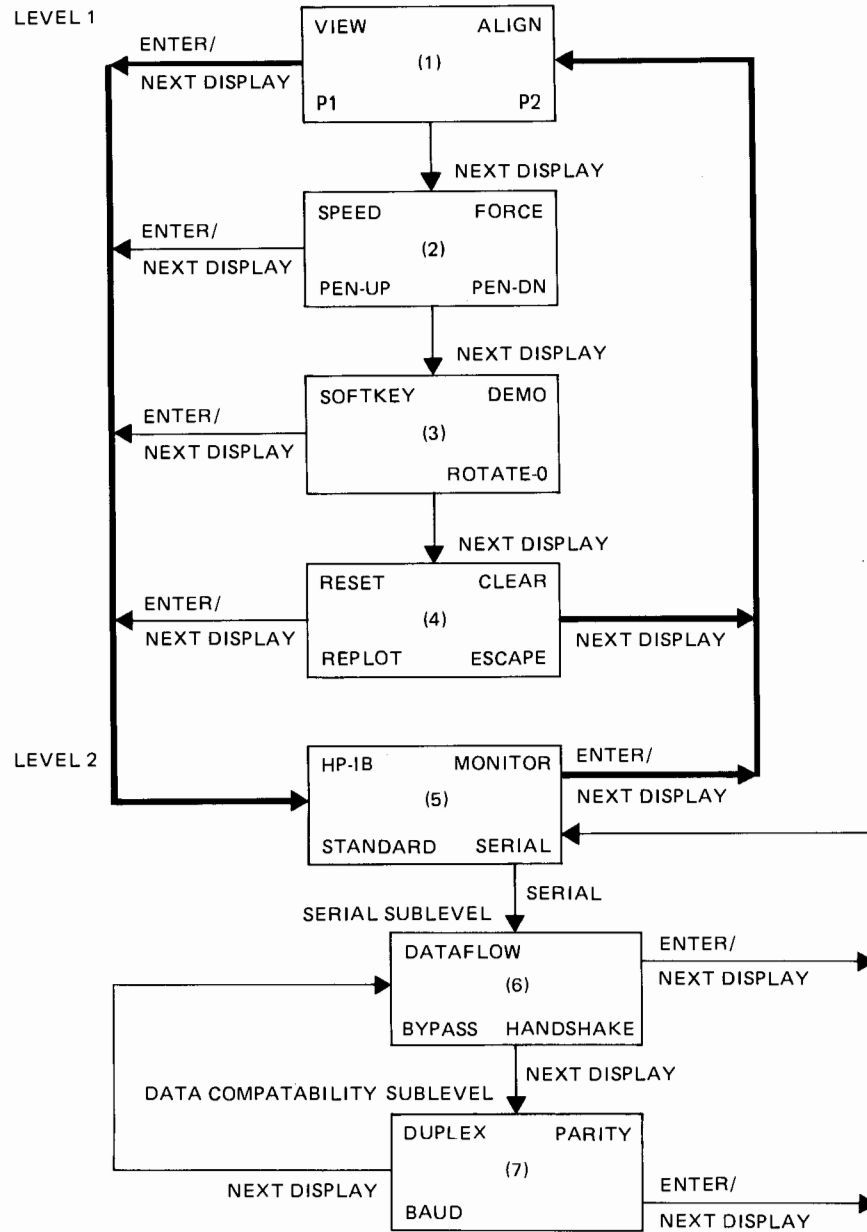
NOTE: With the exception of the **PEN-UP**, **PEN-DN**, and **VIEW** functions, front-panel operations implemented while a plot is being drawn will not be apparent immediately. Usually, the front-panel function will be implemented at the end of the current vector that is being drawn. ■

Turn the plotter on. The HP 7550 powers up in Level 1, Display 1. The plotter checks for a piece of paper and displays the message: **LOAD PAPER TO PLOT** if a plotting medium is not loaded. If you have not already done so, load the medium and the display will return to Display 1.

Level 1, Display 1

In Display 1 you can access the following:





Front-Panel Overview

View

Use **VIEW** when you need to see what is being plotted. Pressing the **VIEW** function key stops plotting, raises the pen, and moves the paper forward, fully extended, so that you can see the entire plotting area. The word **VIEW** will flash on the display. Pressing the **VIEW** function key a second time will turn off the flashing, return the pen to its previous coordinates and status (up or down), and the plotter will resume plotting from where it was interrupted. Note that while **VIEW** is activated, the plotter ignores all other front-panel instructions except the load/unload instruction. No data is lost from your program; **VIEW** merely suspends plotting temporarily.

Pressing the **NEXT DISPLAY** key advances the plotter to Display 2.

P1 and P2

Pressing the **P1** or **P2** function key causes the plotter to raise the pen and move to the current coordinate location of scaling point P1 or P2. On power-up the default P1 location is in the lower-left corner of A4/A-size paper or in the upper-left corner of A3/B-size paper. In each case, the default P2 location is in the corner diagonally opposite from P1. Refer to Chapter 2 of your Interfacing and Programming Manual for a full discussion of P1 and P2. The exact default coordinate locations of scaling points P1 and P2 are:

Default Scaling Points (Plotter Units)

Paper Size	P1 _x ,P1 _y	P2 _x ,P2 _y
A	80,320	10 080,7 520
B	620,80	15 820,10 080
A4	430,200	10 430,7 400
A3	380,430	15 580,10 430

Pressing the **ENTER** key and then either of the **P1** or **P2** function keys establishes the current pen location as the new coordinates of scaling point P1 or P2.

NOTE: P2 tracks P1, so when P1 is changed P2 changes to reflect the same proportions. If you want P2 to be at a specific location, set P1 first and then set P2. ■

Pressing the **NEXT DISPLAY** key advances the plotter to Display 2.

Align

Use the align function to align preprinted grids on your media with the physical axes of the plotter.

1. Manually load the gridded sheet in the plotter. Be sure the left page edge is aligned with the left platen edge.

2. Press the function key labeled **P1**. Now use the digitizing sight for accurate alignment and to avoid pen marks on the sheet. You can load the sight directly into the pen holder by inserting the pen collar into the groove on the back part of the pen holder.
3. Using the pen cursor keys, position the dot in the digitizing sight directly over one end of the lower grid line that is in the direction of the X-axis.
4. Press **ENTER** followed by **P1** to store the new location of P1.
5. Press **ALIGN**.
6. Using the pen cursor keys, position the digitizing sight directly over the other end of the previously selected grid line.
7. Press **ENTER** and **ALIGN** to store the new location of the alignment point.
8. Press **P1** and check to be sure that the digitizing sight tracks the grid line as the digitizing sight moves to P1.
9. Remove the digitizing sight and begin plotting.

Pressing the **NEXT DISPLAY** key advances the plotter to Display 2.

Level 1, Display 2

In Display 2 you can access the following:



Pen Speed and Force

You can assign different speed and/or force values to individual pens, or you can assign the same values to each pen. The procedure is the same for setting speed or force. The settings remain in effect until you change them or until default values are reestablished by one of the following:

- Power-up initialization
- Insertion of a different type of carousel
- Execution of the HP-GL instruction **IN** (for initialization), **VS** (for speed) or **FS** (for force)

To change pen speed or force:

1. Press the **SPEED=** or the **FORCE=** function key as desired. The display will go to the appropriate sublevel and an asterisk (*) will flash in the upper-right corner of the display, under the **ENTER** key.

2. Either set the **PEN** function key to **ALL** to fix the same speed/force for all pens in the carousel, or set the **PEN** function key to the carousel position number of the selected pen.
3. Press the **SPEED=** or **FORCE=** function key to set the speed or force to the desired value. The options are listed below:

Pen Speed Values		Pen Force Values		
Displayed Speed Option cm/s	Carousel Speed Default	Displayed Force Option	Force (in grams)	Carousel Force Default
10	Transparency	1	15	Drafting
15	Drafting	2	24	Paper & Transparency
20		3	30	
25		4	36	
30		5	45	
35		6	51	Roller-Ball
40		7	57	
45		8	66	
50	Paper			
55				
60	Roller-Ball			
65				
70				
75				
80				

4. Press the **ENTER** key to save your selection. The display will return to Display 2.
5. If you are setting different speed and/or force values for individual pens, repeat steps 1 through 4 for each pen that requires a different value.

Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key will advance the plotter to Display 3 without changing the settings.

Pen-Up and Pen-Down

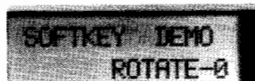
Press the **PEN-UP** function key to raise the pen. Press the **PEN-DN** function key to lower the pen. This function key can be used together with a cursor key to draw lines or to digitize a point. Pressing the **PEN-UP** or **PEN-DN** function key during plotting is equivalent to executing an HP-GL PU or PD instruction. The **PEN-UP** or **PEN-DN** function will remain in effect until the next, opposite HP-GL program instruction is received. To override HP-GL PU and PD instructions, continue to press the **PEN-UP** or

PEN-DN function key. Refer to Chapter 4 of the Interfacing and Programming Manual for complete details on both of these instructions.

Pressing the **NEXT DISPLAY** key advances the plotter to Display 3.

Level 1, Display 3

In Display 3 you can access the following:



Softkey

Pressing the function key labeled **SOFTKEY** will not cause any immediate action unless used in conjunction with the HP-GL write to display instruction, **WD**. In this case, pressing the key labeled **SOFTKEY** will put the last message sent with the instruction on the display and will enable any function key definitions you have assigned with the **define** softkey instruction, **KY**, in your program. (See Chapter 10 in your Interfacing and Programming Manual for complete details on these two instructions.)

Pressing the **NEXT DISPLAY** key advances the plotter to Display 4.

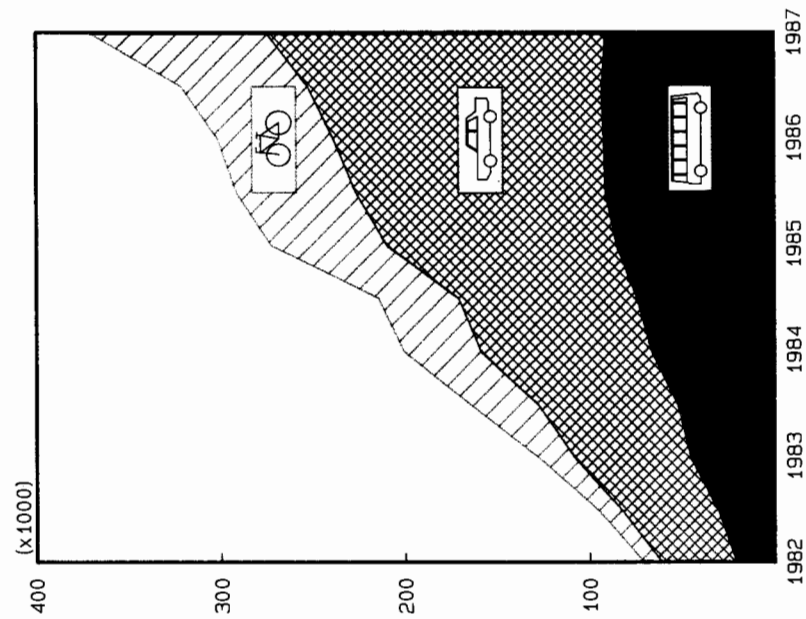
The Demonstration Plot/Confidence Test

The plotter has a built-in demonstration plot that will run on any size paper. Although satisfactory execution of the demonstration plot does not exclude all possible failures, it does serve as a confidence test since the probability is very high that the plotter is operating properly. To run the demonstration plot, follow these steps:

1. Load paper and pen carousel into the plotter. You may load paper manually or automatically. You can also plot on transparency film or glossy presentation paper, but remember to use transparency pens. You may use any combination of pens in the carousel, but the following pen widths and colors are recommended for drawing the demonstration plot shown on the next page.

Pen Number	Pen Type and Color
1	P.7, black
2	P.3, black
3	P.3, red
4	P.3, blue
5	P.3, green
6	P.3, purple
7	P.3, turquoise
8	P.3, lime green

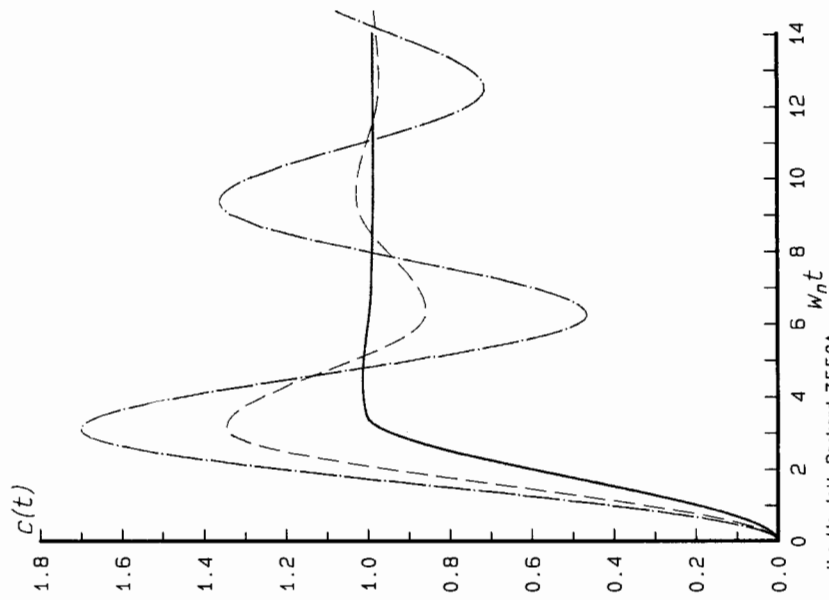
Transportation



This original plot was generated on the Hewlett-Packard 7550A.

Operating the Plotter

Transient Response



2. Begin the demonstration plot shown on the preceding page by pressing the **DEMO** function key. The display will read: **DEMO PLOT**. When the plot is complete, the display will return to Display 3.

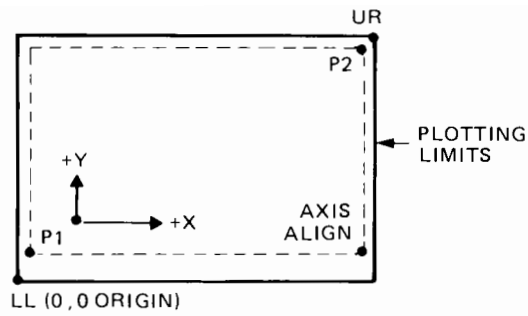
Pressing the **NEXT DISPLAY** key advances the plotter to Display 4.

Rotate-0

The **ROTATE-0** function key alternates between **ROTATE-0** and **ROTATE-90**. Pressing **ROTATE-90** rotates the X- and Y-axes 90 degrees. For A4/A-size media, the default Y-axis is the direction of paper movement and the default X-axis, the direction of pen movement. For A3/B-size media, the default Y-axis is the direction of pen movement; the X-axis, paper movement. Pressing **ROTATE-0** cancels the 90-degree rotation. Pressing **ENTER** before **ROTATE-90** causes the axis align, P1 and P2 positions to be adjusted to the rotated plotting area. Use the rotate function to orient plots vertically or horizontally regardless of how the paper is loaded. This capability is especially useful if your plot was originally designed for a vertical loading (A3/B-size paper), and you want to draw the same plot on A4/A-size paper.

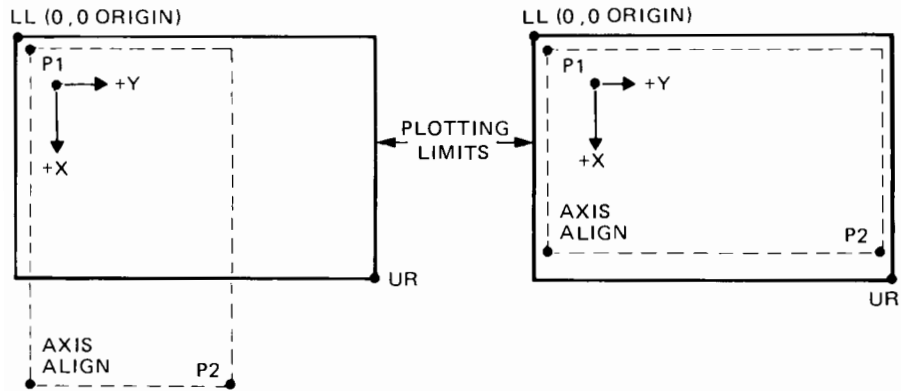
Rotations are not cumulative; that is, you cannot use **ROTATE-90** to rotate the axes 90 degrees and then use it again to obtain a full 180-degree rotation. Note that by pressing **ENTER** and **ROTATE-90**, you keep P1 and P2 inside the edges of the paper. The aspect ratio of the plot area changes but you may avoid making an incomplete plot. Refer to the following illustrations.

Refer to the Chapter 9 in the Interfacing and Programming Manual, Manipulating the Plotting Area, for additional information on rotation. Pressing the **NEXT DISPLAY** key advances the plotter to Display 4.



Default Orientation

ROTATE-0



Rotated 90 Degrees
P2 and Axis Align
Outside Plotting Limits

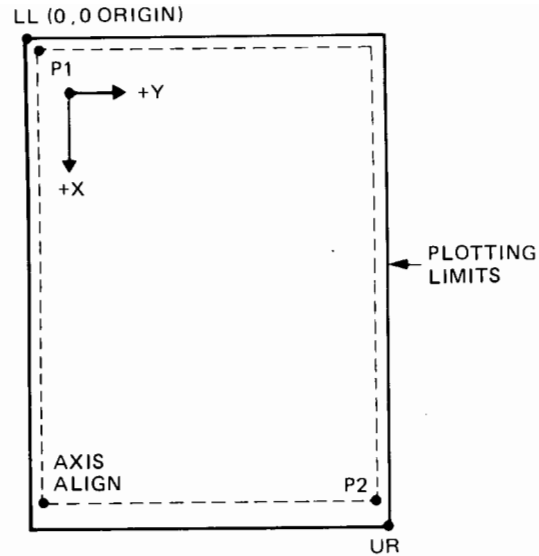
ROTATE-90

Rotated 90 Degrees
P1, P2, and Axis Align
Inside Plotting Limits

ENTER + ROTATE-90

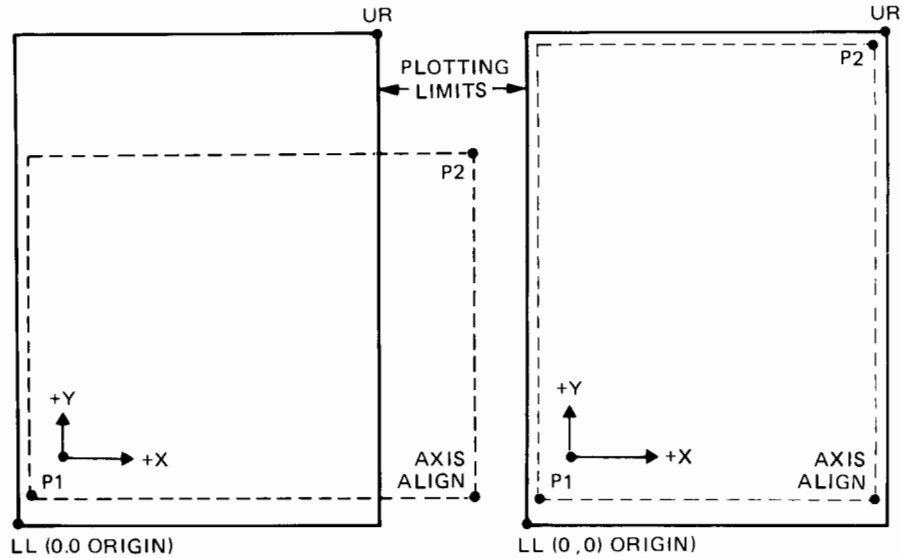
Forms of Rotation on A4/A-Size Paper

Operating the Plotter



Default Orientation

ROTATE-0



Rotated 90 Degrees

P2 and Axis Align
Outside Plotting Limits

ROTATE-90

Rotated 90 Degrees

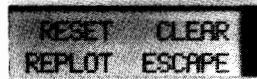
P1, P2, and Axis Align
Inside Plotting Limits

ENTER + ROTATE-90

Forms of Rotation on A3/B-Size Paper

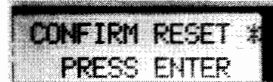
Level 1, Display 4

In Display 4 you can access the following:



Reset

Pressing the **RESET** function key causes the window to show:



An asterisk (*) will flash in the upper-right corner of the display, under the **ENTER** key. If the **ENTER** key is pressed, the plotter returns to its initial power-up conditions, before returning to Display 4. Use **RESET** to return the plotter to a known state. Invoking the **RESET** function has no effect on handshake protocol in any RS-232-C environment, but does clear any existing I/O error condition. The **RESET** function is equivalent to using the HP-GL initialize instruction, **IN**. The conditions listed below are set before the plotter returns to Display 4.

Default Conditions

Function	Equivalent Instruction	Default Condition
Pen control	AP;	Automatic as follows: <ul style="list-style-type: none">• Lift or store a motionless pen after 15 seconds for transparency fiber-tip pens or drafting pens, or after 65 seconds for paper fiber-tip pens and roller-ball pens• Select pen only when required to draw
Label buffer	BL ETX	Cleared
Alternate set	CA 0;	Character set 0
Character selection mode	CM;	HP 7-bit mode
Standard set	CS 0;	Character set 0
Chord tolerance	CT;	Set to angle mode for AA, AR, CI, and WG instructions
Character chord	CC;	Set variable-space font chord angle to 5 degrees

Default Conditions (Continued)

Function	Equivalent Instruction	Default Condition
Digitize clear	DC;	Clear DP instruction and return to current display
Downloadable character buffer	DL;	Cleared
Relative direction	DR 1,0;	Horizontal characters
Label terminator	DT;	ETX (decimal equivalent 3)
Extra space	ES 0,0;	No extra space between characters
Fill type, spacing, and angle	FT;	<ul style="list-style-type: none"> • Type 1, solid bidirectional fill • 1% of the diagonal distance between P1 and P2 • 0 degrees
Mask value	IM 223,0,0;	Recognizes all defined errors
Input window	IW;	Set to hard-clip limits
Label origin	LO 1;	Standard labeling starting at current position
Line type and pattern length	LT;	<ul style="list-style-type: none"> • Type 1, solid line • 4% of the diagonal distance between P1 and P2
Plotting mode	PA;	Absolute
Polygon mode	PM0;PM2;	Polygon buffer cleared
Pen thickness	PT;	Thickness based on current carousel
Scaling	SC;	User-unit scaling off
Character slant	SL 0;	0 degrees
Symbol mode	SM;	Off
Relative size	SR;	<ul style="list-style-type: none"> • Character width = 0.75% of $P2_x - P1_x$ • Character height = 1.5% of $P2_y - P1_y$

Default Conditions (Continued)

Function	Equivalent Instruction	Default Condition
Select set	SS;	Select standard character set
Tick length	TL;	$tp = tn = 0.5\%$ of $ P2_x - P1_x $ for Y-tick and 0.5% of $ P2_y - P1_y $ for X-tick
User-defined fill type	UF;	Solid bidirectional fill

In addition, pressing **RESET** establishes the following conditions:

- Raises the pen graphically and physically.
- Cancels 90-degree rotation.
- Sets default pen speed, force, and acceleration values in accordance with the carousel installed in the plotter.
- Sets bit position 3 of the status word to 1 (to indicate the plotter has been initialized).
- Clears any HP-GL (graphics) error condition.
- Clears lost mode (refer to Relationship of Plotting Instructions and Graphics Limits in Chapter 4 of your Interfacing and Programming Manual).
- Clears the display and removes any function key definitions established by the WD and KY instructions.
- Sets the group count to 0 (GC instruction).
- Turns off the curved line generator (CV instruction).
- Returns P1, P2, and the axis-align point to the X,Y coordinate values that were set when the paper limits were established. Remember that any existing axis alignment is maintained.

