HEWLETT-PACKARD

HP 82906A

Printer

Owner's Manual

CAUTION

82906A Printers that are not specifically configured for operation with a Centronics-type parallel interface (Options 001, 002, 003, and 004) should not be connected to a parallel interface. Attempting to use the Centronics-type port on printers configured for HP-IB, HP-IL or Serial interfacing can cause permanent damage to your printer.

VORSICHT

82906A Drucker, die nicht speziell für den Betrieb über ein Parallelinterface vom Centronics-Typ konfiguriert sind, sollten nicht an ein Parallelinterface angeschlossen werden. Die Verwendung der Centronics-Anschlussbuchse von Druckern, die für den Betrieb über ein HP-IB, HP-IL oder serielles Interface ausgelegt sind, kann zu dauerhaften Beschädigungen Ihres Druckers führen.

ATTENTION

Les imprimantes HP 82906A qui ne sont pas configurées pour fonctionnement avec une interface parallèle de type Centronics (Options 001, 002, 003 et 004) ne doivent en aucun cas être connectées à cette interface parallèle. Le non respect de ce conseil peut endommager des circuits de l'imprimante.

ATTENZIONE

Le stampanti HP 82906A che non sono specificatamente configurate per l'impiego con interfacce parallele tipo Centronics (Opzioni 001, 002, 003 o 004) non devono essere collegate ad interfacce parallele. Utilizzando una porta di tipo Centronics con una stampante configurata per l'interfacciamento seriale HP-IB o HP-IL, potete danneggiare la stampante in modo permanente.

Limited 90-Day Warranty

For Hewlett-Packard Personal Computer Mainframes and Peripherals

What We Do

In the U.S.A. and Canada, this unit is warranted by Hewlett-Packard against defects in materials and workmanship for 90 days from date of original purchase.* If you transfer ownership, this warranty is automatically transferred to the new owner and remains in effect for the original 90-day period.

During the warranty period we will repair or, at our option, replace at no charge any unit that proves to be defective, provided it is returned, shipping prepaid, to an identified Hewlett-Packard repair facility. You are responsible for all customs duties in connection with the return of the unit.

What Is Not Covered

This warranty does not apply if the product has been damaged by accident or misuse, or as a result of service or modification by other than an authorized HP Repair Facility, or by hardware, software, interfacing or peripherals not provided by Hewlett-Packard. Hewlett-Packard shall have no obligation to modify or update products once manufactured. This warranty does not apply to HP Software Products.

No other expressed warranty is given. The repair or replacement of a product is your exclusive remedy. *Any implied warranty of merchantability or fitness is limited to the 90-day duration of this written warranty.* Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. *In no event shall Hewlett-Packard Company be liable for consequential damages.* Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so that above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state, or from province to province.

This is your warranty. Please retain for your records.

*In other countries, contact your local authorized HP dealer or your local Hewlett-Packard Sales and Service facility to determine warranty terms. (For addresses, please see the list on the following page or consult your owner's manual.)

How to Obtain Service For Your Equipment

During the warranty period: If after you follow the maintenance procedures outlined in the owner's manual, you determine that a repair is required, you can help assure efficient servicing by following these guidelines:

● Fill in the attached Repair Information Form and include it with your equipment. Return your equipment to your nearest HP Dealer Repair Center or Field Repair Center.

● Provide a copy of your sales invoice or other documentary proof-of-purchase date to establish warranty coverage period.

● If you need to ship your unit, be sure to ship it in a protective package and insure it. We recommend that you save the original shipping materials for this purpose.

● **Note:** Your warranty will be upgraded from return-to-HP to on-site service free of charge if you purchase a 12-month On-Site Maintenance Agreement within ten days of equipment delivery.

● **After the Warranty Period:** Maintenance is available at your location, at HP Dealer Repair Centers, or at HP Field Repair Centers. You can purchase service at an annual fixed price or on a per-incident basis.

● Under a Field Repair Center Maintenance Agreement, you ship the product to an HP Field Repair Center, where it is repaired within three working days.

● On-Site Maintenance Agreements are available with various levels of response time and coverage, to allow you to select the level of support that fits your needs.

● If you prefer, service on site or at a Field Repair Center is also available on a per-incident, rather than contract, basis.