NOTE: If an axis alignment has been set, only P1 will return to its default physical position on the paper. The hard-clip limits are still compressed, and P2 and the axis-align point will be rotated from their default physical positions by an amount corresponding to the axis alignment. ■

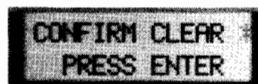
- The carriage-return point for labeling instructions is updated to the current pen position.
- PD and PU instructions with parameters are defaulted to be forms of the PA instruction.
- Although character size is defaulted as if "SI;" were executed, subsequent changes to the scaling points P1 and P2 will cause the character size to vary as if "SR;" were executed.

The **RESET** function is equivalent to switching the plotter off and then on again, except that axis alignment is not changed. Remember that the following front-panel functions are stored in the plotter's continuous memory; neither the **RESET** function, nor switching power off and on, affects the current setting of these functions: **AUTO FEED** key, standard/enhanced, HP-IB address, eavesdrop/standalone, handshake, modem/direct, full/half duplex, parity, 7-bit/8-bit, and baud rate.

If the **NEXT DISPLAY** key is pressed without pressing **ENTER**, the reset operation is cancelled and the display returns to Display 4. From Display 4, pressing **NEXT DISPLAY** returns the plotter to Display 1.

Clear

Pressing the **CLEAR** function key causes the display to show:

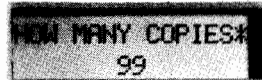


An asterisk (*) will flash in the upper-right corner of the display, under the **ENTER** key. If the **ENTER** key is pressed, the plotter clears the buffer, resets the parser and cancels any pending output, before returning to Display 4. If the **NEXT DISPLAY** key is pressed, without pressing **ENTER**, the clear operation is cancelled, and the plotter returns to Display 4. From Display 4, pressing **NEXT DISPLAY** returns the plotter to Display 1.

Replot

Pressing the **RELOT** function key advances the plotter to the Replot Sublevel. The **RELOT** function stores the program commands that make up a plot into an area of the plotter's buffer; you specify the number of copies you want, and the plotter automatically draws that amount, without rerunning your program. To activate the **RELOT** function, follow these steps.

1. Be sure the plotter is in automatic load/unload mode with paper loaded. Otherwise, the **RELOT** function will not operate.
2. Press the **RELOT** function key.
3. Press the **LOAD** function key. This prepares the plotter for loading a program in its buffer.
4. Run your program. The plotter draws the first plot and stores the program in its memory.
5. When execution of your program is complete, press the **START** function key. The display presents the following question:



HOW MANY COPIES#
99

6. Press the **PEN SELECT** keys for the desired number of plots (from 0 to 99).
7. Press the **ENTER** key; replotting will begin.

The display indicates the number of plots requested and the number of plots completed. (You can also perform the replot function programmatically, using the **RP** instruction. See Chapter 10 of your Interfacing and Programming Manual for complete details.) If you press the **NEXT DISPLAY** key while in the replot mode, the plotter returns to Display 1.

NOTE: In order for **RELOT** to be of use, all the program instructions that make up the plot must fit into the available memory space set aside for this use in the plotter (default = 9954 bytes, maximum available = 12750 bytes). If this space is exceeded during the **LOAD** function, the window will display: **#7: BUFFER OVERFLOW**. You can expand the amount of buffer space allotted for **RELOT** up to the maximum size through program control, using the **ESC.T** instruction. Refer to Chapter 14 of your Interfacing and Programming Manual for details. ■

Escape

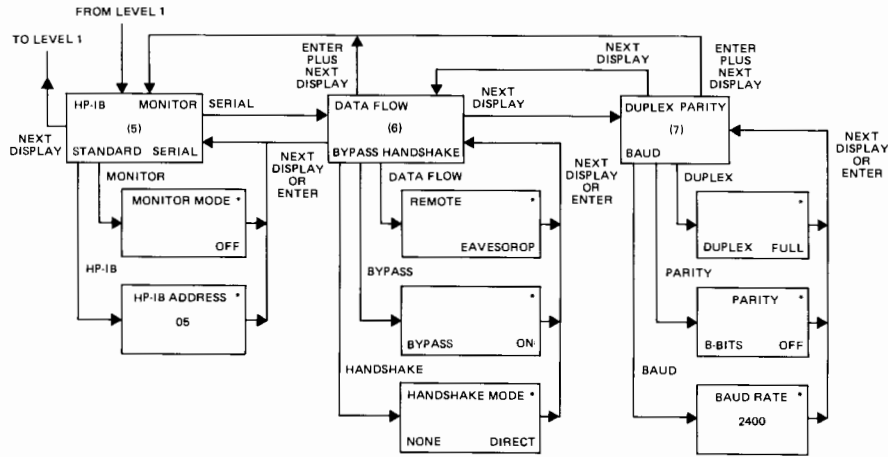
The **ESCAPE** function key is used in conjunction with the output group instruction, **OG**, to clear the plotter buffer. When the **OG** instruction is received by the plotter and **ESCAPE** has been pressed, all HP-GL instructions to the plotter are ignored until the plotter receives an **ESC.U** device control instruction. Refer to Chapters 10 and 14 of your Interfacing and Programming Manual for details regarding the **OG** and **ESC.U** instructions. If you press **ESCAPE**, but the plotter doesn't receive an **OG** instruction from the program, nothing happens.

If the **NEXT DISPLAY** key is pressed, the escape function is cancelled. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 1. Pressing the **ENTER** key and then the **NEXT DISPLAY** key advances the plotter to Level 2, Display 5.

Level 2 Overview

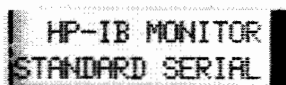
Use Displays 5 through 7 to set up HP-IB and RS-232-C interfacing conditions. If you are not familiar with interfacing concepts, it will be to your advantage to read Chapter 15 or 16 of your Interfacing and Programming Manual, depending on the interface you choose. Reach Level 2 by pressing the **ENTER** key and then the **NEXT DISPLAY** key. Make selections in Level 2 by pressing the **ENTER** key when the desired option is displayed. Read this section for step-by-step instructions on implementing the various modes you can use to establish an interface between your plotter and your computer. To implement these modes using device-control instructions in your program, refer to Chapter 16 of your Interfacing and Programming Manual for details.

The following diagram shows the default values and provides an overview of the options available through front-panel control in Level 2.



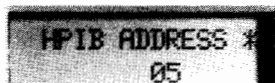
Level 2, Display 5

From Displays 1, 2, 3, or 4, pressing the **ENTER** key, followed by the **NEXT DISPLAY** key, will advance the plotter to Level 2, Display 5. In this display you can access:



HP-IB

When you press the **HP-IB** function key, the display will exhibit the **HP-IB Address Sublevel**. An asterisk (*) will flash in the upper-right corner of the display, under the **ENTER** key. The default **HP-IB** address of 05 will be displayed the first time you turn the plotter on.



If you change the address, you will see that address when you press the **HP-IB** function key. Each time you press the function key under the address, the address displayed is incremented by one. The range of address choices is 0-30 inclusive, plus **LISTEN ONLY** mode. You can reverse the order of selections by pressing the function key to the left of the address function key.

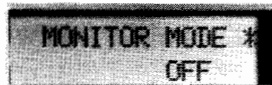
When **LISTEN ONLY** is used, the plotter does not have an address, but listens to all data transmitted on the interface. Listen-only mode is useful in a system that has no controller but, instead, has a dedicated talker, such as a magnetic tape driver or other mass storage unit, transmitting information to the plotter.

Choose an **HP-IB** address that is compatible with your controller and/or software. Press **ENTER** when the desired address is shown on the display to store that choice in the plotter's nonvolatile memory. Once saved, the **HP-IB** address remains as set until you change it, even if you turn the plotter off. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the address unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 5.

NOTE: Do not use address 21 when using the plotter with an HP desktop computer; this address is reserved for the computer. In all cases, be sure the computer, plotter, and any peripherals do not have the same address when they are on the same select code. ■

Monitor Mode

When you press the **MONITOR MODE** function key, an asterisk (*) will flash in the upper-right corner of the display, under the **ENTER** key. The display will read:

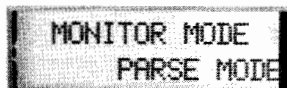


Monitor mode allows for monitoring communication between the plotter and the computer. Monitor mode is primarily intended to be used as a “debugging” aid for solving communication problems when establishing an interface connection between the plotter and a computer. Entering a monitor mode sets the plotter in remote mode. Leave monitor mode **OFF** unless you are testing for interfacing or data communication problems. Monitor mode **OFF** is the factory default setting of the plotter.

Press the **ENTER** key to turn off monitor mode. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 5.

Parse Mode

If you press the **OFF** function key the display will change to read:

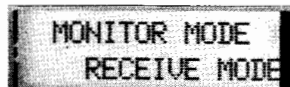


In parse mode, HP-GL instructions sent to the plotter’s buffer are retransmitted to the terminal and displayed on the CRT screen as they are executed. Parse mode enables you to detect plotting errors as they occur.

Press the **ENTER** key to activate parsing capabilities. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 5.

Receive Mode

If you press the **PARSE** function key, the display will read:



In receive mode, HP-GL instructions, device-control instructions, and handshake sequences are retransmitted from the plotter’s buffer to the

terminal and displayed on the CRT screen as they are received. Receive mode enables you to confirm that the plotter receives the information you send it intact, and to monitor the handshake.

Press the **ENTER** key to activate receive mode. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 5.

If you invoke monitor mode through your program, this will not be reflected in the display since enabling parse or receive mode from the front panel overrides any programmatic setting. Front-panel control is a convenient way to change modes without recompiling your program. See Chapters 14–16 of your Interfacing and Programming Manual for information on how to invoke parse and receive modes through program control.

Standard and Enhanced

If you press the **STANDARD** function key, the display will read **ENHANCED**. The displayed mode is implemented immediately. Once saved, the function you choose will be stored in the plotter's nonvolatile memory until you change it, even if you turn the plotter off.

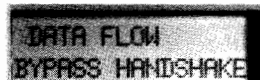
STANDARD and **ENHANCED** affect the implementation of the OD, IW, OW, and UC instructions. Refer to your Interfacing and Programming Manual regarding the instructions, and how the standard and enhanced modes affect each one. **STANDARD** is the factory set default mode of the plotter.

Serial Mode

Pressing the **SERIAL** function key takes you to the Serial Sublevel, described in the following section. Pressing the **NEXT DISPLAY** key returns the plotter to Display 1.

Level 2, Display 6: Serial Sublevel

Pressing the **SERIAL** function key allows you to access the following sublevel:



System Configuration

How you use the modes available in the Serial Sublevel will depend on your system configuration (the way you connect your plotter to a computer). There are two basic ways to position the plotter in a computer system:

- Eavesdrop configuration — where the plotter is connected in series between a computer and terminal.
- Stand alone configuration — where the plotter is connected only to a computer/controller.

Stand alone and eavesdrop can have two configurations:

1. Remote mode — where the computer/controller is connected to the **COMPUTER/MODEM** port of the plotter.
2. Local mode — where the computer/controller is connected to the **TERMINAL** port of the plotter.

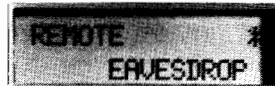
You need only read the section which applies to your system.

In serial configurations, you need to define for the plotter:

- how it is connected to your computer and/or terminal
- how data will be coming to it
- how the input/output (I/O) buffer will be managed so you don't overflow the space available and lose some of your plot.

Data Flow

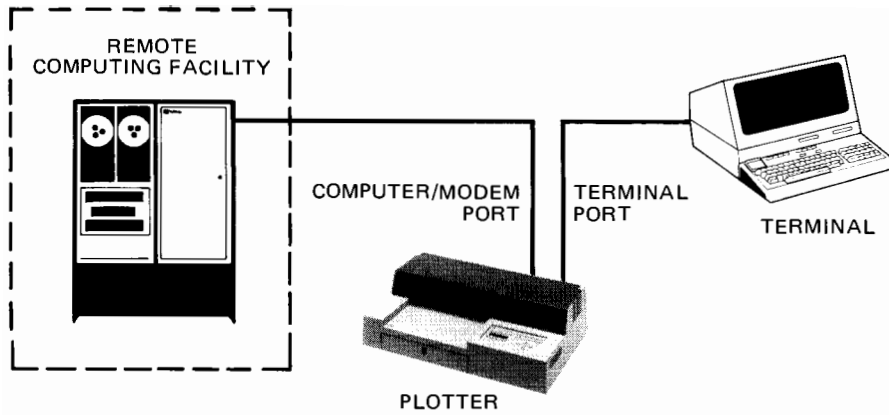
Pressing the **DATA FLOW** function key accesses the following sublevel:



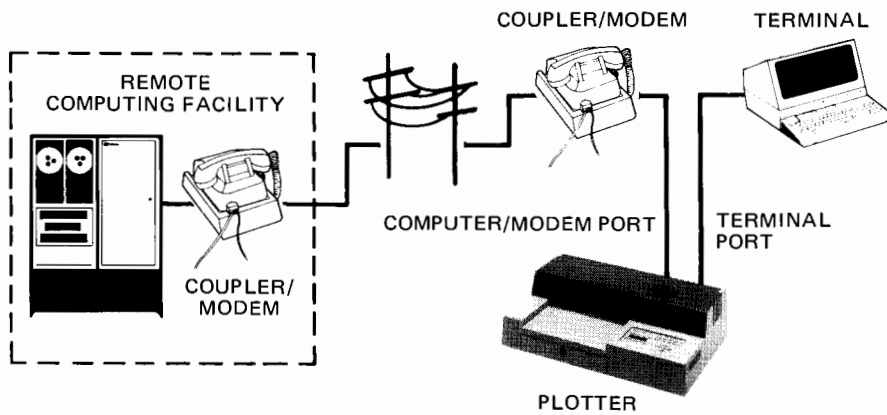
An asterisk (*) will flash in the upper-right corner of the display, under the **ENTER** key. If you press the **REMOTE** function key, the display will alternate between **REMOTE**, **LOCAL**, and **STANDBY** modes. Pressing the **EAVESDROP** function key alternates between **EAVESDROP** and **STANDALONE** modes. Once the proper selection appears in the display window, press the **ENTER** key to save that mode in the plotter's nonvolatile memory. Once stored, the plotter will retain the selected mode until you change it. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6.

Eavesdrop Mode (Serial Interfacing)

In an eavesdrop configuration, the plotter is connected in series between the computer and the terminal with one computer line. Interconnection may be directly through RS-232-C cabling or via a modem for communication over telephone lines. Note that setting **EAVESDROP** mode turns **BYPASS** mode **ON**. You will learn more about bypass mode (and how to turn it off, if need be) later in this section. Eavesdrop mode is the factory default mode of the plotter. Diagrams of both interconnection methods are as follows:



Plotter Interconnection with a Terminal and Remote Facility Using RS-232-C/CCITT V.24 Cabling



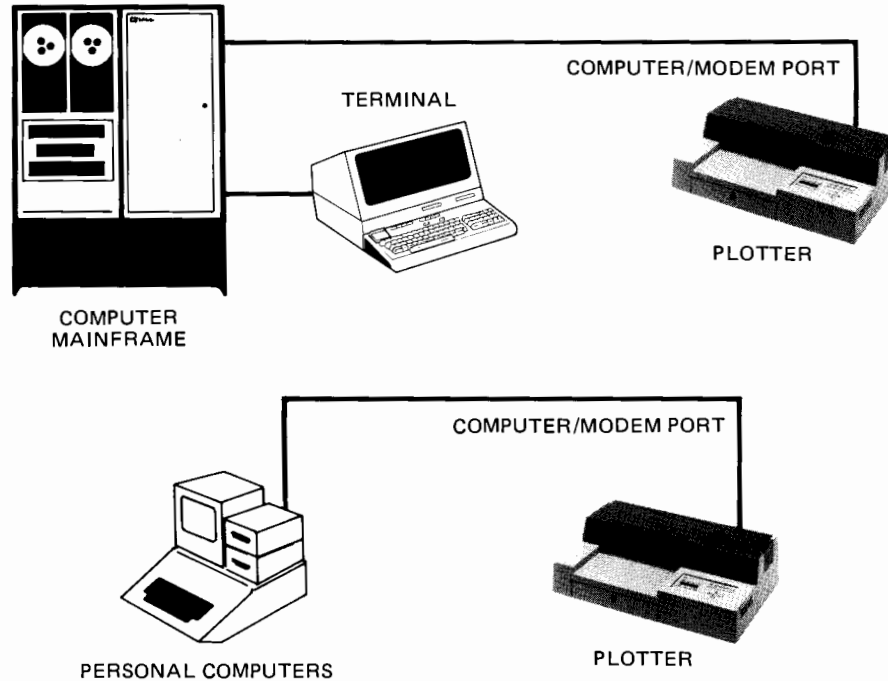
Plotter Interconnection with a Terminal and Remote Facility Using Modems

Press the **ENTER** key when **EAVESDROP** is displayed, to save eavesdrop mode in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6.

Stand-Alone Mode (Serial Interfacing)

In a stand-alone configuration, the plotter is only connected to a computer or controller, and usually is adjacent to it. Entry to the computer is by a keyboard or terminal through a separate port, rather than through the plotter. In stand-alone mode, the plotter waits for plotter instructions to come from the computer. This configuration can be used by some personal computers. It is especially useful when the personal computer is used both as a computer and as a terminal. Diagrams of

this type of system for both large computer mainframes and personal computers are as follows:



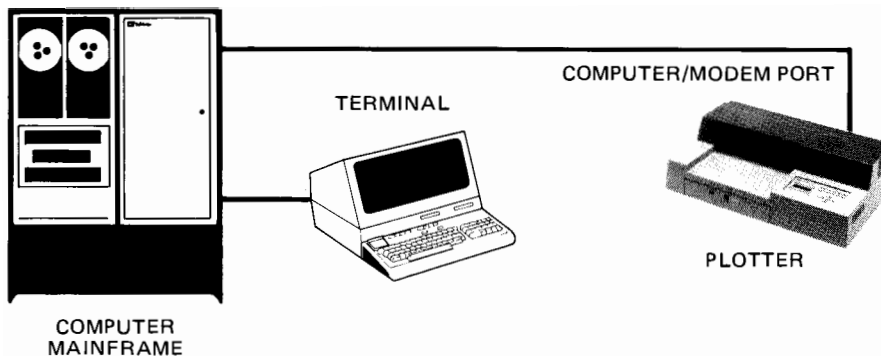
Press the **ENTER** key when **STANDALONE** is displayed, to save the mode in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6.

NOTE: Some personal computers will require specially configured cables when they are used with some independent software packages. Check Accessories Available, in Chapter 1, for the correct cable. ■

Remote Mode (Serial Interfacing)

After setting the plotter in eavesdrop or stand-alone mode, press the **REMOTE** function key to access the **REMOTE**, **LOCAL**, and **STANDBY** modes of connecting the plotter in a computer system.

In remote mode, your computer's RS-232-C interface must be plugged into the plotter's **COMPUTER/MODEM** port. Remote mode is the factory default mode of the plotter. In remote mode, the plotter receives HP-GL and device-control instructions only through its **COMPUTER/MODEM** port. Remote mode applies to systems configured to eavesdrop or stand-alone mode.



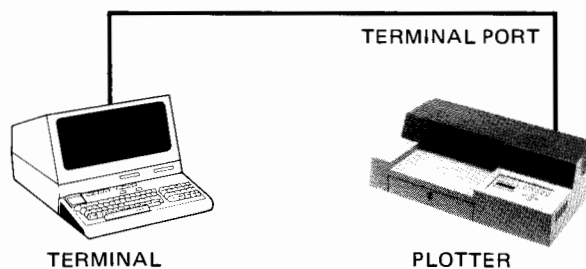
Plotter Interconnection with a Terminal and Remote Facility Using RS-232-C/CCITT V.24 Cabling

Press **ENTER** when **REMOTE** is displayed, to save the mode in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6.

Local Mode (Serial Interfacing)

In a local configuration, the plotter is usually connected to a terminal which is adjacent to it. Plug your terminal's RS-232-C interface into the plotter port labeled **TERMINAL** to use **LOCAL** mode. The plotter will receive HP-GL and device-control instructions through this port. Refer to the following illustration.

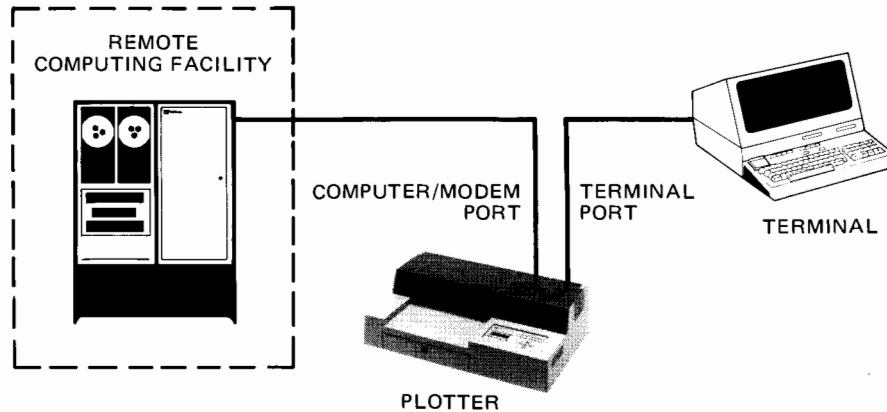
Press the **ENTER** key when **LOCAL** is displayed, to save the mode in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or **ENTER** key returns the plotter to Display 6.



Standby Mode (Serial Interfacing)

Standby mode is a useful tool for locating data communication or interfacing problems when in an eavesdrop configuration. In standby mode,

data is communicated between the computer and the terminal via the plotter. The plotter in this case is considered “transparent” — it does not act on the data. In standby mode, the plotter ignores information received through both the **COMPUTER/MODEM** and **TERMINAL** rear ports. If you suspect that the plotter is interfering with information you are sending between the computer and terminal, standby mode lets you “unhook” the plotter temporarily, without disconnecting the cables or interfering with data transmission between the computer and the terminal.



Plotter Interconnection with a Terminal and Remote Facility Using RS-232-C/CCITT V.24 Cabling Using Standby Mode

Press the **ENTER** key when **STANDBY** is displayed, to save the mode. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or **ENTER** key returns the plotter to the Serial Sublevel, Display 6.

Bypass Mode (Serial Interfacing)

When you press the **BYPASS** function key, the display will exhibit the Bypass Sublevel. An asterisk (*) will flash in the upper-right corner of the display, under the **ENTER** key. Pressing the **OFF** function key will toggle to **BYPASS ON**. Press the **ENTER** key when **BYPASS ON** or **BYPASS OFF** is displayed, to save either mode.



Bypass mode is a useful tool for locating data communication or interfacing problems when in an eavesdrop configuration. Also executable through program control, bypass **ON** mode is similar to standby mode since the plotter temporarily ignores instructions received from the

terminal and computer, except the plotter-on device-control instruction ESC.((or ESC.Y). In effect, the computer and terminal can “talk” to each other and the plotter eavesdrops, waiting for a plotter-on instruction to activate the bypass **OFF** mode. Bypass **OFF** allows the plotter to intercept and plot the data.

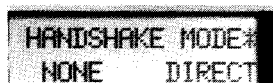
Pressing the **NEXT DISPLAY** key before pressing the **ENTER** key leaves the bypass mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6.

NOTE: When you implement **STANDALONE** mode, **BYPASS** is turned off. ■

Handshake (Serial Interfacing)

If you have an RS-232-C interface, you will need to access the options available in the Handshake Sublevel. The purpose of handshaking is to allow the computer and plotter to transfer information to one another in such a way that data will not be lost or misinterpreted due to plotter buffer overflow.

Pressing the function key labeled **HANDSHAKE** accesses the following display:



An asterisk (*) will flash in the upper-right corner of the display, under the **ENTER** key. Pressing the **NONE** function key allows you to toggle among the following handshake options (each of which is explained below).

- **NONE**
- **XON/XOFF**
- **ENQ/ACK**
- **HARDWIRE**

To select a handshake, press the **ENTER** key when the desired handshake is displayed. Once you choose a handshake for a particular computer, that selection will be stored in the plotter's nonvolatile memory until you change it. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the handshake unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6. From Display 6, pressing **NEXT DISPLAY** advances the plotter to Display 7, described in the next section.

Refer to Chapter 16 of the Interfacing and Programming Manual for a more detailed description of each handshake.

None

In addition to the standard handshake methods available through front-panel control, you can control handshaking through your

program. This method, known as software checking, is managed by the application program. It must be used if the system cannot implement any of the other three handshaking methods. Select **NONE** as the handshake type if software checking is what your applications program will do and/or if your computer system has no other way to manage input/output handshaking. Also select **NONE** if you want to set up your own Xon/Xoff, ENQ/ACK, or hardwire handshake through program control. **NONE** can be invoked programmatically, using the ESC.P0: device-control instruction.

Press the **ENTER** key when **NONE** is displayed, to save that option in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the handshake unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6.

Xon-Xoff

Xon-Xoff handshaking is managed by the plotter. It can be used if the computer system supports an Xon-Xoff protocol, which means that handshake characters are sent from the plotter to the computer to indicate when the plotter's buffer is full and when it again has room for more data. Xon-Xoff handshaking can also be invoked programmatically using the ESC.P1: device-control instruction.

Press the **ENTER** key when **XON/XOFF** is displayed, to save that handshake in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the handshake unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter Display 6.

Enq/Ack

Enquire/acknowledge handshaking is initiated by the computer operating system in specific cases where it uses the ASCII character ENQ, as the enquiry character, and the ASCII character ACK, as the acknowledgment string. The computer asks the plotter if its buffer has room for a block of data using the ENQ. The computer sends that block only after receiving an acknowledgment, the ACK, from plotter. ENQ/ACK handshaking can be invoked programmatically with the ESC.P2: device-control instruction.

Press the **ENTER** key when **ENQ/ACK** is displayed, to save that handshake in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the handshake unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6.

Hardwire

Hardwire handshaking uses a physical wire, pin 20 of the RS-232-C interface, to control handshaking. It can be used if the computer and

plotter are directly connected, without a modem, and the computer system can or does monitor pin 20 (CD, Data Terminal Ready). Hardware handshaking can be invoked programmatically using the ESC.P3: device-control instruction.

Press the **ENTER** key when **HARDWARE** is displayed, to save that handshake in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the handshake unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6.

Direct

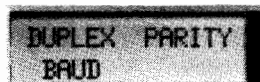
The plotter initially powers up in **DIRECT** mode. Pressing the **DIRECT** function key toggles the plotter between **DIRECT** and **MODEM** modes. Press the **ENTER** key to implement the new mode and save it in the plotter's nonvolatile memory. The mode will be saved until you change it.

Direct and modem modes refer to the communication lines used for communication between the plotter and computer. When in the direct mode, the RS-232-C data communication lines run to the computer from the plotter in a three-wire configuration; pins 2, 3, and 7 are used, with line 20 available for handshaking. When in modem mode pins 5 and 6 are monitored in addition to pins 2, 3, and 7 being used. Unless you require pins 5 (DSR), and 6 (CTS) to hold off data from the plotter, direct mode is recommended even if your system is configured using a modem.

Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the mode unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 6. From Display 6, press the **NEXT DISPLAY** key to advance the plotter to Display 7.

Level 2, Display 7: Data Compatability Sublevel

Pressing **NEXT DISPLAY** from Display 6 advances you to Display 7, the Data Compatability Sublevel. The Data Compatability Sublevel display reads:



The options in this sublevel provide for data compatability between plotter and computer. Once a computer and the plotter have been made mechanically compatible by the interface, they are capable of exchanging messages in the form of electrical signals. In order for these messages to be understood and executed, certain conventions must be followed regarding the formatting of the data to be exchanged. For internal communication, devices may use any data format. However,

each will input and output data in a standard character representation such as ASCII or EBCDIC. The HP 7550 uses a seven-bit ASCII; the eighth bit is occasionally used for changing character sets when labeling. Your computer and plotter must use the same character representation and send data at the same speed in order to communicate. Otherwise, the plotter will receive data from the computer but will be unable to understand it.

Press the **ENTER** key to save the modes you require. Once you store these conditions, they will be saved in the plotter's nonvolatile memory until you change them. Press the **NEXT DISPLAY** key to return to Display 6, the Serial Sublevel. From Display 6, press the **ENTER** and the **NEXT DISPLAY** key to return to Display 5. From Display 5, press the **NEXT DISPLAY** key to return to Display 1.

Duplex

Press the function key labeled **DUPLEX** and the display will read: **DUPLEX FULL**. Press the function key under **FULL** and the display will read: **DUPLEX HALF**. Press the **ENTER** key when the desired duplex is displayed to implement and store the new state in the plotter's nonvolatile memory. The plotter powers up in full duplex mode. Your plotter and computer must be configured to the same duplex in order to communicate correctly.

Full Duplex is used in an echo environment. When in local mode, the plotter echoes all data received from the terminal back to the terminal.

Half Duplex is used in a no-echo environment. It is important only in local mode. When in local mode, the plotter will not echo data it receives from the terminal back to the terminal.

Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the duplex unchanged. Pressing either the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 7.

Parity

Parity checking is an error-checking method to ensure correct transmission of data. ASCII characters are coded in seven or eight bits, with an eighth or ninth bit which can be used as a parity, or error-checking bit. The transmitter keeps track of the number of binary 1's in the character being transmitted. If the parity bit is set to **EVEN** the number of binary 1's is always even. If the parity bit is set to **ODD** the total number of binary 1's should be odd. The plotter, receiving data from the computer, can keep track of the number of binary 1's received and use the parity bit to determine whether the transmission was received intact.

Pressing the function key labeled **PARITY** allows you to toggle between two choices. Press the function key under **8-BITS** to view **7-BITS**. Press **ENTER** to save the data bit width in the plotter's nonvolatile memory.

Press the function key under **OFF** to toggle to **EVEN** and **ODD** parity choices. The plotter's initial, factory default setting is parity **OFF** and **8-BIT** data set. Press **ENTER** to save the parity in the plotter's nonvolatile memory. This will be displayed each time you turn on the plotter. Your plotter, computer, and terminal (if used) must be set to the same parity and number of data bits in order to communicate.

Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the parity unchanged. Pressing either the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 7. Pressing both the **ENTER** and the **NEXT DISPLAY** key returns the plotter to Display 5. From Display 5, pressing the **NEXT DISPLAY** key returns the plotter to Level 1, Display 1.

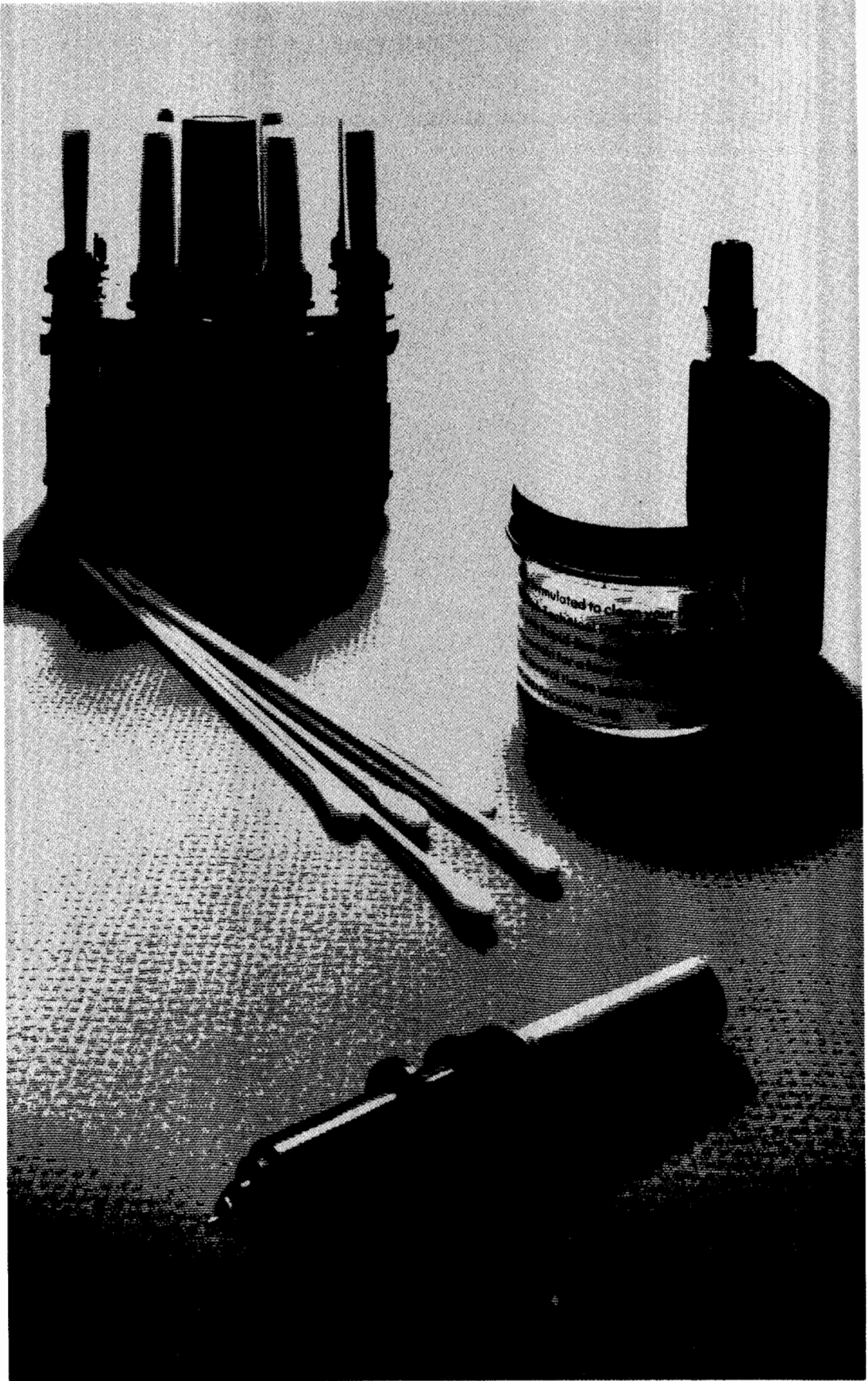
Baud

Because computers have a wide range of operating speeds, you must ensure that the data transmission speed of your plotter and your computer are equal. Data transmission speed is known as the baud rate. The baud rate is approximately equal to the number of bits transmitted per second. Failure to match the baud rate of your computer and plotter will result in garbled data. Check your computer's operating manual to determine its baud rate. Refer to Chapter 16 of your Interfacing and Programming Manual for an explanation of **EXTERNAL** baud rate, if you need to use a baud rate that isn't listed below.

Each time you press the function key under the baud rate, you step through the values listed in the following table. Reverse the order of selections by pressing the function key to the left of the **BAUD RATE** function key.

Baud Rate Settings	
75	
110	
150	
200	
300	
600	
1200	
2400	— Factory Default
4800	
9600	
EXTERNAL	

Press the **ENTER** key to implement a new baud rate and save it in the plotter's nonvolatile memory. Pressing the **NEXT DISPLAY** key without pressing the **ENTER** key leaves the baud rate unchanged. Pressing the **NEXT DISPLAY** or the **ENTER** key returns the plotter to Display 7. From Display 7, pressing both **ENTER** and **NEXT DISPLAY** returns the plotter to Display 5. From Display 5, pressing the **NEXT DISPLAY** key returns the plotter to Level 1, Display 1.



Chapter 4

Selecting Media, Pens, and Ink

What Kind of Output Do You Need?

Your selection of pens, inks, and media to use with the plotter will be based upon your application and how the drawings will be used. Consider your requirements for color, line quality, length of storage, medium stability, cost, and reproduction before deciding which output tools you will use. Consider these factors before selecting pen and medium:

- The speed at which the plot can be drawn.
- The ability of the plotting medium to withstand many lines drawn closely together.
- Color density desired.
- The storage life of the report.
- The potential wear to the pen tip.

The fast plotting speed and high quality results of fiber-tip paper pens on chart paper are excellent for multicolor charts such as in an annual report. Fiber-tip paper pens are available in a wide variety of colors. Chart paper absorbs ink well, making it a good choice for drawings, such as bar graphs, that require solidly-filled areas.

To produce the highest quality plots for special reports or publication, use fiber-tip transparency pens with glossy presentation paper. Colors appear more vivid on this paper than they do on transparency film.

For presentations, use overhead transparency film in combination with fiber-tip transparency pens. HP fiber-tip transparency pens use a special ink that adheres to overhead transparency film. Transparency pens contain extra dye, ensuring vivid colors when graphics are projected onto a screen.

Some drawings require sharp, dark lines so that they can be reduced, reproduced, stored, and used again at a later date. Drafting pens on vellum or double-matte polyester film produce excellent results, but the plots take longer and the cost per copy is greater. Any of these combinations provides for good storage life, although double-matte polyester film is the most stable and durable.

The main factors influencing your choice are the availability and cost of the media, and the ease of use and writing speed of the pens. Following the individual detailed descriptions of media and pens, you will find a table that shows recommended plotting combinations.

Understanding Media

Your plotter is designed to be used with five types of media: chart paper, glossy presentation paper, vellum, double-matte polyester film, and overhead transparency film. Tested products in each of these categories are available from Hewlett-Packard. A Plotter Price List and Ordering Information (Part No. 5953-9715) is also shipped with your plotter. You may also obtain these types of media from most reputable blueprint and engineering supply dealers or paper distributors in your local area.

Chart Paper

Chart paper (also called ledger paper or bond) is a light- to medium-weight, low-cost plotting medium for preliminary drawings and check-plots. Chart paper is also good for producing publication- or presentation-quality plots, particularly with fiber-tip pens.

Chart paper is an opaque medium composed of wood pulp and/or rag fibers that absorb ink. Depending on the smoothness of the surface, the ink may “bleed” or “feather” (fill in the depressions between the fibers) as it is absorbed, producing a line that lacks the clear definition of a line drawn on smoother media. Hewlett-Packard chart paper is selected to minimize these shortcomings. Reproduction through xerographic, diazo, or microfilm processes accentuates any inconsistencies in line quality that may be present on chart paper.

Glossy Presentation Paper

Glossy presentation paper is a heavy-weight, gloss-finish paper ideal for high quality reports and handouts. For best results, this paper should be used with transparency pens at a speed of 10 cm/s. This combination results in vibrantly colored plots. Load the paper manually; do not load paper automatically. Handle glossy presentation paper carefully; fingerprints or oily smudge marks may interfere with ink adhesion. Also, frequent use of glossy presentation paper will cause residue buildup on the grit wheels. Be sure to clean the grit wheels frequently to ensure smooth paper handling.

Overhead Transparency Film

Overhead transparency film is a high-grade, clear, plotting medium used for presentations. Hewlett-Packard transparency film has a paper backing which enables the plotter's grit wheels to firmly hold the film without damaging it. Transparency film must be used with inks which adhere to its surface. For best results using transparency film, we recommend using fiber-tip, transparency pens only. Fingerprints on the surface interfere with ink adhesion, so film must be handled carefully before it is used.

Vellum

Vellum is a high-grade, light- to medium-weight drawing medium for applications where overlays and diazo reproduction are required. It is commonly used for preprinted forms and record copies of drawings.

Vellum is either part paper and part rag or 100% rag that has been impregnated with resin or oil to improve inking and to add strength and transparency. Some vellums have a surface coating for increased smoothness and ink receptivity. As a result, an ink that adheres on the surface must be used; the best drawings on vellum are produced with drafting pens. Drafting pens require longer preparation and plotting time.

Double-Matte Polyester Film

Double-matte polyester film is a dimensionally stable film recommended for close-tolerance, high-accuracy applications; for overlays; and for master copies that will be handled repeatedly, modified, or updated continuously. It has excellent translucency and does not tear, crack, peel, or fade under normal use.

Double-matte polyester film is uniformly coated with silica particles to produce a matte finish, and then is chemically coated and treated for ink adhesion and static charge reduction. Fingerprints on the surface interfere with ink adhesion, so film must be handled carefully before it is used. Ink must be able to dry on film through evaporation rather than absorption. For this reason, drafting pens are most suited for drawing on film. Drafting pens on film produce a distinct, continuous line with virtually no beading, bleeding, or feathering. For this reason film renders quality reproductions that are clear and sharp.

Due to the plotter's unique media-handling mechanism, use only *double-matte* film (film with a matte finish on both sides). Recommended film thickness is 0.075 mm (0.003 in.); film thicknesses from 0.05 mm (0.002 in.) to 0.1 mm (0.004 in.) are suitable for use on the plotter.

Manufacturers use various formulas to prepare plotter film, with some brands of film having coarser coatings than other brands. The coarser the matte coating, the greater the wear on pen tips and on the plotter's platen. Hewlett-Packard distributes a finely coated polyester film that minimizes pen and machine wear and maximizes line quality.

Sheet Squareness

It is important that the plotting medium have square corners so that both pinch wheels will grip the medium along the sides and corners. Also, the media loading tray will only operate properly if the chart paper used has square corners. For these reasons, media with rounded corners are not recommended for use on the HP 7550 graphics plotter.

Effect of the Environment on Media

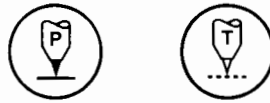
There may be great differences in temperature and/or humidity between the locations where a plotting medium is packaged and where it is used. Media that is exposed to high humidity can warp or curl, causing paper load failures when in **AUTO FEED** mode. Plotting distortions will occur if the medium shrinks or stretches while the plot is in progress. For this reason, it is recommended that you stabilize the medium by removing the sheet from the package and exposing it to air in the vicinity of the plotter for at least 15 minutes before using it. This procedure is not necessary for double-matte polyester film or for an open package of any other medium that has acclimated to the plotter's environment for several days.

Understanding Pens and Inks

The plotter can be operated with four types of pens: fiber-tip paper pens, fiber-tip transparency pens, roller-ball pens, and drafting pens. Each type of pen has characteristics that help determine the best type of plotting medium for the pen.

Hewlett-Packard manufactures its own fiber-tip and roller-ball pens and distributes drafting-pen plotter points and ink manufactured by a company that has many years of experience in the technical drafting field. All pens and inks are designed, tested, and packaged under carefully controlled conditions to ensure excellent writing quality and a long, useful life.

Fiber-Tip Pens



There are two types of fiber-tip pens: fiber-tip paper pens and fiber-tip transparency pens. Ease of use, ten colors in two line widths, high quality characters, opaque lines, and economy make fiber-tip paper pens ideal for display applications or preliminary drawings on chart paper.

Transparency pens are ideal for presentation applications on glossy presentation paper or overhead transparency film. They come in seven colors and two line widths. The ink used for transparency pens is formulated to dry through evaporation rather than through absorption, making them unsuitable for use on chart paper, double-matte polyester film, or vellum.

The optimum plotting speed is 50 cm/s at 24 grams of force for new fiber-tip paper pens and 10 cm/s at 24 grams of force for new fiber-tip transparency pens. As the ink supply in the pens begins to run out, line density decreases. When lines begin to fade, slow the pen speed to improve ink flow, to create a darker line, and to prolong pen life.