● Many authorized HP Dealers offer hardware servicing. To locate your nearest Dealer Repair Center consult your yellow pages.

Hewlett-Packard Field Repair Centers

The HP Field Repair Centers listed below provide return-to-HP repair for HP computing equipment—both during and after the warranty period.

If there is no Field Repair Center in your country, contact your authorized HP Series 80 Dealer or your HP Sales and Service Office for shipping instructions.

To find the location of one of the 240 Hewlett-Packard offices serving you worldwide, check your local telephone directory, or contact one of the HP Sales and Service offices listed below.

United States

Illinois
Hewlett-Packard Company
5201 Tollview Drive
Rolling Meadows, IL 60008
(312) 255-9800

California
Hewlett-Packard Company
5400 West Rosecrans Avenue
Lawndale, CA 90260
(213) 970-7500

Hewlett-Packard Company
3003 Scott Boulevard
Santa Clara, CA 95050
(408) 988-7000

Georgia
Hewlett-Packard Company
2000 South Park Place
Atlanta, GA 30339
(404) 955-1500

Texas
Hewlett-Packard Company
930 East Campbell Rd.
Richardson, TX 75081
(214) 231-6101

Massachusetts
Hewlett-Packard Company
32 Hartwell Avenue
Lexington, MA 02173
(617) 861-8960

New Jersey
Hewlett-Packard Company
W. 120 Century Road
Paramus, NJ 07652
(201) 265-5000

Canada
Hewlett-Packard Company
6877 Goreway Dr.
Mississauga, Ontario LV4 1M8
(416) 678-2350

Europe
Hewlett-Packard, S.A.
7 Rue du Bois-du-Lan,
P. O. Box
CH-1217 Meyrin 2
Geneva, Switzerland

Other International Locations
Hewlett-Packard Intercontinental
3495 Deer Creek Road
Palo Alto, CA 94304 U.S.A.

HEWLETT PACKARD

HP 82906A
Printer

Owner's Manual

Contents

General Information

Introduction

The HP 82906A Printer is a general-purpose impact printer featuring 160 character-per-second printing. It utilizes a 9 by 11 dot matrix character format. It prints in 40, 48, 68, 80, 96, or 137 columns. Two programmable print fonts are provided to easily alternate printing modes.

You can choose elite, pica, enlarged elite, enlarged pica, condensed pica, or enlarged condensed pica characters. Other features include proportional spacing, underline mode, and four boldness settings. Superscript and subscript characters can also be printed.

Three character sets can be accessed:

- The ROMAN 8 set with 182 printable characters including international characters.

- The ROMAN extension set with 88 international characters.

- The user-defined character set for specifying up to 190 different characters. Any character that can be specified in a 9 by 11 matrix can be added to the user-defined character set.

Graphics mode gives you the ability to print illustrations, charts, graphs, block letters, etc. using patterns of dots under software control. The printer can produce up to 576 dots per line. The printing method used is HP standard raster graphics.

Because the printer has both pin and friction feed, either fanfold or cut sheet paper can be used. A short tear-off feature enables paper to be torn within an inch of the last print position. One original and up to two copies can be printed at a time. Form widths of 9½ through 10 inches for fanfold paper can be used. The maximum width for cut sheet paper is 8½ inches. An optional tractor unit is available for fanfold paper widths of 4 through 9½ inches. (Refer to appendix A.)

Many printer features are switch-programmable. These include setting the page length, the number of columns per line, selecting between normal and emphasized characters, enabling skip-over-perforation, and changing the line spacing.

Compatibility

If instructions in other documentation say to use an HP 82905B Printer, the HP 82906A Printer will be compatible for character printing. The control characters and escape sequences used by the HP 82905B Printer are also available on the HP 82906A Printer. The HP 82906A Printer conforms to the raster graphics standard used on the HP 2631G Printer and all HP thermal printers. The HP 82906A Printer is otherwise compatible with the HP 82905B Printer.

The HP 82906A Printer uses the Hewlett-Packard Interface Bus (HP-IB) for communicating with HP computers. Connection to a computer with an integrated HP-IB interface requires only a cable. Use an HP-IB Interface Cable (part number 10833A, B, C, or D). Connection to a computer without an integrated HP-IB interface (HP-83, HP-85, and HP-86A computers) requires the HP 82937A HP-IB Interface Module. With the HP-83 and HP-85 computers, it is also necessary to install the Plotter/Printer ROM (part number 00085-15002).