Each pen is a sealed, disposable system that is easy to load into the pen carousel. Pen tips are made of a very hard fibrous material through which the ink flows quickly and evenly, depositing a continuous line on the plotting medium. Abrasive media tend to wear and broaden the pen tip. Because of this, fiber-tip paper pens are not recommended for use on vellum or double-matte polyester film. Chart paper is the best media for fiber-tip paper pens. Overhead transparency film or glossy presentation paper are the best media for fiber-tip transparency pens.

Roller-Ball Pens



Roller-ball pens are easy to use, are available in four colors and one line width, and produce good line quality at the fastest plotting speeds. These characteristics make this the preferred pen for applications which require speed, uniform line width, and line differentiation. The pens are convenient, sealed units with a large ink capacity, so that they write for a longer distance than fiber-tip pens. Roller-ball pens are

recommended for use on chart paper. The black, red, and green inks diazo-reproduce more clearly than the blue ink.

Roller-ball pens draw narrow, continuous lines that are less dense than lines drawn with drafting pens. Under the optimum speed and force settings of 60 cm/s and 51 grams (displayed parameter values of 60 and 6), line width remains consistent throughout the life of the pen.

The pen tips incorporate a tungsten carbide ball that turns as it contacts the surface of the writing medium, transferring ink from the reservoir inside the pen to the medium. Unlike a fiber-tip pen, which is rubbed across the surface of the medium, the roller-ball tip rolls across the surface. Since friction is minimized, pen wear is negligible.

Roller-ball pens start a line by depositing the dot of ink contained on the tip just before the ball turns over and smoothly transfers ink from the ink reservoir to the medium. This start-up characteristic is most noticeable on the short line segments contained in characters.

Drafting Pens



Carefully maintained, drafting pens provide the highest quality lines available on the plotter. Lines are continuous, dense, uniform, and smooth. These pens provide excellent resolution on vellum and polyester film. The results on chart paper are less satisfactory because the paper absorbs the ink quickly and its loose fibers tend to clog the pen tip. For this reason, chart paper is not recommended for drafting pens.

Plotter operators frequently avoid drafting pens due to the tendency of ink to dry and clog in the pen tip. This tendency is greatly reduced through the design of the plotter, which automatically returns the pen to the carousel to be capped if the pen has not been used for 15 seconds.

Drafting-pen assemblies are specifically designed for use on plotters. Hewlett-Packard supplies plotter points, and manufactures and supplies the pen bodies. In addition, Koh-I-Noor Rapidograph, Inc. and Rotring (in Europe) sell plotter points that will fit the HP pen bodies. Tungsten carbide points are recommended, and a 3.95- or 4-mm external diameter bushing is required.

The care and maintenance of drafting pens are discussed in detail in Appendix A, Using Drafting Pens.

Ink

Ink for Fiber-Tip and Roller-Ball Pens

The ink used in Hewlett-Packard's fiber-tip paper pens and roller-ball pens is formulated for use on chart paper. Since the ink dries through absorption rather than evaporation, it does not adhere to vellum and polyester film and is generally unsuitable for these media.

Fiber-tip transparency pens use an ink that dries quickly by evaporation, minimizing bleeding and smearing. Use transparency pens with non-absorbant glossy presentation paper and overhead transparency film. The end result is a quick-drying plot.

Ink for Drafting Pens

The ink supplied with your plotter for use with drafting pens is formulated to plot on vellum and polyester film. Although only one type of black ink is available from Hewlett-Packard, other types, brands, and colors of ink are available from engineering supply stores. Consider the following when selecting your ink:

- Formulas are available for writing only on film, only on paper, or for both purposes.
- Black ink is available with a choice of opacity rating (percentage of light transmission). Opacity contributes to the way a plot looks as well as to how it reproduces under different processes (xerography, microfilm, diazo). Colored inks are available in transparent or opaque colors.
- Some formulas increase drying time, others decrease drying time. A fast drying speed is generally preferable once ink has been deposited on the medium, but a slow drying speed reduces problems caused by ink drying in the pen.
- Different brands of the same type of medium may react differently to the same brand of ink.
- Some inks are sensitive to environmental conditions and may work well in one environment, not as well in another.

If you find that one kind of ink does not meet all of your needs, try others until you find the best solution for your requirements, or change brands of media.

Combining Pens and Media

The following table provides a summary of the pen and media combinations discussed in the preceding sections.

HP 7550 Recommended Pen and Media Combinations

<div>Pen Characteristics</div> <div>Media Characteristics</div>	Paper Pens	Roller-Ball Pens	Drafting Pens	Transparency Pens
	10 colors; 0.3-mm and 0.7-mm widths Even ink flow; high-quality characters Disposable	4 colors; 0.3-mm width Even wear and ink flow for uniform lines Fast plotting speed Long writing distance Disposable	Liquid ink in refillable pens Varied point widths Highest drafting-quality pen Requires maintenance	7 colors; 0.3-mm and 0.6-mm widths Vivid colors Disposable
Chart paper				
Good for presentations and preliminary drawings With continued handling, tears and wrinkles	High speed and high quality Ink absorbs well Good for solidly-filled areas Excellent for multi-color charts	Highest speed and good quality Ink absorbs well Opaque, uniform lines Good for preliminary drawings Not recommended for area fill	Not recommended	Not recommended

Glossy Presentation Paper

Best paper for high quality plots Fingerprints on surface may affect ink adhesion	Not recommended	Not recommended	Not recommended	Excellent quality for reports Ink dries quickly Vivid colors
--	-----------------	-----------------	-----------------	--

Overhead Transparency Film

Good for overhead presentations and overlays Backed with paper for proper tracking on grit wheel plotters	Not recommended	Not recommended	Not recommended	Good quality for overhead presentations, overlays Ink dries quickly Maximum color density for overhead projection
--	-----------------	-----------------	-----------------	---

Vellum

Good for overlays and diazo reproduction Coated surface	Not recommended	Not recommended	Excellent quality and good contrast for diazo reproductions at fast developing speed	Not recommended
--	-----------------	-----------------	--	-----------------

**Double-Matte
Polyester Film**

Dimensionally stable Good for high- accuracy applica- tions and archive storage	Not recommended	Not recommended	Excellent quality and good contrast for reproductions Sharp, dense, and uniform lines	Not recommended
--	-----------------	-----------------	---	-----------------

Purchasing Supplies

Hewlett-Packard sells a wide selection of supplies for the HP 7550 graphics plotter. Consult the HP Computer Users Catalog (Part No. 5953-2450) for a complete listing or contact your HP Sales and Support Office for details. If you know the part number of the item(s) you need, call our Direct Order telephone number: 800-538-8787 (California: 408-738-4133).

The drafting plotter is also designed to use drafting points, ink, and media that are available commercially. When purchasing supplies from a local drafting or engineering supply dealer, be sure the supplies meet these specifications:

- Plotter points for the drafting pen must be designed for use in plotters and must have a bushing that is 3.95-mm to 4-mm in diameter. It is recommended that you buy points that are at least 0.35-mm wide; smaller points require more cleaning and care, and wear faster. Tungsten carbide points are also recommended because they wear longer than steel points and are less fragile than jewel points.
- Match the type of ink to the kind of medium that will be used. Best results will be obtained from ink that is designed for use with plotters.
- Flat sheets are preferred to rolled media.
- Sheet dimensions must be within the ranges described under Loading the Plotting Medium in Chapter 3.
- Polyester film must be double matte; best results are obtained with film that is 0.075-mm (0.003 in.) thick.

Your Pen and Media Questions Answered

How Can I Optimize Pen Life?

Many factors contribute to the life of a pen, including how much the pen is used, the roughness of the plotting medium (the smoother, the better), the pen force (light is best), and the hardness of the pen tip. Following the suggestions in this manual will help you extend the life of your pens.

Can an Existing Plot Be Reloaded for Additional Plotting?

Yes, it is easy to modify a plot by including registration marks on the original, then setting P1 and P2 using the front-panel **ALIGN** function, to these registration marks by digitizing these points when you reload the medium. This will correctly orient the plotting program and will compensate for any dimensional differences in the medium resulting from environmental changes.

Can Any Commercial Ball-Point or Pressurized Ball-Point Pens Be Used on the Plotter?

No, the pen force required to make commercial ball-point pens write is more than the plotter is designed to exert. The roller-ball pens designed for the plotter offer speed and writing quality comparable to that expected of ball-point pens.

Can Any Medium Be Loaded Automatically into the Plotter?

No, the automatic media loading tray is designed to be used only with chart paper or transparency film.

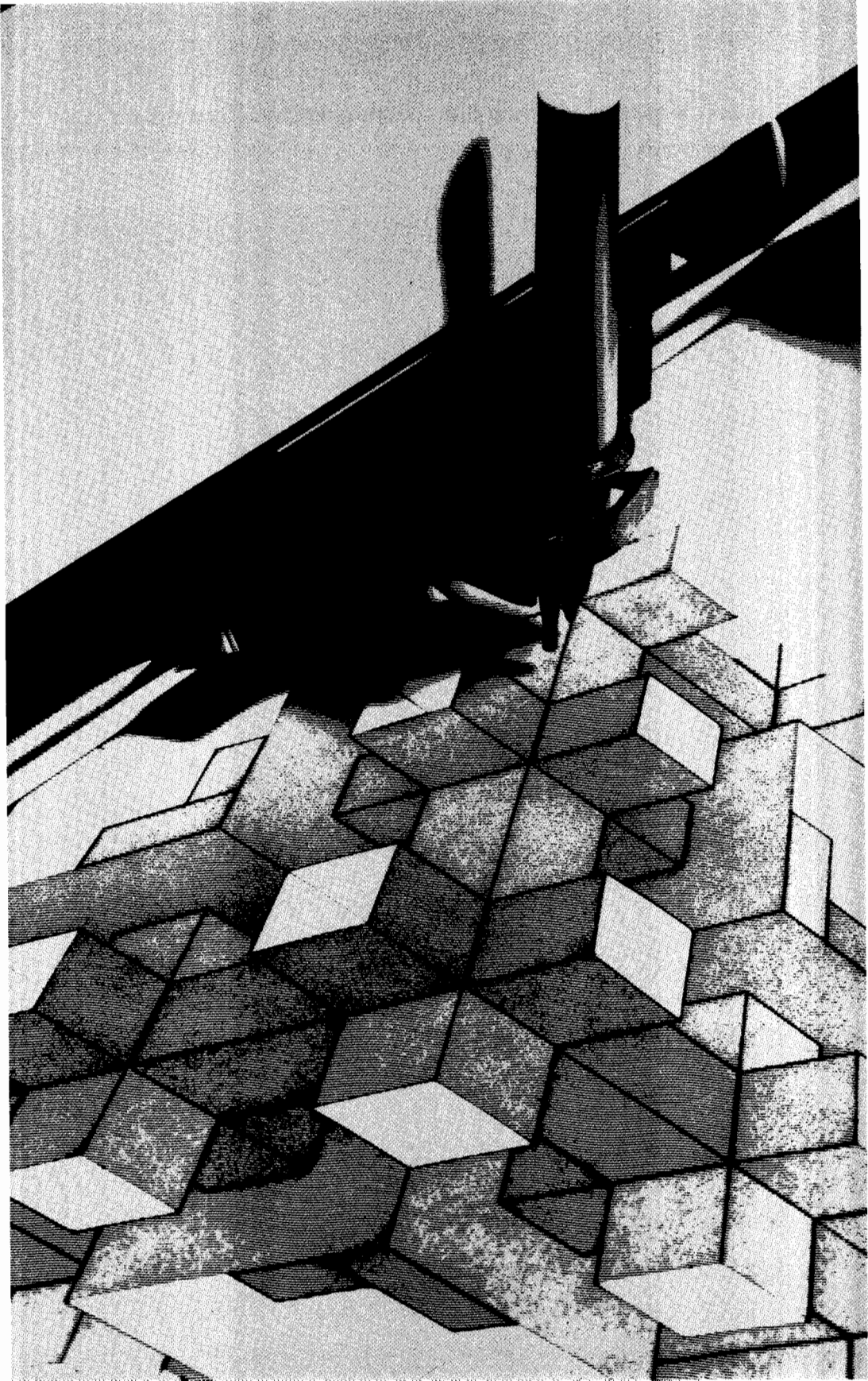
How Many Plots Can I Expect from a Tray of Paper?

The automatic media loading tray will hold 150 sheets of chart paper or 100 sheets of transparency film. Remember, however, that your pens might run out of ink before the tray runs out of paper, depending on how much solid-fill plotting you do.

How Many Plots Can I Expect from a Set of Pens?

This depends on how much solid area fill you do, since that requires the most ink. As a guide, using the plotter's demonstration plot on A4- or A-size chart paper, you will get 45-50 graphs before you notice a decrease in the density of the ink in the filled-area.

Notes



Chapter 5

Symptoms and Solutions

If you follow the suggestions in this manual, you can prevent most plotting difficulties. If, however, you find that the quality of your output does not match your expectations, this chapter may help you correct the situation. The many factors involved with quality output include type, brand, and condition of pens, ink, and media; the speed, force, acceleration, and mechanical performance of the plotter; the temperature, relative humidity, and cleanliness of the plotting environment; and the experience of the programmer and the operator.

The following table lists possible causes and solutions for several symptoms; use the table to help you diagnose and correct output problems.

Possible Cause	Solution
Pen Does Not Write	
The pen is out of ink.	Get a new pen (fiber or roller-ball) or refill the ink reservoir (drafting pen).
Fiber-tip pen is dried out.	Prime the pen by manually writing with it until the ink begins flowing from the internal ink supply to the pen tip. If very dry, dip the tip in a drop of water to initiate ink flow, or shake it like a thermometer. When plotting, be sure to use the fiber-tip pen carousel, which is designed to protect the pen tips from drying between plots. Keep the caps on fiber-tip pens whenever they are not stored in the carousel. Leave new pens in their hermetically sealed foil packages until they are needed.

Possible Cause	Solution
Pen Does Not Write (Continued)	
Drafting pen is dried out or air vent in the pen nib is clogged.	Clean the outside of the pen body and the rubber cap in the carousel. Prime the pen by applying suction with a syringe bulb; then draw with the pen manually. It may help to dip the pen tip in a drop of water. If priming does not work within a minute or two, carefully clean all parts of the pen. Follow the instructions in this manual, or the manufacturer's instructions provided with the plotter point or the ultrasonic cleaner (if one is being used).
Drafting pen's cleansing wire is bent.	Check the pen very carefully, using a magnifying glass if possible. If the cleansing wire is bent, replace the plotter point.
The pen is defective.	Although rarely the case, it is possible that a pen is defective and will not write from the beginning. Check all other possibilities first. Increase the pen force and decrease the pen speed.
Pen Dries Out Before It Is Used	
The wrong carousel is being used.	Use the pen carousel that is designed for the type of pen being used.
Pen cap in the carousel may be out of alignment.	Carefully inspect the pen caps in the carousel to see if any are missing, loose, or damaged. If loose, firmly press them into place. If damaged or missing, contact your Hewlett-Packard service representative.
Fiber-tip and roller-ball pens have been stored longer than their specified shelf life.	Roller-ball and fiber-tip pens are packaged in hermetically sealed foil envelopes that preserve the pens. New pens that have been stored in an

Possible Cause	Solution
Pen Dries Out Before It Is Used (Continued)	
Relative humidity is low.	<p>unopened package are guaranteed to write if used by the date stamped on the envelope. Order carefully to avoid having the shelf life expire before pens are needed. Always leave packages sealed until the enclosed pens are to be used.</p> <p>In very dry climates, ink can be expected to dry out more quickly than in humid environments. If this problem is suspected, take extra care to make sure pens are capped.</p>
Beginning of Line Does Not Show	
The pen tip was partially dried out or pen was temporarily clogged.	<p>The beginning of the line actually primed the pen to start the ink flow. If the pen has been sitting a long time in the carousel without being used, prime the pen manually by drawing with it until it writes.</p> <p>To avoid this problem, be certain that the pens are used in the correct carousels and remove them after use. Store pens carefully between plotting sessions, removing them from their carousels and replacing their original caps.</p> <p>For drafting pens, if an ultrasonic cleaner is available, insert the plotter point into the cleaner up to the threads for a few minutes to start ink flow. You may also need to prime the pen by applying suction with a syringe bulb or by drawing with the pen manually. Be sure to clean drafting pens at the end of each plotting day.</p>

Possible Cause	Solution
Beginning of Line Does Not Show (Continued)	
Water dilutes ink.	Technical drafting pens are occasionally stored with a drop of water in the cap to keep the pen tip moist. Hewlett-Packard drafting-pen caps are designed to keep tips moist without water; do not put water in the pen caps.
Roller-ball pens have a characteristic start-up pattern.	When they start a line, roller-ball pens deposit the dot of ink that is present on the tip. Then they leave a tiny uninked area on the paper while the ball turns over and begins transferring the ink from the ink reservoir to the paper. Store roller-ball pens vertically with the tips pointing down to minimize this start-up characteristic.
Pen Appears to Skip or Drag	
Pen tip is in poor condition.	Check the pen tip carefully, using a magnifying glass. Compare the tip to the tip of a new pen to see if it is damaged or worn. Jewel-tip drafting pens may be chipped. Discard the pen if it is in poor condition. Try "rejuvenating" an old drafting pen by cleaning it thoroughly and increasing the pen force.
Drafting pen is partially clogged.	Particles of ink, dust, or lint can cause pens to skip, especially at higher speeds. Clean the plotter point and ink reservoir thoroughly. Carefully swab out the pen cap in the carousel.
Pen force may be incorrectly set.	Check the amount of force that is being used and change it to the optimum value.

Possible Cause	Solution
Pen Appears to Skip or Drag (Continued)	
The plotting medium is the wrong weight or thickness.	A plotting medium that is too thin or too thick can cause pens to appear to skip or drag. Change to an appropriate medium.
The plotting medium has oil on the surface.	Skin oil, hand lotion, or other agents that repel ink may be present on the surface of vellum or polyester film. Correct the problem by using a new sheet of medium. Keep hands clean while working with the medium, and always handle it by the edges.
The plotting medium has a watermark in it.	Some brands of media, primarily chart paper, contain a manufacturer's watermark, i.e., an impression in the paper. If skipping occurs in the area of the watermark, decrease pen speed to allow the ink to flow into the impression.
The plotter may need service.	The plotter has an automatic height adjustment mechanism that compensates for tiny variances in the height of the platen or thickness of the medium by continually measuring and correcting the pen's distance from the surface of the medium. If all other possible solutions have been explored and the skipping or dragging problem persists, call your Hewlett-Packard service representative.
There is static buildup on pens and plotting medium.	In low humidity, static may cause dust and particle buildup, especially when plotting on transparencies. To reduce the problem, slow the pen speed down, increase the humidity

Possible Cause	Solution
Pen Appears to Skip or Drag (Continued)	
	in the plotting environment, try another brand of film that emphasizes static-resistant qualities, or change to another plotting medium.
Pen Tip Clogs or Ink Blobs	
Pen force may be too high.	Drafting pens may clog when the pen force is heavy. This happens because the pen tip dislodges bits of paper fiber or film coating, which then collect on the pen tip. If not deposited on the paper in a blob of ink, the debris will clog the pen tip, hindering ink flow. Decrease the pen force.
Pen speed, ink viscosity, absorbency of the plotting medium, and plotter point width are out of balance.	When ink flows from the pen faster than the medium can absorb it, or when the medium is quite porous, blobs and splashes appear. This is more common with drafting pens, which use liquid ink. Experiment with the plot, varying one factor at a time — pen speed, ink viscosity, brand of plotting medium, or plotter point width — until you discover a satisfactory combination.
Pen speed is too fast for drafting pens.	When the speed is too fast, the line is thin during the fast movements of the pen, but gets thick or blotchy when the pen slows down at the ends of line segments and at corners and curves. Lower the pen speed to correct the problem.
Ink has leaked around the drafting-pen plotter point.	If ink has leaked around the top of the plotter point where the pen adapter meets the point, the internal air flow may be obstructed or the vent hole may be clogged. Clean the pen. Do not shake the pen.

Possible Cause	Solution
Pen Tip Clogs or Ink Blobs (Continued)	
Drafting-pen tip is dirty.	The tip may be dirty from dried ink or particles. Clean the pen thoroughly.
There is static buildup on pens and plotting medium.	In low humidity, static may cause dust and particle buildup, especially when plotting on polyester film. To reduce the problem, slow the pen speed down, increase the humidity in the plotting environment, try another brand of film that emphasizes static-resistant qualities, or change to another type of plotting medium.
Pen Tip Wears Out Quickly	
Polyester film is the medium.	Polyester film has a textured surface to which ink adheres. The texture wears down pen tips of all types, and the coarser the texture or the higher the pen force or speed, the faster the wear occurs. Some brands of polyester film are much smoother or coarser than others. If pen wear seems to be excessive, compare brands of film and buy one that is smooth to the touch. Reducing the pen force and/or the pen speed may also help. Do not use stainless steel drafting pens on polyester film.
The pen is fiber tipped.	Fiber-tip pens wear faster than roller-ball or drafting pens by nature of their composition. The wear is exhibited as a broadening of the line. To prolong fiber-tip pen life, use a smooth plotting medium and the lowest pen force that will produce acceptable results for your application.

Possible Cause	Solution
Lines Sometimes Look Wiggly	
Pen tip is damaged.	The pen tip may be damaged in such a way that it draws lines that appear to wiggle. Examine the pen and replace it if the tip is not exactly centered.
There may be a mechanical problem.	Periodic wiggles that are not associated with a pen should be referred to your Hewlett-Packard service representative.
Line Width Is Not Uniform	
Drafting pen may be dirty.	A drafting pen can work when it is dirty, but this may affect the width of the line. Clean the pen thoroughly.
Variations in pen speed create variations in line boldness.	Curves and characters are a collection of many tiny line segments. The plotter stops at the beginning of each line segment that it draws, which creates a bolder line on shorter line segments than on longer line segments. Lowering the pen speed will make the line width more uniform. Using the HP-GL programming instructions for the drafting plotter's internal arc and circle generator will also produce smoother, more uniform lines. This is because the computation time for each segment is reduced; thus the plotter does not stop as long at the beginning of each segment.
Drafting-pen ink flow is too fast.	The flow of ink in drafting pens may be okay for longer line segments, but is too fast when the pen slows down to draw a curve. An ink with higher viscosity may give more satisfactory results. A lower

Possible Cause	Solution
Line Width Is Not Uniform (Continued)	
	pen speed or use of a slow-drying ink may also make line width more uniform.
Line Width Is Too Narrow or Too Wide	
Drafting-pen point size may be too small or too large.	Many point sizes are available for plotter drafting pens. If the sizes provided with your Hewlett-Packard plotter are not sufficient, consult the HP Computer Users Catalog or contact an engineering supply company to obtain a larger variety.
Fiber-tip pen may be worn down.	Fiber-tip pens broaden with use, producing a wider line than when they were new. If a fine line is required, use a new fiber-tip pen or use a roller-ball pen, which maintains a constant width.
Your program may not be drawing enough lines.	Write a subroutine to draw multiple lines spaced so closely together that they appear to be a single line.
Ink Flow Is Uneven	
Drafting pen is dirty.	Drafting pens must be absolutely clean in order to write well. Pens pick up lint when plotting, especially at high speeds, and draw a ragged line. Residue in the ink reservoir also affects ink flow in drafting pens. Clean all parts of the pen thoroughly.
Plotter speed is too fast for the pen type.	When the speed is too high, ink flow cannot keep pace. Be sure that the correct carousel is used, since it automatically sets optimum speed and force values for the pen type it is holding. If the problem persists, slow the pen speed by means of front-panel controls or program command.