Note: Some computers with an integrated HP-IB interface have a data transfer rate that exceeds the printer's ability to accept data. In these cases the data transfer rate causes the HP-IB interface to become inoperative. Make sure the computer you plan to use is intended to support the HP 82906A Printer.

Using This Manual

This manual is organized to help you get the most from your HP 82906A Printer. Owners who are only interested in using the printer as a hard-copy output device under software control need only read sections 1, 2, and 3. Owners who want to take advantage of the many optional features available with the printer will find section 4 helpful. Reference tables and instructions for using the optional tractor unit are presented in the appendices.

Section 1 presents general features and technical specifications of the printer.

Section 2 includes instructions for unpacking the printer, loading paper, and preparing the printer for operation.

Section 3 takes you through the steps necessary to access the printer with an HP Series 80, 100, or 200 computer.

Section 4 gives complete descriptions of control characters and escape sequences. This information is listed both functionally and alphabetically.

Section 5 provides instructions for reordering consummables, such as printer ribbons, and contains important information on maintaining your printer.

Appendix A supplies information for purchasing and using the optional tractor unit. This unit extends the range of form widths the printer can utilize.

Appendix B contains print samples of many character formats and provides the commands necessary for accessing them.

Appendix C includes complete listings of the character sets available on the HP 82906A Printer.

An index is provided to help you quickly locate information about specific features of the printer.

Specifications

Printer	
Printing Method	Impact dot matrix.
Printing Speed	160 characters per second (CPS).
Line Feed Repeat Rate	Six line feeds per second.
Form Feed Speed	7 seconds.
Character Structure	9 by 11 dot matrix.
Character Size	2.1 mm (0.083 inch) by 3.1 mm (0.120 inch).
Graphics Resolution	72 by 72 dots to the inch.
Characters Per Line	40, 48, 68, 80, 96, 137.
Printing Direction	Bidirectional with logical seeking (text mode).
Line Spacing	6, 8, 9, 12, 16, 18, 24, 36, or 72 lines per inch.
Ribbon	Black-inked cartridge ribbon.

Paper	
Fanfold	9½ to 10 inches wide.
	4 to 9½ inches wide with optional tractor unit.
Cut Sheet	8½-inch maximum width.
Thickness	0.3 mm (0.01 inch) maximum.
Copies	Original plus two carbons.
Feed	Adjustable pin feed.
	Friction feed.
	Tractor feed with optional tractor unit.

Environmental	
Operating Temperature	5° to 35°C (41° to 95°F).
Storage Temperature	−30° to 60°C (−22° to 140°F).
Operating Humidity	10 to 80 percent (no condensation).
Storage Humidity	5 to 85 percent (no condensation).

Power Requirement	
Power Supply	100V ± 10 percent, 50/60 Hz.
	120V ± 10 percent, 50/60 Hz.
	220V ± 10 percent, 50/60 Hz.
	240V ± 10 percent, 50/60 Hz.
Maximum Power Consumption	70W.

Reliability	
MTBF (excluding print head life)	5,000,000 lines.
Print Head Life Expectancy	100,000,000 characters.
Ribbon Life Expectancy	3,000,000 characters.
Duty Cycle	Average 40 pages per day.

| Physical Specifications	
Dimensions	420 by 347 by 100 mm (16.5 by 13.7 by 3.9 inches).
Weight	Approximately 7.5 kg (16.5 lb).

Installation

Unpacking and Inspecting the Printer

Your printer was carefully inspected, both electrically and mechanically, before shipment. Remove it from the shipping carton and check the printer for any physical damage that may have occurred during shipment. You should immediately notify the dealer or sales office where you purchased the printer if there is any such damage. It is your responsibility to file a claim with any carriers involved.

Verify that you have received all of the standard accessories shown in this illustration. If any item is missing, contact your local dealer or sales representative.