Possible Cause	Solution
Ink Flow Is Uneven (Continued)	
Pen force is too high or too low.	When the pen force is too high or too low for the speed being used, the result may be lines that are narrow in some places and wider in others. Reestablish default values for force and speed by initializing the carousel (remove and reinsert the carousel). If the problem continues, vary only the pen force to find an optimum value.
Pen is running out of ink.	When the pen begins to run out of ink, the ink flow generally decreases before completely stopping. Decreasing the plotter speed may provide a smoother ink flow under these conditions. If it is a drafting pen, refill the ink reservoir.
Ink is too thick for the drafting-pen point size being used.	Ink with a great deal of pigmentation or ink that has large particles in it cannot flow through a very small plotter point. Use a larger point size, thin the ink with distilled water, try a new bottle of ink, or use another brand or formula of ink such as a high-speed plotter ink.
Ink Smears or Does Not Dry	
Pinch wheels are rolling over border line.	<p>Make sure your plotter is adjusted for the paper size you are using. Pinch wheels should not roll over the plotting area. Refer to Loading the Plotting Medium in Chapter 3 for details on adjusting the pinch wheel.</p> <p>Also be sure that the corners of the plotting medium are square. Refer to Sheet Squareness in Chapter 3. Transparency pens are made with</p>

Possible Cause	Solution
Ink Smears or Does Not Dry (Continued)	
Ink and media combination is incompatible.	<p>an ink that won't adhere to plotting medium other than overhead transparency film, or glossy presentation paper.</p> <p>Fiber-tip paper and roller-ball pens contain ink that dries by absorption into the plotting medium. They are not suitable for use on polyester film and most types of vellum. Other ink/medium combinations may also be incompatible. Change the brand of medium or pen if this problem persists.</p>
Ink Fades or Separates	
Ink may be reacting to oil in vellum.	Change ink or type of pen, brand of vellum, or type of medium. This problem is most apparent when fiber-tip paper or roller-ball pens are used.
Drafting ink may be unstable.	With age, some inks tend to break down. Clean the pen thoroughly and use a new bottle of ink.
Ink Flakes Away	
Surface of plotting medium is contaminated.	The medium surface may be coated with tiny particles, such as a cleaning powder, to which ink adheres. In time, the particles flake off, taking ink with them. Never treat plotting media with cleaning powder or similar drafting compounds.
Plotter Seems to Misregister or "Drift"	
Plotter has been bumped or plotting medium has been moved.	If the plotter is bumped during the course of a plot, it will generally continue to plot without any noticeable effect. It is possible, however, that a bump will jar the pen, causing the appearance of a misregistered line. An obstruction to the medium's

Possible Cause	Solution
Plotter Seems to Misregister or "Drift" (Continued)	
Plotting medium's movement is obstructed.	movement or slippage (due to a medium that is too heavy, too slippery, or that has been rolled up) may also look like line misregistration. The movement of the medium may be obstructed if the plotter is placed close to a wall or other object. Operate the plotter in an open area where the medium can move freely.
The grit wheels are clogged with fibers.	If the grit wheels are dirty, the media-gripping mechanism will not work properly. Clean the grit wheels with the soft brush provided with the plotter. To avoid fiber buildup, use media recommended by Hewlett-Packard.
Climatic conditions have changed.	Changes in temperature and/or relative humidity during the course of a plot can cause media to stretch or shrink. This change in dimension may look like a misregistered line. To avoid the effects of environmental changes, let the plotting medium acclimate to the room in which the plotter is located before beginning to plot. If it is not possible to control the environment, use a more stable medium such as polyester film.
Medium is unsuitable.	Media that are too thick, too thin, or too slippery may not be gripped properly as they move through the rollers. If you are using polyester film, a thickness of 0.075 mm (0.003 in.) is recommended.
Program has an error.	Lines may not be drawn where expected due to a programming error. Check the program listing.

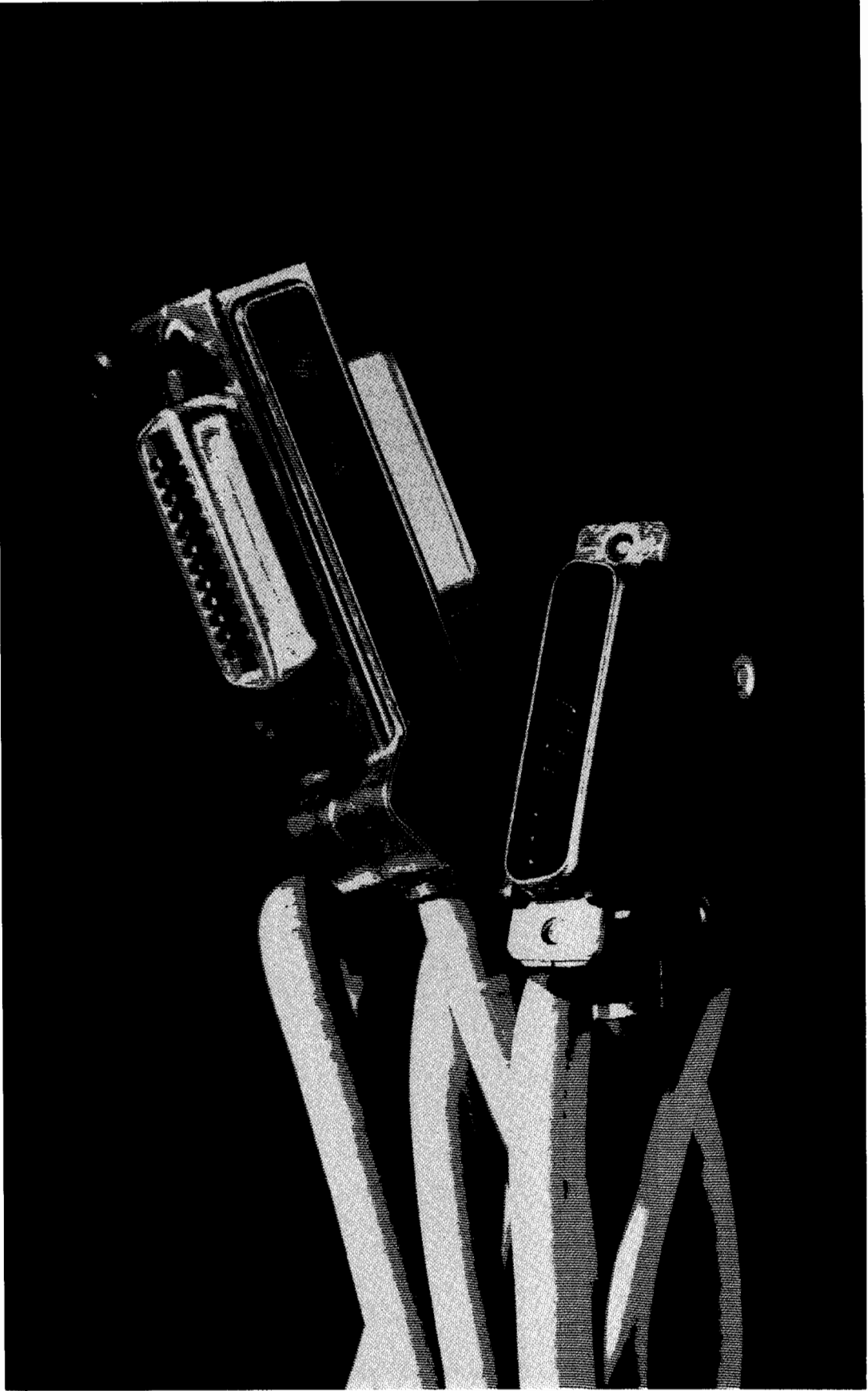
Possible Cause	Solution
You Want to Plot Faster	
Use roller-ball pens.	Roller-ball pens provide the most consistent line quality at the highest speed of the plotter. Use a high-quality, smooth-surfaced chart paper to maintain line quality and minimize pen wear.
Change the pen speed.	The default pen speed established for each pen type by the plotter optimizes output quality and pen life. You may find that a faster speed produces both quality and pen wear that are acceptable for your application. The maximum plotting speed is 80 cm/s (32 in./s). Change the plotting speed through front-panel controls or program command. A smooth-surfaced, less absorbent medium will help improve line quality at higher speeds.
Drawings Reproduce Poorly	
Lines are not dense enough.	<p>Try roller-ball pens on chart paper to produce dense lines. Fiber-tip paper or roller-ball pens on vellum or polyester film produce faded lines because the ink is not absorbed.</p> <p>Drafting pens produce the best lines for reproduction purposes. Several types of ink are available for drafting pens, providing for a selection of opacity ratings. To determine which type would be best for your purposes, contact the representative for your reproduction equipment or experiment with several types of plotter points and different types of ink for drafting pens.</p>

Possible Cause	Solution
Drawings Reproduce Poorly (Continued)	
Plotting medium is not suitable for the reproduction process being used.	Contact the representative for your reproduction equipment to determine the best medium to use.
Writing Surface Is Rippled, Torn, or Scratched	
Plotting medium is too thin.	Thin or tissue-like media do not have the tensile strength to move through the rollers. Change to a heavier medium.
Plotting medium is too thick.	The pen tip may scrape the medium if it is too thick. The plotter works effectively with chart paper or vellum no thicker than 0.15 mm (0.006 in.) and with polyester film no thicker than 0.1 mm (0.004 in.).
Plotting medium is uneven.	It is possible that the medium is warped or otherwise uneven. If this defect is present, it may cause the pen to tear or scrape at the high places. Check the medium carefully to see if any surface aberrations can be detected. If so, replace the medium.
Pen force is too high.	Too much force on the pen may scratch the medium. Be sure that the correct carousel is being used; select a lower pen force by front-panel control or program command if necessary.
Pen tip is damaged.	Check the tip and replace it if it is damaged.
Pen is too close to the surface.	The plotter has an automatic pen height mechanism that continually measures and corrects the distance of the pen tip from the surface of

Possible Cause	Solution
Writing Surface Is Rippled, Torn, or Scratched (Continued)	
Plotting medium is improperly loaded.	the medium. The pen tip may be too close for one of two reasons: the medium is thicker than is acceptable to the plotter or the height mechanism is out of order. When the latter is suspected, contact your Hewlett-Packard service representative.
Ink has soaked the plotting medium.	Reload the sheet. Make certain the medium has square corners, is against the paper stops, and the pinch wheel is aligned over the right edge of the medium. If many closely spaced lines are drawn on chart paper, transparency film, polyester film, or vellum without sufficient time to dry, the medium may become damp and weak. Further drawing in the same area can tear the medium. Change the plotting conditions so that the ink will have time to dry before more lines are drawn in the same area.
Medium Hits the Plotter As It Moves Back and Forth	
Medium has been rolled.	The curl in the medium causes it to hit the back of the plotter, which can create a noise and tear the end of the paper. The best solution is to store the medium flat so that it will not curl.
Repeated Paper Load Failures	
Media wasn't fanned.	Media may be slightly curled. Fan the paper or film and reload the paper tray. If repeated failures occur, turn stack over or try a new stack.

Possible Cause	Solution
Repeated Paper Load Failures (Continued)	
Media is too thin.	Thin or tissue-like media do not have the tensile strength to move through the rollers. Change to a heavier paper. HP media is recommended.
Media is too thick.	Media that is too rigid will not feed properly. The automatic sheet feed works effectively with chart paper no thicker than 0.15 mm (0.006 in.). Change to a thinner paper. HP media is recommended.
Media is uneven.	It is possible that the media is warped or otherwise uneven. If this defect is present, the paper may go over the pinch wheel or misalign. Check the paper carefully to see if any surface aberrations can be detected. If the warp is minor, turning the stack over may cure the problem. Otherwise, replace the paper.
Media has an uneven edge.	Square corners and straight edges are needed for the media to align correctly. Replace the media.
Media is the wrong size.	Media size must be exactly A4, A, A3, or B. Other paper sizes will not work in the plotter.
Plotter Stops Working/X- or Y-Axis Failure	
Plotter has been bumped or plotting medium movement has been obstructed.	If the plotter is bumped during the course of a plot or an obstruction is on the platen the plotter motor could overload. The plotter comes to a halt and displays: X-AXIS (Y-AXIS) FAILURE SEE MANUAL . Remove any obstruction(s) from the platen and cycle the power to correct the problem. If failure occurs repeatedly, contact your Hewlett-Packard service representative.

Possible Cause	Solution
Plotter Does Not Respond, or Responds Unexpectedly	
Leaning on front panel while turning on power.	There are several sequences of front-panel controls that, when pressed in conjunction with a power-up, put the plotter in a self-test mode. To remedy this, turn the plotter off and then on again, keeping your hands clear of the front panel. If the plotter continues to respond unexpectedly, turn the power on while holding down the FAST button. You should be aware that this procedure sets the plotter to its factory default conditions.



Chapter 6

Plotter Interconnection

Introduction

This chapter will guide you step-by-step through connecting the HP 7550 plotter to your computer, and verifying communication between them. An important part of interconnection involves setting interface conditions from the plotter's front-panel. Refer to Chapter 3 to learn how to use the front panel. If you need more information about plotter/computer communication or interfacing, consult Chapters 15 and 16 in the Interfacing and Programming Manual.

The following questions and answers are designed to anticipate your interconnection problems. Read the General Instruction section to get an idea of the interconnection sequence for all computers. When you are ready to begin, refer to the interconnection guide for your specific computer. The guides are organized alphanumerically by computer name and model number. Hewlett-Packard computers are in the first group, followed by other computers.

Each interconnection guide lists the equipment required and illustrates how the equipment should look when properly connected. The guide will tell you how to connect the equipment, establish interface conditions, and verify communication by sending a short computer program to the plotter. All programs are written in a programming language recognised by the specific computer. In response to the verification program, the plotter will label the message "7550A COMMUNICATION OK", or simply "COMMUNICATION OK".

What If My Computer Isn't Listed?

If your computer isn't listed, there is a good possibility that it still can be interfaced to the HP 7550. First, determine which kinds of communication interfaces are available for your computer. If your computer supports an RS-232-C/CCITT V.24 interface or an ANSI/IEEE 488-1978 (HP-IB) interface, then it probably can be interfaced with the HP 7550. Read the manual that describes the communications equipment for your

computer, and then determine how information is sent and received. Next, read either Chapter 15 or 16 in the HP 7550 Interfacing and Programming Manual (depending on which interface you're using) to get a better understanding of how information is sent and received by the plotter. In the RS-232-C environment, pay particular attention to the cabling requirements between the computer and the plotter. Then, choose an interconnection example in this chapter that uses similar equipment. Use this as a guide for creating your own communication verification program.

What If My System Configuration Is Different?

There are many variables in computer systems. Often, substituting hardware or software can cause communication problems. Therefore, if you make substitutions, be aware that these may affect the operation of the equipment or the communication verification program.

If you are having problems getting your system to work with substitute hardware, carefully read the manual on the substitute equipment. Try to identify the difference between the hardware you are using and that which is recommended. Also, consult Chapter 15 or 16 of the Interfacing and Programming Manual to better understand plotter communication requirements. Again, when using an RS-232-C cable, pay attention to the cabling requirements between the computer and plotter. Finally, adapt the connection instructions, interface conditions, and programming information for use with your equipment.

If you are having problems getting the verification program to work with substitute software, read the software manual. There are usually two parts to a program that establishes communication — opening the communications port and writing to the communications port. Opening the communications port may require you to reset plotter and computer interface conditions such as baud rate, parity, etc. In any case, the interface conditions must be set at the same values for the computer and the plotter. Writing to the communications port is usually straightforward. The plotter communicates using ASCII code. Find the output statement in your programming language that can send an ASCII string to the communications port. Then adapt the verification program for use with your operating system and/or programming language.

I've Done Everything You Said and It Still Doesn't Work...

After following the interconnection guide, the verification program should cause the plotter to label "7550A COMMUNICATION OK" or simply "COMMUNICATION OK". If it doesn't, there are a number of things to check:

Is your computer working properly?

- Check the computer by running a program that you know works.

Is your communications hardware and cable working properly?

- Check that none of the connectors on the computer interface, cable, or plotter are damaged.
- Try another cable if one is available.
- If your computer uses an interface card, make sure the card is inserted in the proper slots and that the switches are set to the values specified in the interconnection guide.

Is your plotter working properly?

- Run the plotter confidence test as described in Chapter 3.
- Check to see that the plotter is turned on, paper is loaded correctly, and the **VIEW** function key has not been pressed.

Are the plotter's front-panel interface conditions set correctly?

- Use the front-panel controls to verify all interface conditions specified in your computer's interconnection guide, including the default conditions.

Are you using the proper operating system and programming language?

- Check to see if you are using the operating system and/or programming language listed in the interconnection guide.

If you are still having problems, contact your salesperson. Your salesperson will probably be able to solve your problem or refer you to someone who can.

General Instructions

Step 1 — Connect Equipment

Gather the equipment listed in your computer's interconnection guide.

CAUTION

Set all power switches to the **OFF** position before connecting equipment.

If your computer requires an interface card, set the switches, and install the card as outlined in the interconnection guide.

Now connect the computer to the plotter. One end of the interface cable attaches to the plotter's HP-IB or RS232-C connector located on the back of the plotter. Each connector is shielded by a protective cover. Using one hand, raise the protective cover and hold it upright while inserting the interface cable in the appropriate connector. Manually tighten the screws on both sides of the interface cable. Attach the other end of the cable to your computer as instructed.

Plug in all power cords. Then turn the plotter and computer on.

Step 2 — Establish Interface Conditions

Use the plotter's front-panel controls and display to reset or confirm interface conditions. (Refer to Chapter 3 to learn how to use the front-panel controls.)

The left side of the following table lists the interface conditions that you can store in the plotter's non-volatile memory. The plotter is set to the factory default conditions listed on the right side of the table. When you reset a condition from the front panel, it replaces the corresponding default condition. Once stored, a condition will remain even after you turn the plotter off.

Plotter Interface Conditions	Default Conditions
HP-IB Address	05
Monitor Mode: Off/Parse/Receive	Off
Standard/Enhanced Mode	Standard
Remote/Local/Standby Mode	Remote
Eavesdrop/Standalone Mode	Eavesdrop
Bypass: On/Off	On
Handshake: None/Xon-Xoff/	None
Enq-Ack/Hardwire	
Direct/Modem Mode	Direct

Plotter Interface Conditions	Default Conditions
Duplex: Full/Half	Full
Parity: 7 Bits/8 Bits	8 Bits
Off/Even/Odd	Off
Baud Rate	2400

When using the RS-232-C cable, reset only the interface conditions listed in the interconnection guide for your computer. All other interface conditions should remain at their default settings. Remember to press the **ENTER** soft key to save the reset conditions. If you are unsure of what your plotter's interface conditions are, you can use the front panel to check them. (To return the plotter to the default interface conditions, press the **FAST** button while turning the plotter on.)

If you are using the HP-IB cable, you only need to verify that the HP-IB address is set to 05. All other interface conditions should remain at their default settings unless otherwise instructed.

At this point, depending on your computer, you may also need to establish interface conditions in your computer. If so, follow the instructions that tell you how to send this information to your computer.

Step 3 — Verify Communication

Load pens and paper into the plotter. On your computer keyboard, type in the program listed under "Verify Communication". Send the program to the plotter. This program will cause your plotter to print "7550A COMMUNICATION OK" or simply "COMMUNICATION OK".

NOTE: Many of the programs that verify communication include instructions that establish a "handshake" or define other conditions to assure communication. Refer to Chapters 15 and 16 in the Interfacing and Programming Manual if you need more information about these instructions. ■

Computer: HP 120, HP 125 (HP-IB)

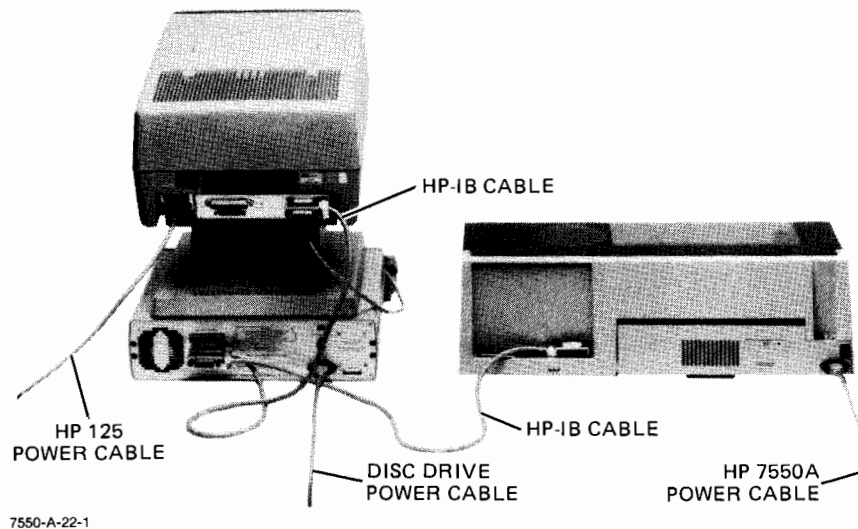
Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Desktop Computer	HP 120 or HP 125
HP-IB Cable (2 required)**	HP 10833B or HP 45529B
GRAPHICS/125 Software	HP 45532A

*Listed equipment represents the minimum components necessary to establish communication between your plotter and computer. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

**One HP-IB cable is required to connect the plotter to the computer, a second HP-IB cable connects the computer to the disc drive.