Contents of Carton
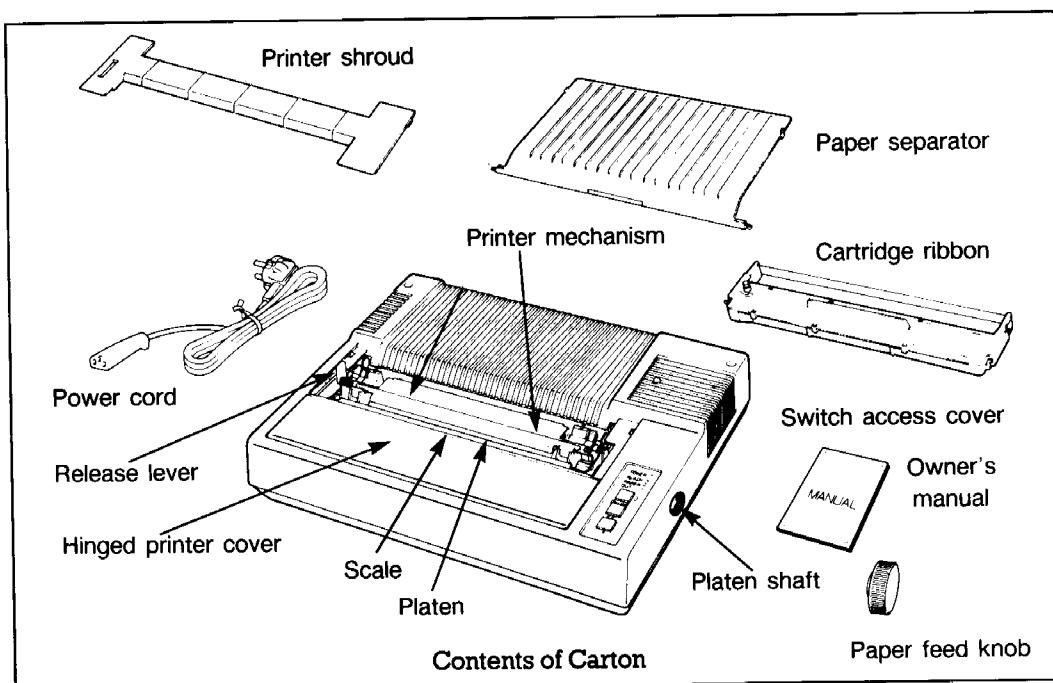
Install the paper feed knob by inserting it into the hole on the right side of the printer case. Gently rotate the knob over the platen shaft. When the knob is properly aligned, push the paper feed knob onto the platen shaft.

Selecting an Operating Site

When selecting a site to operate your printer keep the following guidelines in mind:

- The printer should be placed on a flat surface, such as a tabletop.
- Don't expose the printer to direct sunlight or excessive dust.
- Don't operate the printer at temperatures below 5°C (41°F) or above 35°C (95°F).

Removal of Protective Paper

When your printer was shipped, a protective paper was installed to protect the paper out detector from vibration during transportation. Before operating the printer, be sure to remove this paper. If the printer is to be reshipped, remember to place a sheet of paper in the original position.

Installing the Ribbon Cartridge

You can easily install the ribbon cartridge in the following manner:

1. Be sure the printer is turned off.

2. Open the hinged printer cover and remove it.

3. Lift the scale to the upright position.

4. Grasp the projection at the center of the cartridge case and push the cartridge down onto the printer mechanism.
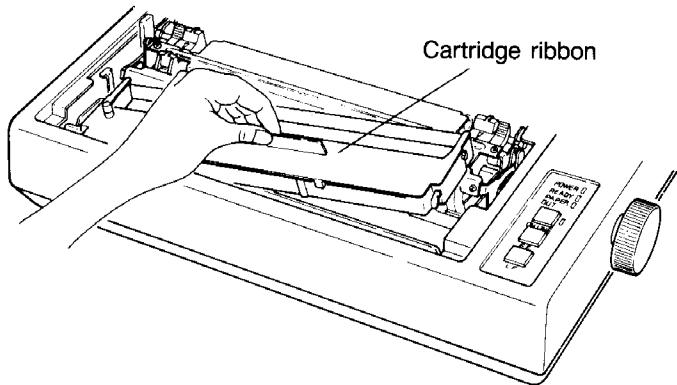
Cartridge ribbon

5. Make sure that the ribbon is not twisted or creased and the cartridge is seated firmly in place.

6. Place the ribbon between the head nose and the ribbon mask (see illustration for step 8).

7. Tighten the ribbon feeding knob to remove slack from the ribbon.

Ribbon feeding knob
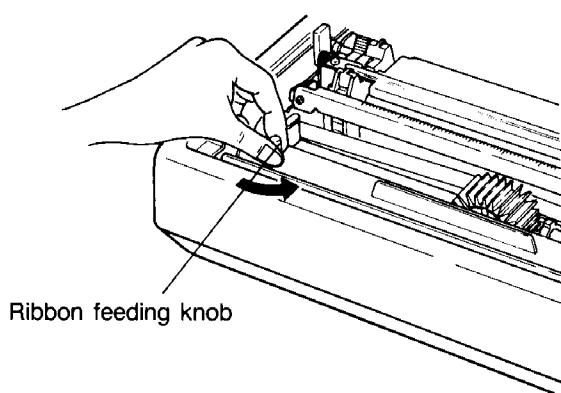
8. Slide the print head back and forth to correctly align the ribbon with the head nose and ribbon mask.

| Incorrect | Incorrect | Incorrect | Correct |
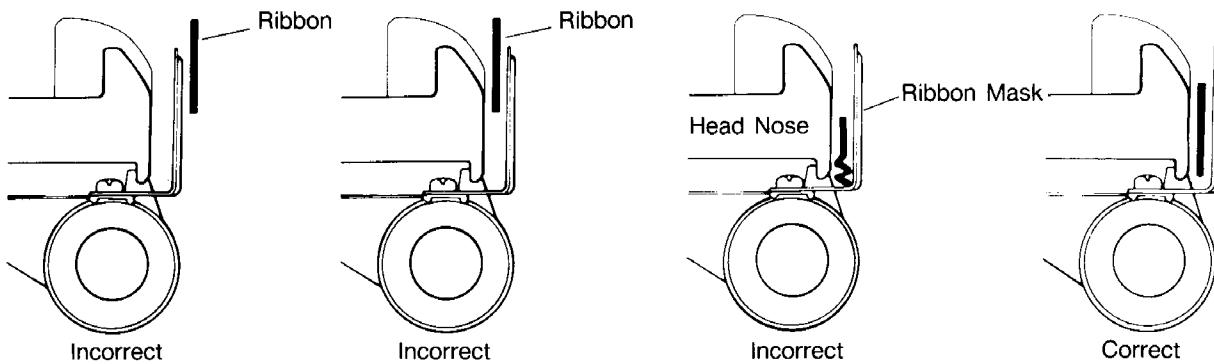
Loading Paper

The printer accommodates fanfold paper from 9½ through 10 inches wide and cut sheet paper up to 8½ inches wide. Fanfold paper from 4 through 9½ inches can be used with the optional tractor unit (appendix A). This manual provides separate instructions for loading fanfold paper, loading cut sheet paper, and loading fanfold paper with the tractor unit.

Fanfold Paper

To load fanfold paper:

1. Turn off the printer.

2. Snap off the printer shroud.

3. Open the hinged printer cover.

4. Move the scale away from the platen.

5. Pull the release lever forward.
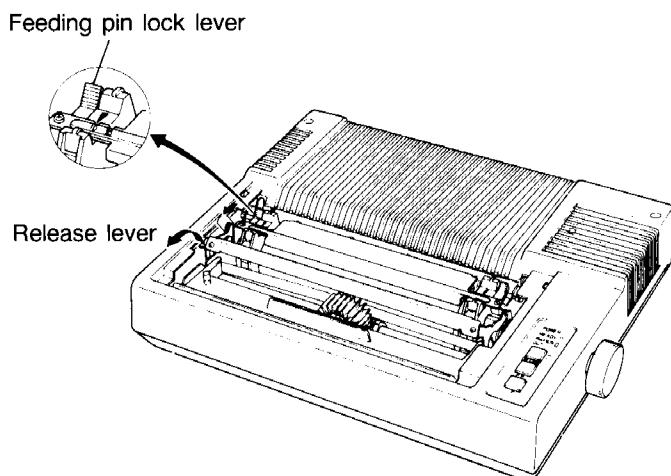
6. Push the print head to one extreme end (printer must be turned off).