Connect the Equipment

The illustration below shows how the HP 7550 plotter is to be connected to the HP 125 computer. The HP 120 is similar.



HP-IB Cable Connection; HP 125

Establish and Verify Communication

Turn on the plotter. Use the front-panel controls to confirm that the HP-IB address is set to 05 (the default value). Now, load pens and paper into the plotter. Turn on the computer and use GRAPHICS/125 software to verify communication. See the GRAPHICS/125 manual for examples.

Computer: HP 150 (Touchscreen) (HP-IB)

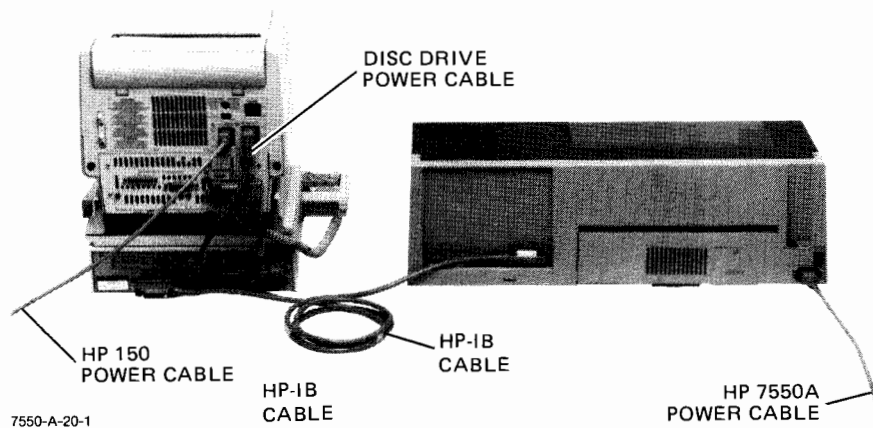
Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Touchscreen Computer	HP 150
HP-IB Cable (2 required)**	HP 10833B or HP 45529B

*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

**One HP-IB cable is required to connect the plotter to the computer, a second HP-IB cable connects the computer to the disc drive.

Connect the Equipment

Make sure that all power switches are in the **OFF** position. Connect the plotter to the computer as shown in the following illustration. Simply attach one end of the cable to the disc drive, and attach the other end to the HP-IB connector on back of the plotter.



HP-IB Cable Connection

Establish Communication

Turn on the plotter. Using the plotter front-panel controls confirm that the HP-IB address is set to 05. (All other conditions should remain at their default values.)

Now, turn on the disc drive, load the MS™-DOS* operating system, and then turn on the computer. The P.A.M. screen will appear on the monitor. On the touchscreen, press **DEVICE CONFIG**, then press **START APPLIC**. This causes the Device Configuration screen to appear. Locate and press the **PLT** field. Now press **NEXT CHOICE** until "HP-IB 5" appears opposite **PLT**. Press **SAVE CONFIG** to retain this setting. (All other fields should be set to default values.)

Using the keyboard, hold down the **SHIFT** key, then press the **USER SYSTEM** key. On the screen, press **EXIT CONFIG**. Now that the computer is configured, you are ready to verify communication.

Verify Communication

Load pens and paper into the plotter. Insert the BASIC disc into the right-hand drive. On the touchscreen, press **REREAD DISCS**. Now press **BASIC**, then press **START APPLIC**. Use the keyboard to type the following BASIC program. When finished, exit the program, type "RUN", and press **RETURN**.

```
10 OPEN "0",1"PLT"
20 PRINT #1,"IN;SP1;PA500,500;"
30 PRINT #1,"LB COMMUNICATION OK"+CHR$(3)
40 PRINT #1,PA0,0;SPO;"
50 END
```

The plotter will label: COMMUNICATION OK

*MS is a trademark of MicroSoft Corp.

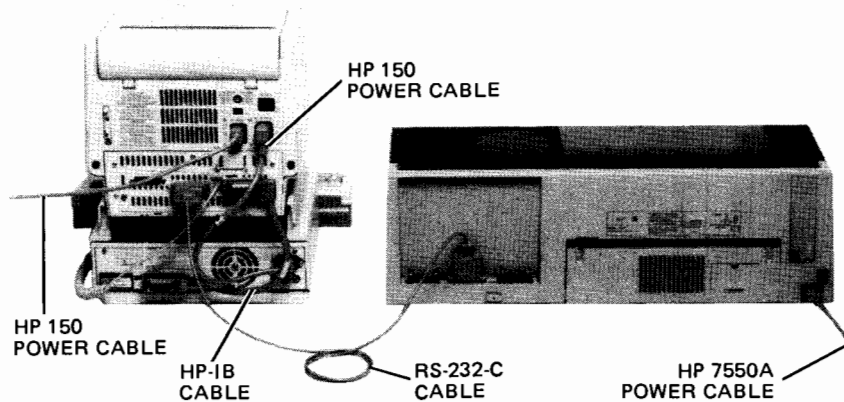
Computer: HP 150 (Touchscreen) (RS-232-C)

Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Touchscreen Computer	HP 150
RS-232-C Cable (M-F Special)	HP 17755A

*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

Connect the Equipment

Make sure that all power switches are in the **OFF** position. Connect the plotter to the computer as shown in the following illustration. Simply attach one end of the cable to Port 2 on back of the computer, and attach the other end to the COMPUTER/MODEM connector on back of the plotter.



7550-A-21-2

RS-232-C Cable Connection

Establish Communication

Turn on the plotter. Using the plotter front-panel controls, confirm or reset the following interface conditions. (All other conditions should remain at their default values.)

1. Remote
2. Standalone
3. Handshake: hardwire

4. Direct
5. Duplex: full
6. Parity: 8 bits, off
7. Baud: 9600

Turn on the computer's disc drive, load the MS-DOS operating system, and then turn on the system. The P.A.M. screen will appear on the monitor. On the touchscreen, press **DEVICE CONFIG**, then press **START APPLIC**. This causes the Device Configuration screen to appear. Locate and press the **PLT** field. Now press **NEXT CHOICE** until "Port2" appears opposite **PLT**. Press **SAVE CONFIG** to retain this setting.

Now look at your keyboard, in the top row is a key labeled **USER SYSTEM**. Press this key twice; the screen will change once again. Locate and press the **BAUDRATE** field, then press **NEXT CHOICE** until "9600" appears opposite **BaudRate**. Now, locate and press **CS(CB)Xmit**, then press **NEXT CHOICE** until "yes" appears opposite **CS(CB)Xmit**. Press **SAVE CONFIG** to retain these settings.

Using you keyboard, hold down the **SHIFT** key and press the **USER SYSTEM** key once again. On the screen, press **EXIT CONFIG**. Now that the system is configured, you are ready to verify communication.

Verify Communication

Load pens and paper into the plotter. Insert the BASIC disc into the right-hand drive. Using the screen, press **REREAD DISCS**. Now press **BASIC**, then press **START APPLIC**. Use the keyboard to type the following BASIC program. Exit the program, then type "RUN" and press **RETURN**.

```
10 OPEN "0",1,"PLT"
20 PRINT #1,"IN;OI;"
30 CLOSE #1
40 OPEN "I",2,"PLT"
50 INPUT #2,ID$
60 OPEN "0",1,"PLT"
70 PRINT #1,"SP1;PA500,500;"
80 PRINT #1,"LB";ID$;"COMMUNICATION OK"+CHR$(3)
90 PRINT #1,"PA0,0;SPO;"
100 END
```

The plotter will label: 7550A COMMUNICATION OK

Computer: HP 3000 (RS-232-C)

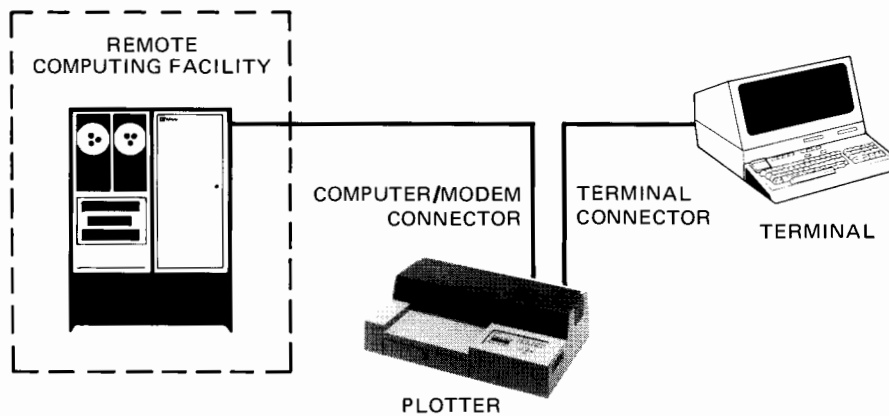
Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Computer	HP 3000
RS-232-C Cable (2 required)**	HP 31391

*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your supplier for specific computer hardware and memory requirements.

**The RS-232-C cable listed connects the plotter to the HP 3000. You will need a second RS-232-C cable to connect the plotter to your terminal. The part number of this second cable will depend on the model number of your terminal.

Connect the Equipment

Make sure that the plotter and terminal power switches are in the **OFF** position. Connect one RS-232-C cable from the HP 3000 to the COMPUTER/MODEM connector on back of the plotter. Connect the second RS-232-C cable between the plotter and the terminal. Simply attach one end of the cable to the back of the terminal, and attach the other end to the TERMINAL connector on back of the plotter.



RS-232-C Cable Connection

Establish and Verify Communication

Turn on the plotter. Using the plotter front-panel controls confirm the following default interface conditions. (All other conditions should also remain at their default values.)

1. Remote
2. Eavesdrop
3. Handshake: none

Now, load pens and paper into the plotter. Turn on the terminal. Use the keyboard to type and run the following HP 3000 FORTRAN program.

```

PROGRAM INTERCONNECT
CHARACTER*5 ID
INTEGER ESCAPE,ETX
ESCAPE=27
ETX=3
WRITE(6,10) ESCAPE,ESCAPE
10  FORMAT(%320C,1R1,".(",1R1,".P2:IN;SP1;PA500,500;")
WRITE(6,20)ETX
20  FORMAT(%320C,"LBCOMMUNICATION OK",1R1)
WRITE(6,30)
30  FORMAT(%320C,"OI;")
READ(5,40) ID
40  FORMAT(A5)
WRITE(6,50) ID,ETX,ESCAPE
50  FORMAT(%320C,"LB ",A5,1R1"PA0,0;SP0; ",1R1,".Z")
STOP
END

```

The plotter will label: 7550A COMMUNICATION OK

Computer: HP 9000, Series 200 (HP-IB)

Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Desktop Computer	HP 9000, Model 216, 226, or 236**
HP-IB Cable (2 required)***	HP 10833B or 45529B

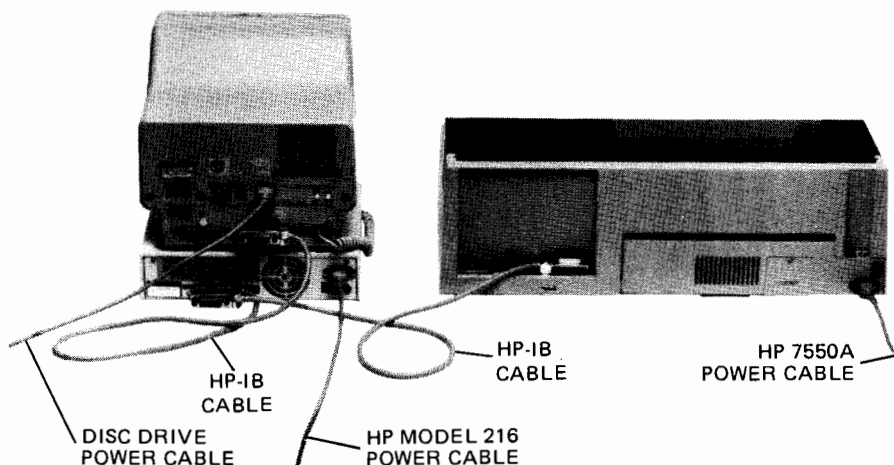
*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

**Previously HP 9816, 9826, and 9836

***One HP-IB cable is required to connect the plotter to the computer. The second HP-IB cable connects the computer to the disc drive.

Connect the Equipment

The illustration below shows how the plotter is to be connected to your HP 9000, Model 216 computer. Models 226 and 236 are similar.



7550-A-19-1

HP-IB Cable Connection: Model 216

Establish and Verify Communication

Turn on the plotter. Using the plotter front-panel controls, confirm that the HP-IB address is set to 05. (All other conditions should remain at their default values.) Load pens and paper into the plotter. Turn on the disc drive and load BASIC 2.0 into your computer. Use the keyboard to type and run the following program.

```
10  OUTPUT 705; "IN;SP1;PA500,500;"
20  OUTPUT 705; "LB COMMUNICATION OK"&CHR$(3)
30  OUTPUT 705; "PA0,0;SPO;"
40  END
```

The plotter will label: COMMUNICATION OK

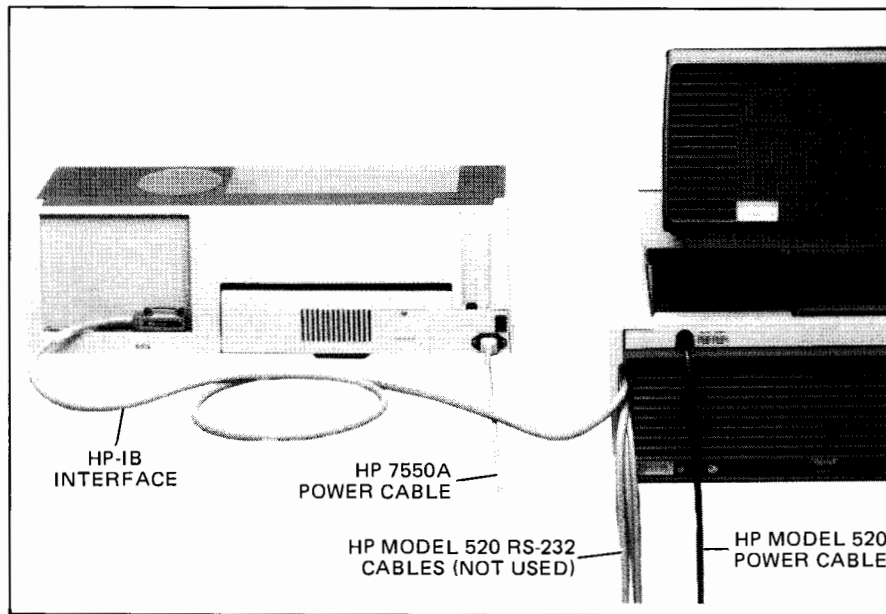
Computer: HP 9000, Series 500 (HP-IB)

Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Desktop Computer	HP 9000, Model 520, 530, or 540
HP-IB Interface	HP 27110A

*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

Connect the Equipment

The illustration below shows how the plotter is to be connected to your HP 9000, Model 520 computer. Models 530 and 540 are similar.



7550-A-16-1

HP-IB Interface Connection: Model 520

Plotter Interconnection

Establish and Verify Communication

Turn on the plotter. Using the plotter front-panel controls, confirm that the HP-IB address is set to 05. (All other conditions should remain at their default values.) Load pens and paper into the plotter. Turn on the disc drive and load Series 500 BASIC into your computer. Use the keyboard to type and run the following program.

```
10  OUTPUT 705; "IN;SP1;PA500,500;"
20  OUTPUT 705; "LB COMMUNICATION OK"&CHR$(3)
30  OUTPUT 705; "PA0,0;SPO;"
40  END
```

The plotter will label: COMMUNICATION OK

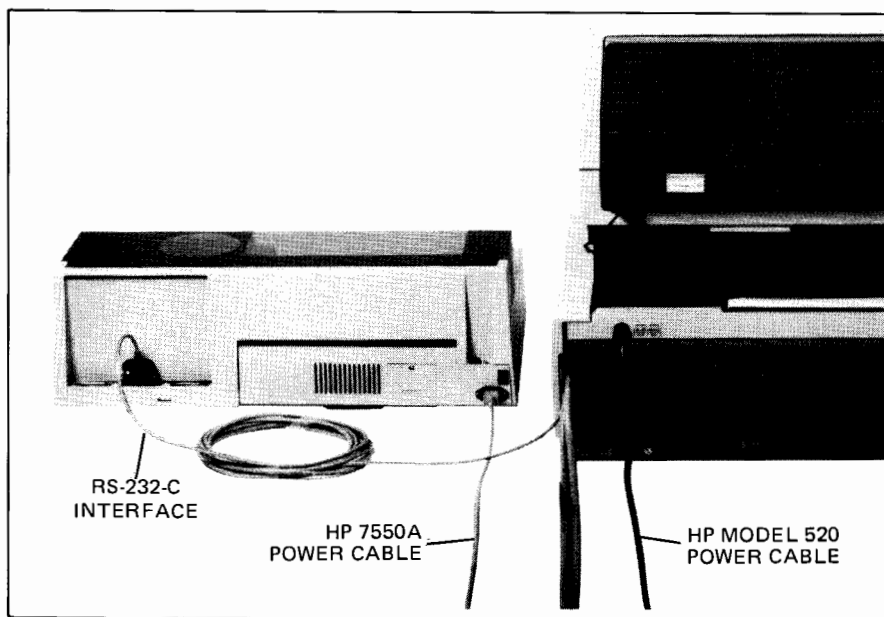
Computer: HP 9000, Series 500 (RS-232-C)

Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Desktop Computer	HP 9000, Model 520, 530, or 540
RS-232-C Interface (ASI Female)	HP 27128A

*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

Connect the Equipment

Make sure that the plotter and computer power cords are unplugged. Open all switches on the Series 500's RS-232-C interface card except for switch 8 which should be closed. Connect the RS-232-C cable from the HP 9000 to the COMPUTER/MODEM connector on back of the plotter, as illustrated. Model 530 and 540 are similar. Plug in both the computer and plotter power cords.



7550-A-18-1

RS-232-C Interface Connection: Model 520

Plotter Interconnection

Establish and Verify Communication

Turn on the plotter. Using the plotter front-panel controls, confirm or reset the following interface conditions. (All other conditions should remain at their default values.)

1. Remote
2. Eavesdrop
3. Handshake: Xon-Xoff
4. Duplex: half
5. Baud: 9600

Load pens and paper into the plotter. Now, turn on the terminal and use the keyboard to type and run the following Series 500 BASIC program.

```

10  RESET 8
20  OUTPUT 8;CHR$(27)&" .MO;10;0;10:"
30  OUTPUT 8;"OI;"
40  ENTER 8;Id$
50  OUTPUT 8;"IN;SP1;PA500,500;"
60  OUTPUT 8;"LB"&Id$&" COMMUNICATION OK"&CHR$(3)
70  OUTPUT 8;"PA0,0;SP0;"
80  END

```

The plotter will label: 7550A COMMUNICATION OK

Computer: Apple II Plus or Apple IIe (RS-232-C)

Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Apple II Unit	—
Apple /// Monitor or equivalent	—
Apple Super Serial Card	Apple A2B0044
RS-232-C Cable (M-F)	HP 31391A

*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

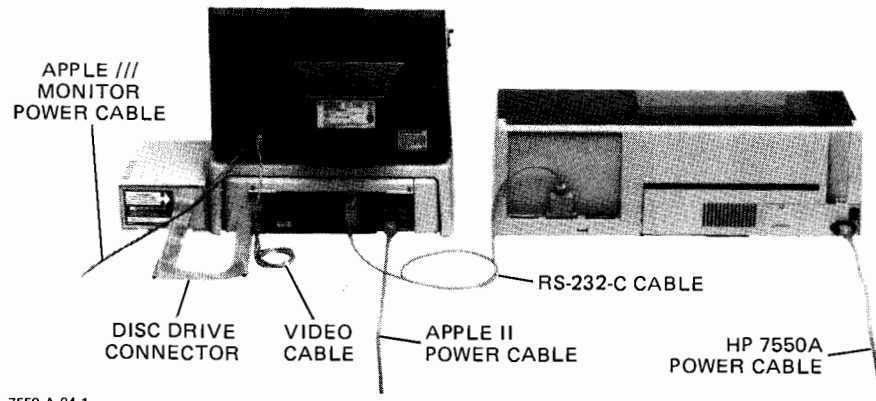
Connect the Equipment

Unplug all computer power cords. Remove the cover from the Apple II unit. If the Super Serial Card is already installed, remove it. Set the two banks of switches on the card as shown below:

	1	2	3	4	5	6	7
SW1	OFF	ON	OFF	ON	OFF	ON	ON
SW2	ON	OFF	OFF	ON	OFF	OFF	OFF

This sets the card to 2400 baud, no parity, and 7 data bits. Check to see that the arrow in the card's jumper block is pointing to the word "TERMINAL". Install the card in slot #2 and replace the cover.

Connect the plotter to the computer as shown in the following illustration. Simply attach one end of the cable to the back of the computer, and attach the other end to the COMPUTER/MODEM connector on back of the plotter. Finally, plug in all power cords. Although the Apple II Plus is shown, the Apple IIe connection is similar.



7550-A-24-1

RS-232-C Cable Connection

Establish Communication

Turn on the plotter. Using the plotter front-panel controls confirm or reset the following interface conditions. (All other conditions should remain at their default values.)