7. Raise the feeding pin lock levers to the unlocked position. The 9.5" and 10.0" inscriptions on the frame can be used to adjust the feeding pin position to the correct paper width.

8. For single-sheet fanfold forms, fold the paper at the perforation to prevent it from wrinkling.

9. Push the leading edge of the paper into the insertion slot at the rear of the printer mechanism.

10. Adjust the feeding pin width so that the left and right edges of the paper fit into the paper feeding guides on either side of the insertion slot.

11. Lock the feeding pin lock levers.

12. Gently turn the paper feed knob clockwise. Manually push the paper into the rear of the printer mechanism until the feeding pins engage the feeding holes of the paper.

Note: It may be necessary to slide the print head back and forth to move the paper past the ribbon mask.
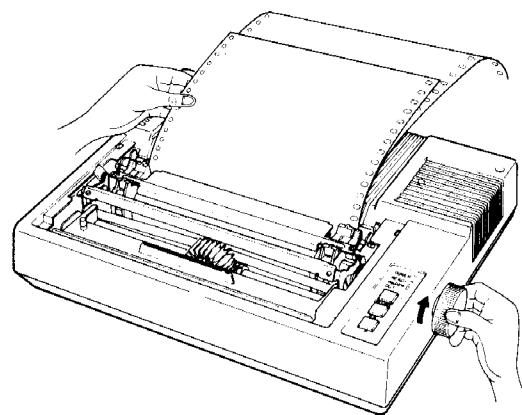
13. After the leading edge of the paper is past the scale, slide the scale back into position.

14. Insert the projections on the paper separator into the two notches located on the back frame of the printer mechanism.
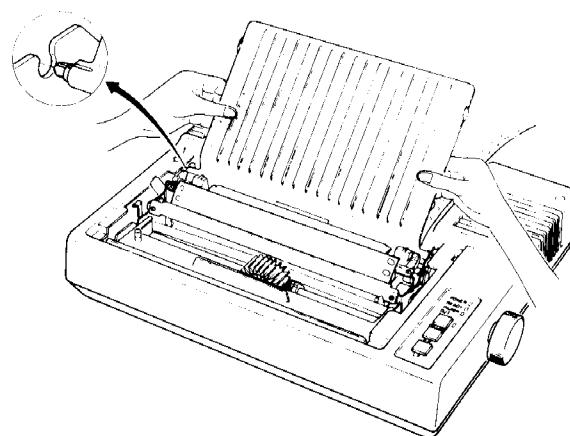
15. Close the printer cover and snap the printer shroud into place over the printer mechanism.

Printer shroud

Printer cover
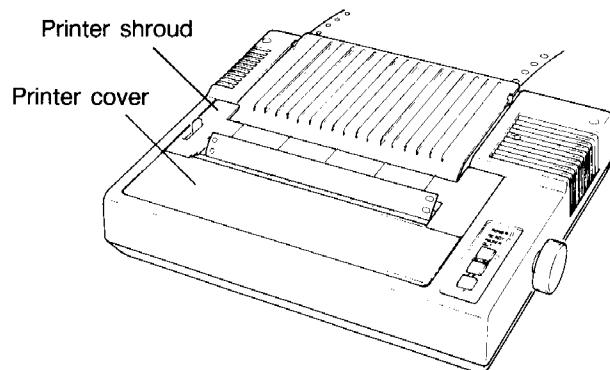
When you operate the printer on a desk or a bench, arrange the paper supply in parallel with the printer as shown below. This arrangement permits the paper to fold in accordian style.