1. Remote
2. Standalone
3. Handshake: hardwire
4. Duplex: full
5. Direct
6. Parity: 7 bits, off
7. Baud: 2400

Verify Communication

Load pens and paper into the plotter. Turn on the computer and use the keyboard to type the following AppleSoft BASIC program. Type "RUN" and press **ENTER**.

```
10 PR# 2
20 PRINT "IN;SP1;PA500,500;"
30 PRINT "LB COMMUNICATION OK"+CHR$(3)
40 PRINT "PA0,0;SP0;"
50 PR# 0
60 END
```

The plotter will label: COMMUNICATION OK

Computer: Apple /// (RS-232-C)

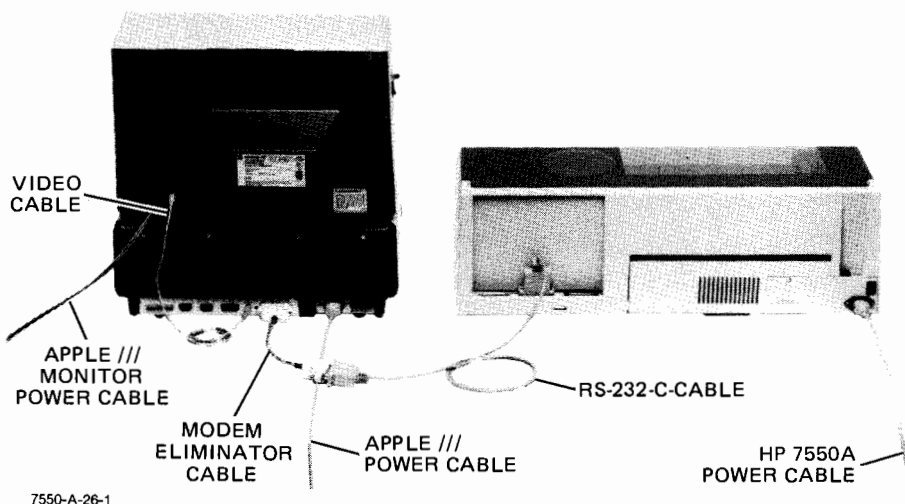
Equipment*	Model/Part Number
Graphics Plotter	HP 7550
Apple /// Unit	—
Apple /// Monitor or equivalent	—
RS-232-C Cable (M-F)	HP 31391A
Apple /// Modem	Apple A3M0019
Eliminator Cable	

*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

Plotter Interconnection

Connect the Equipment

Make sure all power switches are set to the **OFF** position. Connect the plotter to the computer as shown in the following illustration. Simply attach one end of the modem eliminator cable to the back of the computer, and attach the other end to the female end of the RS-232-C cable. Then plug the free end of the RS-232-C cable into the COMPUTER/MODEM connector on back of the plotter. Finally, plug in all power cords.



RS-232-C Cable Connection

Establish Communication

Turn on the computer. Using the Apple /// System Configuration Program, modify the RS-232-C Serial Driver by setting the Driver Configuration Block as follows (for more details, see the Apple /// Standard Device Drivers Manual):

Byte	0	1	2	3	4	5	6	7	8	9	A	B
Value	0A	2E	00	00	00	00	00	00	00	00	00	80

This sets the driver to 2400 baud, 7 data bits, space for parity, and hardware handshake.

Turn on the plotter. Using the plotter front-panel controls confirm or reset the following interface conditions. (All other conditions should remain at their default values.)

1. Standalone
2. Handshake: hardware
3. Parity: 7 bits, off
4. Baud: 2400

Verify Communication

Load pens and paper into the plotter. Turn on the computer and use the keyboard to type the following Apple Business BASIC program. Next, type "RUN" and press **ENTER**.

```

10 OPEN #1,"RS232"
20 PRINT #1,"IN;SP1;PA500,500;"
30 PRINT #1,"LB COMMUNICATION OK"+CHR$(3)
40 PRINT #1,"PA0,0;SPO;"
50 CLOSE #1
60 END

```

The plotter will label: COMMUNICATION OK

Computer: DEC VAX (RS-232-C)

Equipment*	Model/Part Number
Graphics Plotter	HP 7550
DEC VAX Computer,	—
Terminal, and Monitor	—
RS-232-C Cable (M-F)**	HP 31391A or equivalent

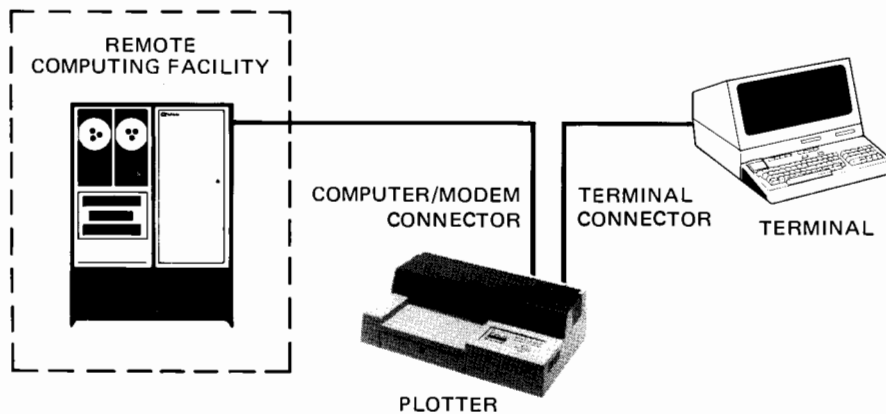
*Listed equipment represents the minimum components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

**The RS-232-C cable listed connects the plotter to the DEC VAX computer. You will need a second RS-232-C cable to connect the plotter to your terminal. The part number of this second cable will depend on the model number of your terminal.

Connect the Equipment

Make sure that the plotter and terminal power switches are in the **OFF** position. Connect the RS-232-C cable from the DEC VAX to the **COMPUTER/MODEM** connector on back of the plotter. Connect the second RS-232-C cable between the plotter and the terminal. Simply attach one end of the cable to the back of the terminal, and attach the other end to the **TERMINAL** connector on back of the plotter.

Plotter Interconnection



RS-232-C Cable Connection

Establish and Verify Communication

Turn on the plotter. Using the plotter front-panel controls confirm or reset the following interface conditions. (All other conditions should remain at their default values.)

1. Remote
2. Eavesdrop
3. Handshake: none
4. Direct
5. Duplex: full
6. Parity: 8 bits, off
7. Baud: set to match computer baud rate

Load pens and paper into the plotter. Now, turn on the terminal and use the keyboard to type and run the following FORTRAN program.

```

      PROGRAM INTERCONNECT
      CHARACTER*5 ID
      INTEGER ESCAPE,ETX
      ESCAPE=27
      ETX=3
      WRITE(6,10) ESCAPE,ESCAPE
10    FORMAT('+',A1,'.(',A1,'.P1:IN;SP1;PA500,500;')
      WRITE(6,20)
20    FORMAT('+', '0I;')
      READ(6,30) ID
30    FORMAT(A5)
      WRITE(6,40) ID,ETX
40    FORMAT('+', 'LB',A5,' COMMUNICATION OK ';A1)
      WRITE(6,50) ESCAPE
50    FORMAT('+', 'PA0,0;SP0;',A1,'.Z')
      STOP
      END

```

The plotter will label: 7550A COMMUNICATION OK

Computer: IBM Personal Computer (RS-232-C)

Equipment*	Model/Part Number
Graphics Plotter	HP 7550
IBM System Unit	—
Monochrome Display	—
IBM Asynchronous Communications Adapter**	—
RS-232-C Cable (M-F)	HP 17655A

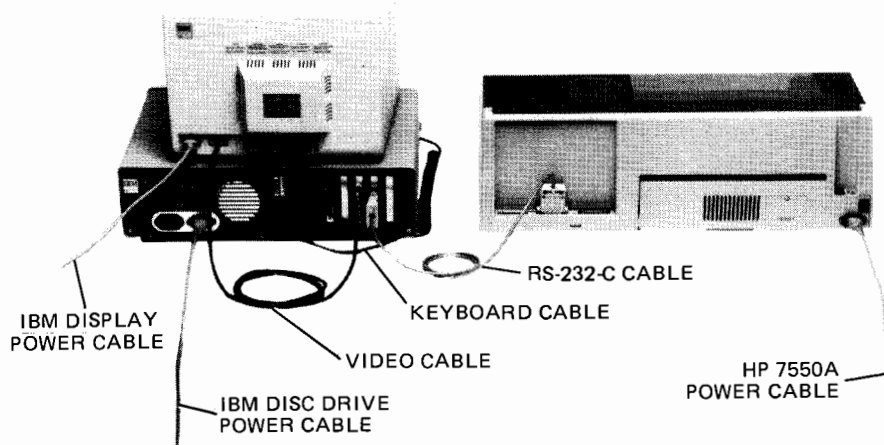
*Listed equipment represents the minimum number of components necessary to establish communication. If you will be using graphics software, check with your software supplier for specific computer hardware and memory requirements.

**Adapter is standard for the IBM PC-XT.

Connect the Equipment

Unplug the computer power cord. Remove the cover from the IBM system unit. If the Asynchronous Communications Adapter (RS-232-C interface card) is not installed, insert the card in any unused slot and replace the cover. (Refer to IBM PC documentation if you need more information.)

Make sure all power switches are in the **OFF** position. Connect the plotter to the IBM PC computer as shown in the following illustration. Simply attach one end of the cable to the communications adapter exposed on the back of the computer, and attach the other end to the COMPUTER/MODEM connector on back of the plotter. Although the IBM PC is shown, the IBM PC-XT computer is similar.



7550-A-27-1

RS-232-C Cable Connection

Establish Communication

Turn on the plotter. Using the plotter front-panel controls confirm or reset the following interface conditions. (All other conditions should remain at their default values.)

1. Remote
2. Standalone
3. Handshake: hardwire
4. Direct
5. Duplex: full
6. Parity: 8 bits, off
7. Baud: 9600

Verify Communication

Load pens and paper into the plotter. Turn on the computer, load the BASIC 1.10 operating system (BASIC version 2.0 is strongly recommended for the IBM PC-XT). Use the keyboard to type the following BASIC 1.10 program (BASIC 2.0 for the IBM PC-XT). Now run this program.

```

10 OPEN "COM1:9600,S,7,1,RS,CS65535,DS,CD" RS #1
20 PRINT #1, "IN;OI;"
30 INPUT #1, ID$
40 PRINT #1, "SP1;PA 500,500;"
50 PRINT #1, "LB";ID$;" COMMUNICATION OK";CHR$(3)
60 PRINT #1, "PA 0,0;SPO;"
70 END

```

The plotter will label: 7550A COMMUNICATION OK

If the plotter does not label 7550A COMMUNICATION OK, try replacing line 10 with the following line:

```
10  OPEN "COM1:9600,S,8,1,RS,CS65535,DS,CD" AS #1
```

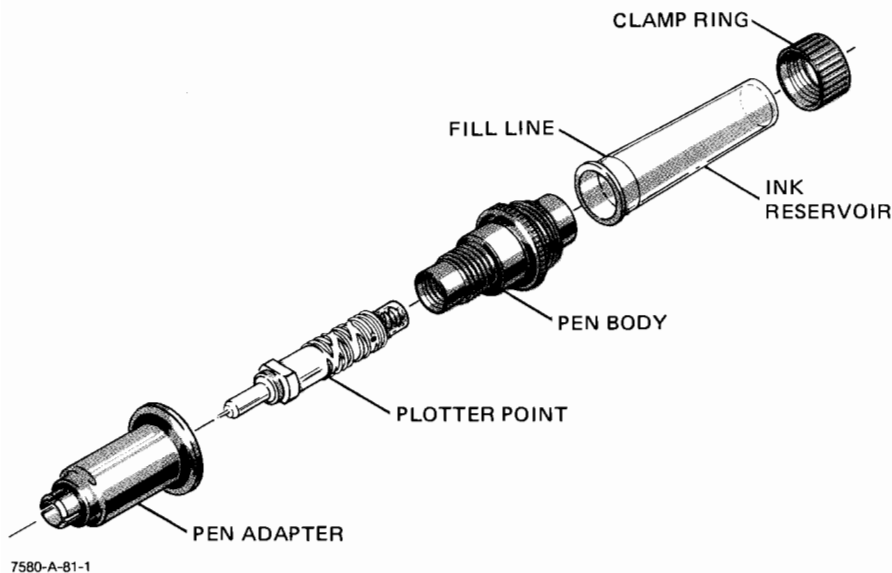
If the plotter still won't label 7550A COMMUNICATION OK, use the plotter's front-panel controls and change the parity to 7 bits, off. Then replace line 10 in the verification program to:

```
10  OPEN "COM1:9600,N,7,1,RS,CS65535,DS,CD" AS #1
```


Appendix **A**

Using Drafting Pens

Pen care is the most important influence on drafting-pen output quality. When a drafting pen cannot breathe freely, it will not function properly; pens must be spotlessly clean or plotting results will be disappointing. Careful cleaning, storage, filling, and insertion into the carousel are necessary when using drafting pens.



Pen Assembly Parts

Drafting pens consist of a plotter point that is connected to the pen body and protected by the pen adapter, and a refillable ink reservoir that connects to the opposite end of the pen body by means of a clamp ring. Refer to the above illustration of pen assembly parts.

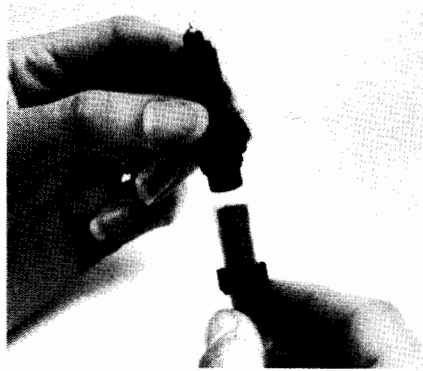
Cleaning the Drafting Pen

Clean drafting pens on a regular basis, making certain that all parts of the pen, and especially the vent hole, are free of dried ink. For best results, clean pens at the end of each plotting session to prevent ink from drying inside or outside. Work with one pen at a time.

Use the method described here to clean the pens. If you use drafting pens frequently, you may want to purchase an ultrasonic pen cleaner; if so, follow the directions accompanying the ultrasonic cleaner. If possible, work at a sink with running water.

To disassemble and clean the pen assembly:

1. Unscrew the reservoir clamp ring; then, with the plotter point upright, pull the ink reservoir off of the pen body. Refer to the photograph on the left below.
2. Pour the ink out of the reservoir. Lightly tap the reservoir and the rear portion of the pen body on a piece of absorbent paper to remove any excess ink.
3. Unscrew the pen adapter and the plotter point from the pen body; refer to the photograph on the right below.



7580-A-198-1



7580-A-197-1

4. Thoroughly rinse all parts under running warm water to remove the majority of the ink. Partially fill the reservoir with water, place your thumb over the open end, shake the reservoir, then flush it with warm water.
5. Soak the reservoir and plotter point in a pen cleaning solution such as Rapido-Eze® until dried ink has dissolved. A period of 10 or 20 minutes should be sufficient, unless pens have not been cleaned for some time. (If using ink not supplied by Hewlett-Packard, use the cleaning solution recommended by the ink manufacturer.)

Rapido-Eze is a registered trademark of Koh-I-Noor Rapidograph, Inc.

6. Rinse the plotter point and the reservoir with clear water. Make sure that the vent hole in the plotter point is thoroughly cleaned.
7. Dry all parts completely before reassembling or filling the pen. Air-dry or use a pressurized air spray. Do not dry the inside of the reservoir or the plotter point with a cotton swab or tissue, as these deposit lint fibers that interfere with the operation of the pen. If you want to use the pen before it is completely dry, flush the reassembled pen by repeatedly filling and expelling ink several times. When you are sure that all water and cleaning fluid have been expelled, fill the pen a final time; refer to the procedures listed under Filling the Drafting Pen with Ink in this chapter.

Storing the Drafting Pen

Store pens that are clean and dry in the plotter supply chest or in a similarly protected area where pens will not be subjected to moisture or abrasion. Pens containing ink may be stored temporarily (up to one day) in the drafting-pen carousel.

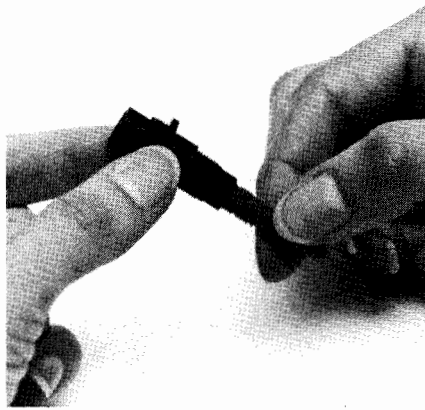
NOTE: The smaller the size of the plotter point, the faster the ink will dry inside the pen tip. ■

Filling the Drafting Pen with Ink

Follow the steps listed below to assemble and fill your drafting pen.

NOTE: Depending on the brand of plotter point being used, there may be a gap between the pen body and pen adapter and a gap between the clamp ring and the pen body. The gaps belong there; do not overtighten the threads. ■

1. Screw the plotter point into the small end of the pen body. Refer to the photograph on the left on the next page.
2. Place the pen adapter over the plotter point and screw it onto the pen body.
3. Hold the ink reservoir vertical and fill it with ink. Do not fill it past the fill line. The volume of ink does not affect the line quality.
4. Gently press the large end of the pen body into the open end of the ink reservoir. Refer to the photograph on the right on the next page.



7580-A-203-1



7580-A-204-1

5. Place the clamp ring over the reservoir and screw it onto the pen body.
6. Once assembled, point the pen tip down. Leave the pen pointed down for a couple of minutes, especially if the pen is new. This allows time for the ink to begin filling the plotter point. It may help to gently tap the point near the pen body to dislodge air bubbles. However, do not shake the pen.
7. Using the pen cleaning syringe supplied with the plotter, prime the pen by applying suction to the tip until ink appears. Refer to the photograph on the left below.



7580-A-202-1



7580-A-199-1

8. Draw a line on a spare piece of drafting medium, as shown in the photograph on the right above. Immediately place the pen into the drafting-pen carousel and leave it in the carousel until the pen is ready to be disassembled and cleaned. Be certain the cap is well seated on the pen.

NOTE: When the pen contains ink, handle the pen only by the clamp ring and never by the reservoir. If you hold the pen by the reservoir, the heat from your hand will expand the gases in the reservoir and may cause the pen to drip or may force ink into the air passages.

Once filled, always keep the pen tip down. ■

Ink Flow

The amount of ink that is deposited on the medium is affected by pen speed, pen force, ink viscosity, and the absorbency of the medium. The goal is for the ink to flow as fast as the pen is moving, but no faster or slower. Keep these pointers in mind:

- Do not mix different inks.
- Always keep ink bottles tightly closed when not in use.
- Never use ink that contains sediment or shows signs of deterioration.

Rate of Ink Flow

The pen speed must be fast enough that ink will not blob, yet slow enough that the line width is uniform. With all plotter point sizes, a faster speed produces a narrower line than a slower speed, since less ink is deposited in a given space. Default parameters for the drafting-pen carousel are set to give good line quality on any medium; you may find that a faster velocity provides acceptable quality for your use, or a slower velocity might work better for you.

Pen Force

The recommended pen force for drafting pens is 15 grams (displayed parameter value of 1). A force that is too high may affect the uniformity of ink flow and the continuity of lines. A heavy force also may cause the pen tip to scrape the surface of the medium and gather dust particles, paper fibers, or bits of matte coating. At best, these particles prevent the pen tip from laying down a uniform line and are eventually deposited on the medium in a blob of ink. At worst, the medium tears or the pen tip is damaged.

If a drafting pen makes a mark on the paper but the line is weak, increase the pen force to 24 grams (displayed parameter value of 2). Removing the spring in the plotter point may also improve the writing quality in this situation.

Ink Viscosity

Two factors determine how viscous or “thick” ink is: the formula of the ink and the environment of the plotter.

Formula — In general, the greater the amount of pigment in the ink, the higher the viscosity and slower the flow. While a large amount of pigment may make a very dark and attractive mark, it may also require a decrease in pen speed to ensure continuous lines. Thick inks can be thinned with distilled water. When ink flows too freely, a smaller plotter point size may be required.

Environment — Ink dries faster in warm, dry conditions than it does in cool, moist conditions. The temperature, humidity, and air flow in the plotter’s environment may contribute to or detract from the quality of the line and must be taken into account when selecting the ink to use with drafting pens.

Media Absorbency

Chart paper and tracing bond absorb ink, whereas vellum and polyester film do not. Highly absorbent papers (generally inexpensive ones) hasten the flow of ink and draw it out of the pen tip faster than the rate at which it would normally flow, creating lines that are not uniform in width.

Appendix **B**

Reference Material

Conditions You Can Store in the Plotter's Nonvolatile Memory

The left side of the following table lists conditions that can be stored in the plotter's nonvolatile memory. Once stored, these conditions will remain as set, even when you turn the plotter off. The right side of the table lists the plotter's original, factory-set default conditions. The conditions you set, using front-panel controls, can replace the defaults listed below. To restore default conditions, hold down the **FAST** key as you turn the plotter on.

NOTE: Software programs, using appropriate device-control instructions, can temporarily override some of the parameters that you have stored in the plotter's nonvolatile memory. Be aware that the values stored in nonvolatile memory do not change to reflect the program selections; rather, the nonvolatile memory retains the values you selected from the front panel. ■

Conditions You Can Store in the Plotter's Nonvolatile Memory	Factory-Set Default Conditions
HP-IB Address	05
Standard/Enhanced Mode	Standard
Eavesdrop/Stand-alone Mode	Eavesdrop
Handshake: None/Xon-Xoff/Enq-Ack/ Hardwire	None
Direct/Modem Mode	Direct
Duplex: Full/Half	Full
Parity: 7 Bits/8 Bits	8 Bits
Off/Even/Odd	Off
Monitor Mode: On/Off	Off
Remote/Local/Standby	Remote
Bypass: On/Off	On
Baud Rate	2400
Manual/Automatic Paper Load	Manual

Plotter Default Conditions

The following conditions are established when the plotter is turned on or the **RESET + ENTER** function keys are pressed.