Course of paper
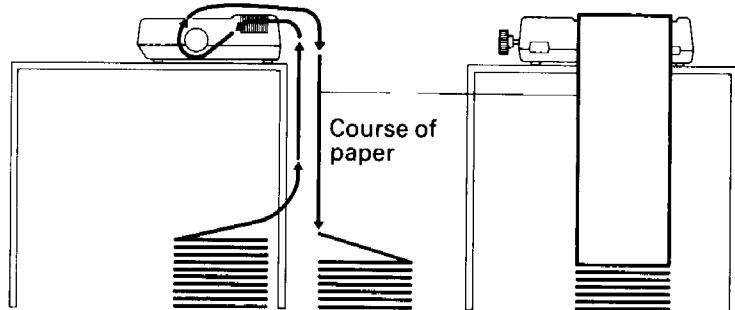
Short Tear-Off Feature

The printer permits removal of paper forms within 1 inch of the last print position. Only tear the paper at the perforation.
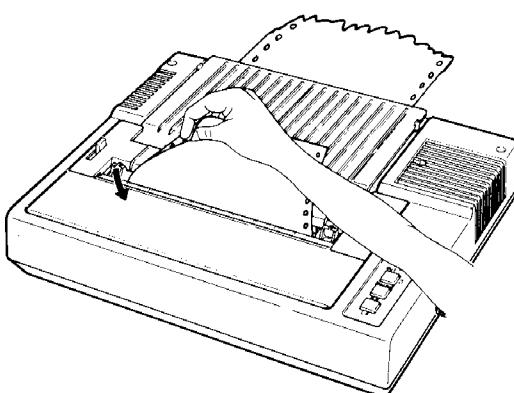
Cut Sheet Paper

To load cut sheet paper:

1. Open the hinged printer cover and snap off the printer shroud.

2. Remove the paper separator.

3. Pull the scale away from the platen.

4. Move the feeding pins to the maximum outward position and lock them.

5. Lock the release lever.
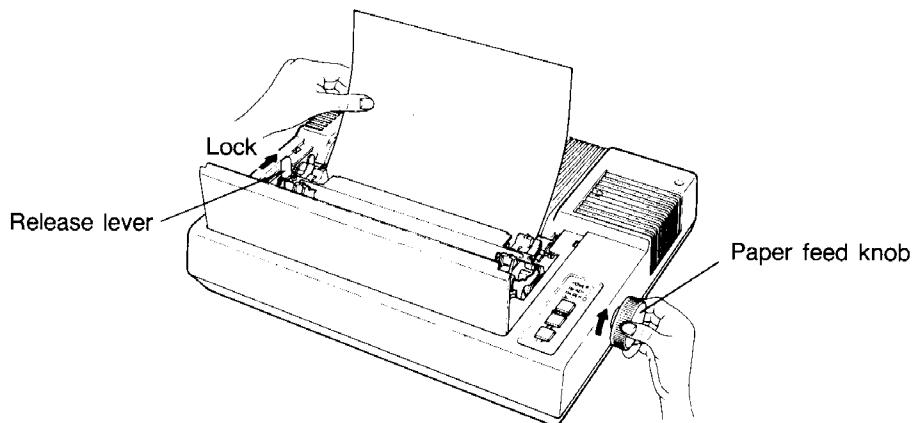
6. Insert the cut sheet paper into the insertion slot at the rear of the printer mechanism. The paper should not enter the paper feeding guides used for fanfold paper.

7. Advance the paper by turning the paper feed knob clockwise.

8. If the paper does not advance straight up, the release lever can be unlocked to align the edges of the paper as shown below.
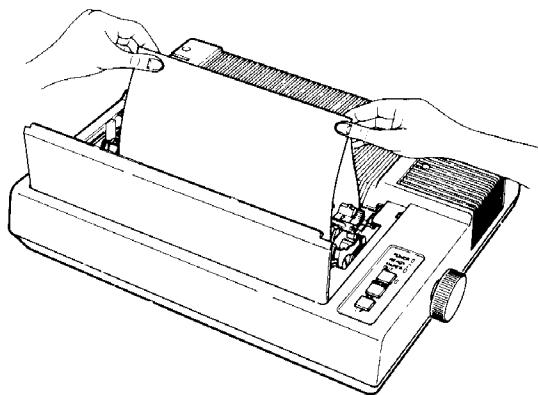
9. Push the scale back into position, close the hinged printer cover, and snap the printer shroud into place.
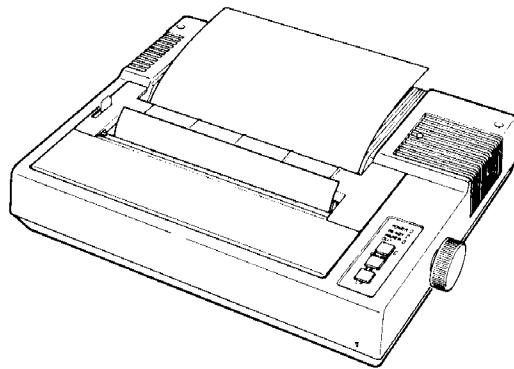
Adjusting the Print Head Gap

The gap between the printer's head nose and platen is adjustable. This adjustment is used to vary the printing pressure and to allow the printer to accommodate paper of various thicknesses. These settings are recommended:

- Forward (+) position for carbon copies or single-sheet forms with reduced head wear.