Function	Equivalent Instruction	Default Condition
Pen control	AP;	Automatic as follows: <ul style="list-style-type: none"> • Lift or store a motionless pen after 15 seconds for transparency fiber-tip pens or drafting pens, or after 65 seconds for paper fiber-tip pens and roller-ball pens • Select pen only when required to draw
Label buffer	BL ETX	Cleared
Alternate set	CA 0;	Character set 0
Character selection mode	CM;	HP 7-bit mode
Standard set	CS 0;	Character set 0
Chord tolerance	CT;	Set to angle mode for AA, AR, CI, and WG instructions
Character chord	CC;	Set variable-space font chord angle to 5 degrees
Digitize clear	DC;	Clear DP instruction and return to current display
Downloadable character buffer	DL;	Cleared
Relative direction	DR 1, 0;	Horizontal characters
Label terminator	DT;	ETX (decimal equivalent 3)
Extra space	ES 0, 0;	No extra space between characters
Fill type, spacing, and angle	FT;	<ul style="list-style-type: none"> • Type 1, solid bidirectional fill • 1% of the diagonal distance between P1 and P2 • 0 degrees
Mask value	IM 223, 0, 0;	Recognizes all defined errors

Function	Equivalent Instruction	Default Condition
Input window	IW;	Set to hard-clip limits
Label origin	LO 1;	Standard labeling starting at current position
Line type and pattern length	LT;	<ul style="list-style-type: none"> • Type 1, solid line • 4% of the diagonal distance between P1 and P2
Plotting mode	PA;	Absolute
Polygon mode	PM0; PM2;	Polygon buffer cleared
Pen thickness	PT;	Thickness based on current carousel
Scaling	SC;	User-unit scaling off
Character slant	SL0;	0 degrees
Symbol mode	SM;	Off
Relative size	SR;	<ul style="list-style-type: none"> • Character width = 0.75% of $P2_x - P1_x$ • Character height = 1.5% of $P2_y - P1_y$
Select set	SS;	Select standard character set
Tick length	TL;	$tp = tn = 0.5\%$ of $ P2_x - P1_x $ for Y-tick and 0.5% of $ P2_y - P1_y $ for X-tick
User-defined fill type	UF;	Solid bidirectional fill

Additional Default Conditions:

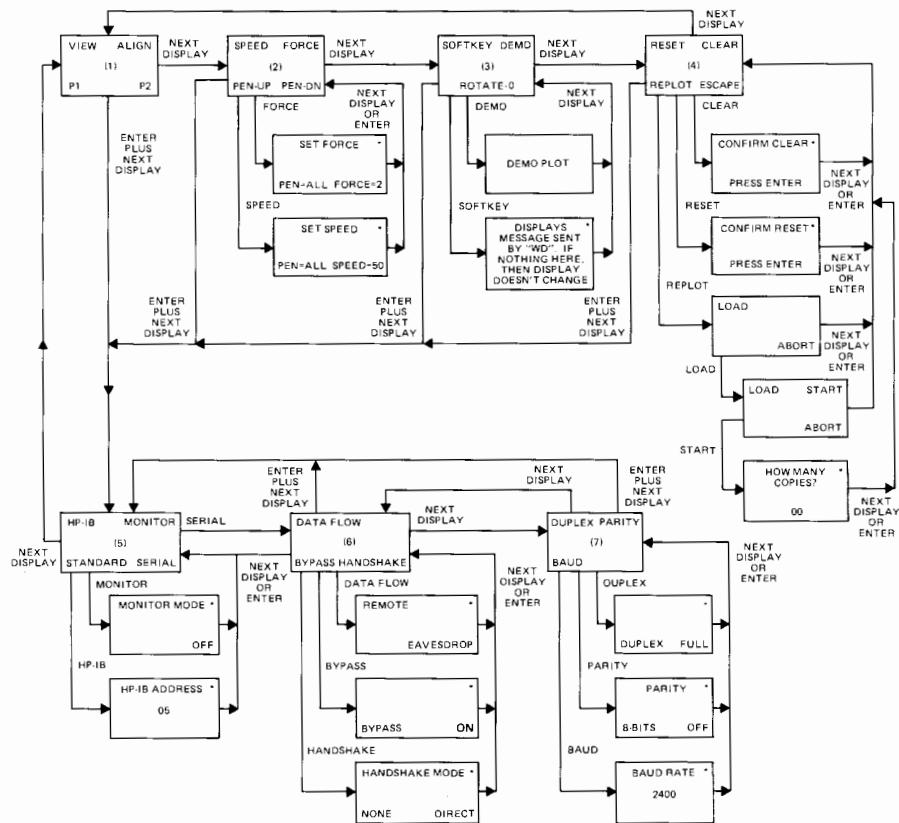
- The carriage-return point for labeling instructions is updated to the current pen position.
- PD and PU instructions with parameters are defaulted to be forms of the PA instruction.
- Although character size is defaulted as if "SI;" were executed, subsequent changes to the scaling points P1 and P2 will cause the character size to vary as if "SR;" were executed.

- The pen is raised graphically and physically.
- 90-degree rotation is cancelled.
- Default pen speed, force, and acceleration values are set in accordance with the carousel installed in the plotter.
- Bit position 3 of the status word is set to 1 (to indicate the plotter has been initialized).
- Any HP-GL error condition is cleared.
- Lost mode is cleared.
- Any function key definitions established by the WD and KY instructions are removed.
- The group count is set to 0 (GC instruction).
- The curved line generator is turned off (CV instruction).
- P1, P2, and the axis-align point are returned to the X,Y coordinate values that were set when the paper limits were established.

Conditions Not Affected:

- Setting of these front-panel conditions: **AUTO FEED** key, standard/enhanced, HP-IB address, eavesdrop/standalone, handshake, modem/direct, full/half duplex, parity, 7-bit/8-bit, and baud rate

Front-Panel Hierarchy



Front-Panel Error Messages

The table on the next page lists the 15 error messages that can be reported on the front-panel display. These error messages indicate problems associated with the use of HP-GL and device-control instructions in your program; the plotter is not malfunctioning. Familiarity with the instruction set, explained in detail in your Interfacing and Programming Manual, will help you correct and avoid such errors.

Error Number	Displayed Message
HP-GL ERRORS	
1	COMMAND NOT RECOGNIZED
2	WRONG NUMBER OF PARAMETERS
3	BAD PARAMETER
5	UNKNOWN CHARACTER SET
6	POSITION OVERFLOW
7	BUFFER OVERFLOW
DEVICE-CONTROL ERRORS	
10	INVALID I/O OUTPUT REQUEST
11	INVALID BYTE FOLLOWING ESC.
12	INVALID BYTE IN I/O CONTROL
13	OUT OF RANGE I/O PARAMETER
14	TOO MANY I/O PARAMETERS
15	ERROR IN I/O TRANSMISSION
16	I/O BUFFER OVERFLOW
17	TRANSMIT UNDERRUN
18	I/O ERROR INDETERMINATE

Cable Information

The HP 7550 plotter can be interfaced with a variety of HP and non-HP personal computers and larger computer systems. However, not all combinations require the same interface cable. Use the table on the following page to select the proper cable to connect the HP 7550 with your computer system. Cable restrictions and cable schematics for the two most common RS-232-C cables follow the table.

Interface	System	Cable Part Numbers
HP-IB (IEEE-488)	HP Series 80 HP Series 100 HP 9000 Series 200 HP 9000 Series 500	HP 45529A/B or HP 10833A/B or HP 31389A/B
RS-232-C (CCITT V.24)	HP 150 (standalone), TI Pro, Wang PC	HP 17755A
	HP 150 (terminal mode, plotter in eavesdrop mode)	HP 13242N
	IBM PC & XT, Compaq	HP 17655A
	Apple II+, Apple IIe DEC Rainbow, Osborne	HP 31391A
	Apple ///	HP 31391A and Apple A3M0019
	IBM PC jr	HP 17655A and IBM Serial Device Adapter
	HP 3000 (plotter in eavesdrop mode)	Cable from computer
RS-422-A	HP 3000 Series 64 (plotter in stand- alone mode)	HP 17855A

Cable Restrictions

If any other devices are to be connected to your computer through the same HP-IB interface, the plotter should always be the device nearest the computer.

It is recommended that no more than three piggy-back connectors be stacked together on one device. The resulting structure could exert enough force on the connector mounting to damage it.

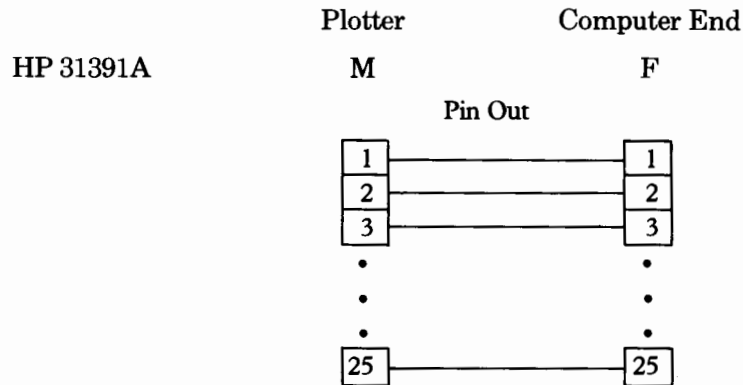
The following two rules must be observed regarding the total length of cables when they are connected together.

Compaq is a product of Compaq Computer Corp. DEC Rainbow is a product of Digital Equipment Corp. IBM PC-XT and PC-jr are products of International Business Machines Corp. Osborne is a product of Osborne Computer Corp. TI Pro is a product of Texas Instruments. Wang PC is a product of Wang Laboratories, Inc.

- The total length of cable permitted in one system must be less than or equal to two meters times the number of devices connected together. If an HP-IB interface card is not an internal part of your computer, it is counted as a separate device.
- The total length of the cable must not exceed 20 meters.

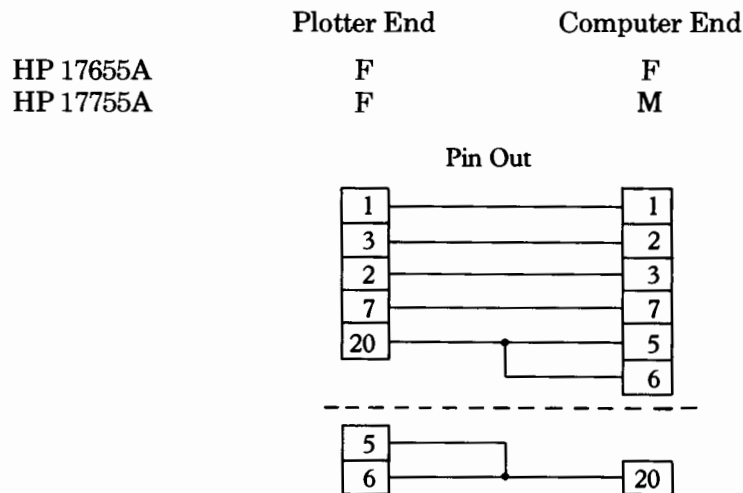
Cable Schematics

Straight Through Type



Pins 1-25 are directly connected.

Modem Eliminator Type



The pins above the dotted line are used in cable designs. If you plan to build your own cable, include the additional pins.

Glossary

Address	The characters sent by the computer to specify which device will receive information along a particular interface bus.
ASCII	American Standard Code for Information Interchange. A seven bit standard code capable of representing letters, numbers, punctuation marks, and control codes in a form acceptable to machines.
BASIC	Beginner's All-Purpose Symbolic Instruction Code.
Baud Rate	Data transmission rate between computer and peripheral device(s). A baud is equal to one signal element (usually a bit) per second.
Buffer	The plotter's input/output buffer stores data until it can be processed. This enables the computer to send large blocks of data at high speeds. Plotting instructions from the computer are held in the buffer, if necessary, until the plotter is free to process and execute them. The plotter has four other buffers: replot, vector, polygon, and downloadable character. Refer to your Interfacing and Programming Manual for a description of these buffers.
Bus	A signal line or a set of signal lines used by an interface system to which a number of devices are connected and over which messages are carried.
Default	A value that is automatically assumed if no other value is specified. See Appendix B for a table of default conditions.
Eavesdrop	A configuration in which the plotter is connected in series between a computer and a terminal.
EBCDIC	Expanded Binary Coded Decimal Interchange Code. An eight bit code used to represent 256 unique letters, numbers, and special characters.
Enquire/ Acknowledge Handshake	A handshake initiated by the computer operating system in specific cases where it typically uses the two ASCII characters ENQ and ACK as the enquiry character and the acknowledgment string.

Glossary (Continued)

Function Key	The unmarked keys surrounding the plotter's front panel display.
Handshake	Communication between computer and plotter about the availability of buffer space in the plotter.
Hardwire Handshake	A handshake which uses a physical wire, pin 20 of the RS-232-C connector, to control handshaking. It can be used if the computer and the plotter are directly connected (without a modem), and if the computer operating system can monitor pin 20 (CD, Data Terminal Ready).
HP-GL	Hewlett-Packard Graphics Language. The graphics instruction set understood by the plotter.
HP-IB	Hewlett-Packard Interface Bus. Hewlett-Packard's implementation of IEEE Standard 488-1975.
Initialize	To set certain conditions to a known state (usually the default state).
Interface	A connection between computers and peripheral devices to achieve mechanical, electrical, and data compatibility.
Local	A mode in which data is received through the plotter's TERMINAL connector.
Modem	Modulator-demodulator. A device which translates data coming from data processing equipment into a form compatible with transmission facilities, and vice-versa.
Nonvolatile Memory	Plotter memory which stores plotter modes, such as eavesdrop mode, even when the plotter is turned off. Refer to Appendix B for a table of the conditions which can be stored in the plotter's nonvolatile memory.
Parity	An error-checking method which counts the number of binary one's in a data byte when information is transmitted between a computer and a device.
Peripheral	A device used to enhance the performance of a computer; for example, a disc drive, printer, or plotter.

Glossary (Continued)

Port	A communication channel for data transfer between one or more devices. The HP 7550 has three ports, found on the rear panel. Each port has a different connector, identified by a label: HP-IB , TERMINAL (RS-232-C), and COMPUTER MODEM (RS-232-C).
Remote	A state in which data is received from the plotter's COMPUTER connector.
RS-232-C	RS-232-C interfacing. Interface standardized by EIA standard RS232.
Stand Alone	A mode in which the plotter is connected to a single device, and data is not meant to be passed on.
Standby	A mode in which data is transmitted between the computer and the terminal via the plotter. The plotter in this case is considered "transparent" — it does not act on the data.
String	A linear sequence of alphanumeric characters.
Xon-Xoff Handshake	A handshake initiated by a peripheral device, e.g., the plotter. It can be used if the computer operating system supports an Xon-Xoff protocol, which means that control characters are sent from the plotter to the computer to indicate when the plotter's buffer is full and when it again has room for more data.

Notes

Subject Index

a

Accessories Available	1-4 - 1-8
Accessories Supplied	1-3 - 1-4
Address, <i>See</i> HP-IB	
Align Function Key	3-17 - 3-18
Apple IIe	6-19 - 6-20
Apple II Plus	6-19 - 6-20
Apple ///	6-21 - 6-22
Auto Feed	2-2, 3-12, 3-14
Automatic Loading	3-9, 3-13 - 3-14
Axis Align Function	3-17 - 3-18

b

Baud Rate	3-43
Brush, Grit Wheel	2-7
Buffer	
Clearing	3-28
Default	3-29
Maximum	3-29
Overflow	3-29
Parse	3-32
Receive	3-32
Bypass Mode	3-34, 3-38 - 3-39

c

Cable Information and Schematics	B-6 - B-8
Carousel	
Cleaning	2-6
Default Values	3-2, 3-19
Initialization	3-2
Inserting Digitizing Sight	3-4 - 3-5
Inserting Pens	3-3
Loading into Plotter	3-4
Questions	3-6 - 3-8
Types	3-1
Chart Paper, <i>See also</i> Media	4-2
Cleaning, General	2-5 - 2-7
Clear Function	3-28
Computer/Modem Connector	2-4, 3-34, 3-36
Confidence Test, <i>See also</i> Demonstration Plot	3-20 - 3-22
Controls, Front Panel	2-1 - 2-4
Cursor Keys	2-3 - 2-4, 3-18

Subject Index (Continued)

d

Data Compatibility 3-41 - 3-44
Data Flow 3-34 - 3-35
DEC VAX 6-23 - 6-24
Default Conditions 3-2, 3-17, 3-19, 3-25 - 3-28, B-1, B-2 - B-4
Demonstration Plot 3-20 - 3-22
Digitizing Sight
 Axis Alignment 3-17 - 3-18
 Loading 3-4 - 3-5
Direct Mode 3-41
Display
 Error Messages 3-14, 5-16, B-5
 Level 1 3-15 - 3-30, B-5
 Level 2 3-16, 3-30, B-5
 Location 2-2
Documentation for the HP 7550 1-3, 1-5
Double-Matte Polyester Film, *See also* Media 4-3 - 4-4
Drafting Pens, *See also* Pens
 Disassembly and Cleaning A-1, A-2
 Filling with Ink A-3 - A-4
 Force 3-19, A-5
 Ink Flow A-5
 Plotter Point A-3 - A-4
 Speed 3-19
 Storage A-3
Duplex 3-42

e

Eavesdrop Mode 3-34 - 3-35, 3-37
Enhanced Mode 3-33
Enquire/Acknowledge Handshake 3-40
Enter Key 2-2, 3-16
Error Messages 5-16, B-5
Escape Function Key 3-29 - 3-30
External, *See* Baud Rate

f

Fast Key 2-3, 5-17
Fiber-Tip Pen, *See also* Pens
 Force 3-19, 4-5
 Speed 3-19, 4-5
Force, *See also* Pens 3-19

Subject Index (Continued)

f (Continued)

Front-Panel Controls	2-1 - 2-4
Error Messages	3-14, 5-16, B-5
Hierarchy	3-16, B-5
Location	2-1
Operations	3-15 - 3-44
Fuse	1-9 - 1-10

g

Grids, Aligning Axes on Preprinted	3-17 - 3-18
Grit Wheel	
Brush	2-7
Cleaning	2-6 - 2-7

h

Handshake	3-39 - 3-41
Hardwire Handshake	3-40 - 3-41
HP 120, HP 125	6-6
HP 150	6-7 - 6-10
HP 3000	6-11 - 6-12
HP 9000, Series 200	6-13 - 6-14
HP 9000, Series 500	6-15 - 6-18
HP-IB	
Address	3-31
Cabling Restrictions	6-4
Connection	6-4

i

IBM Personal Computer	6-25 - 6-26
Ink, <i>See also</i> Pens	
Filling Drafting Pens	A-3 - A-4
Flaking	5-11
Flow	A-5
For Drafting Pens	4-7
For Fiber-Tip Pens	4-7
For Roller-Ball Pens	4-7
Purchasing	4-10
Selection	4-8 - 4-9
Viscosity	A-5
Interface Connectors	2-4 - 2-5

Subject Index (Continued)

l

Level 1	3-15 - 3-30
Level 2	3-30 - 3-44
Line Voltage	1-9
Listen Only	3-31
Loading	
Automatic Loading	3-9, 3-13 - 3-14
Carousel	3-4
Clearing Misfeeds	3-14
Digitizing Sight	3-4 - 3-5
Manual Loading	3-12 - 3-13
Pens	3-3
Plotting Medium	3-9
Load/Unload Key	2-2, 3-12 - 3-14
Local Mode	3-34, 3-36 - 3-37

m

Maintenance	
Carousel	2-5
Drafting Pen	A-1 - A-5
General	2-5 - 2-6
Grit Wheel	2-6 - 2-7
Pen Holder	2-7
Media	
Absorbency	A-6
Catcher	3-13
Chart Paper	4-2
Double-Matte Polyester Film	4-3 - 4-4, 4-9
Loading, Automatic	3-9, 3-13 - 3-14
Loading, Manual	3-9, 3-12 - 3-13
Loading Tray	3-11, 3-14
Misfeeds, Clearing	3-14
Overhead Transparency Film	4-3
Purchasing	4-10
Questions	4-10 - 4-11
Selection	4-8 - 4-9
Sheet Squareness	4-4
Sizes	3-9
Thickness	4-3
Vellum	4-3
Media Catcher	3-13
Media Tray	3-11, 3-14

Subject Index (Continued)

m (Continued)

Modem Mode 3-41
Monitor Mode 3-32 - 3-33

n

Next Display Key 2-2, 3-15, B-5
None, *See also* Handshake 3-39 - 3-40
Nonvolatile Memory B-1

o

Overhead Transparency Film, *See also* Media 4-3

p

P1 and P2 3-17
Paper, *See* Media
Paper Guide 3-11
Paper Load Failures 3-9, 3-14, 5-15 - 5-16
Paper Tray, *See* Media Tray
Parity 3-42
Parse Mode 3-32
Pen Carousel, *See* Carousel
Pen-Dn Function Key 3-19
Pen Force 3-19
Pen Holder
 Cleaning 2-7
 Loading Digitizing Sight 3-4 - 3-5
 Location 2-1
Pen Initialization 3-2
Pen/Media Combinations 4-8 - 4-9
Pens
 Cleaning, Drafting Pens A-2 - A-3
 Default Values 3-19
 Drafting 4-6
 Fiber-Tip 4-5
 Filling, Drafting Pens A-3 - A-4
 Force, Setting from Front Panel 3-18 - 3-19
 Loading, *See also* Carousel 3-3 - 3-4
 Purchasing 4-10
 Questions 4-11 - 4-12
 Roller-Ball 4-5 - 4-6
 Selection (Pen/Media Combinations) 4-8 - 4-9

Subject Index (Continued)

P (Continued)

Speed, Setting from Front Panel	3-18 - 3-19
Storage, Drafting Pens	A-3
Pen Select Keys	2-3, 3-29
Pen Speed	3-19
Pen-Up Function Key	3-19 - 3-20
Pinch Wheels, Adjusting	3-10
Plotter Address	3-31
Plotting Medium, <i>See also</i> Media	
Automatic Loading	3-13 - 3-14
Clearing Misfeeds	3-14
Manual Loading	3-12 - 3-13
Polyester Film, Double-Matte, <i>See also</i> Media	4-3
Power Cord	1-10
Power Options	1-9
Problems	5-1 - 5-17

R

Rear Panel Connectors	2-4 - 2-5
Remote Mode	3-36 - 3-37
Replot Function Key	3-28
Reset Function Key	3-25 - 3-28
Roller-Ball Pens, <i>See also</i> Pens	4-5 - 4-6
Rotate Function Key	3-22 - 3-24
RS-232-C Interface	3-34 - 3-44

S

Scaling Points	3-17
Serial Sublevel	3-33 - 3-41
Sheet Squareness	4-4
Shipment	2-8
Softkey Function Key	3-20
Software Checking	3-39 - 3-40
Speed, <i>See</i> Pens	
Stand-Alone Mode	3-34, 3-35 - 3-36
Standard Mode	3-33
Standby Mode	3-37 - 3-38
Supplies, Purchasing	4-10
Symptoms and Solutions	5-1 - 5-17
System Configuration	3-33 - 3-34

Subject Index (Continued)

t

Terminal Connector 2-4, 3-34, 3-37, 3-38

u

Using the Plotter with a Computer Mainframe, RS-232-C .. 3-34 - 3-38

Using the Plotter with a Personal Computer, RS-232-C 3-35 - 3-36

Using the Plotter with a Terminal 3-34 - 3-38

v

Vellum, *See also* Media 4-3

View Function Key 3-17

Viscosity, *See* Ink

x

X-Axis Failure 5-16

Xon-Xoff Handshake 3-40

y

Y-Axis Failure 5-16

Owner's Information

Symptoms and Solutions

Meet the Plotter

Plotter Interconnection

Operating the Plotter

Using Drafting Pens

Media, Pens, and Ink

Reference Material



HEWLETT
PACKARD

PART NO. 07550-90002
MICROFICHE NO. 07550-90052

OCTOBER 1984
PRINTED IN U.S.A.