- Center position for single-sheet forms.

- Backward (−) position for single-sheet forms with quieter operation and slightly darker print.

To adjust the gap, move the head adjusting lever located on the left side of the printer mechanism. If you move the lever toward the front of the printer, the gap will widen and conversely, if you move it toward the rear of the printer, the gap will narrow.
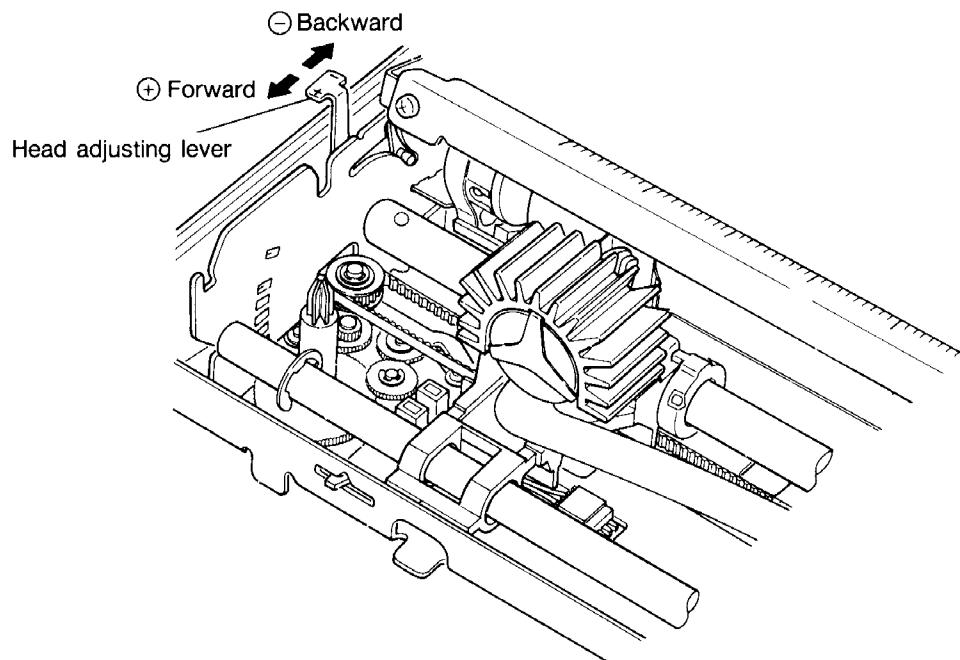
Operation

Connecting the Printer to a Power Source

The HP 82906A Printer is pre-wired to operate with one of the following four ac power sources:

- 100 Vac, 50/60 Hz.

- 120 Vac, 50/60 Hz.

- 220 Vac, 50/60 Hz.

- 240 Vac, 50/60 Hz.

Before connecting your printer to a power source, check the label on the rear of the printer case to make sure the power rating is correct. If your printer has a power rating different from that of the available power source, do not attempt to operate the printer. Contact your dealer or Hewlett-Packard for a replacement unit with the correct power rating.

Power cords supplied for the printer should match the plug requirements in your area. However, power cords with different plugs are available and are illustrated below. If the printer has the wrong power cord for your area, please contact an authorized HP dealer or sales representative in your area.

WARNING

Use only the power cord specified by Hewlett-Packard for your area. If it is necessary to replace the power cord, the replacement must have the same polarity as the original. Otherwise a safety hazard from electrical shock may exist. In addition, the printer could be extensively damaged.

U.K.
8120-1351

Australia
8120-1369

Europe grounded
8120-1689

Printer end of power cord (same for all power cords).

U.S. grounded
8120-1378

Denmark
8120-2956

Switzerland
8120-2104
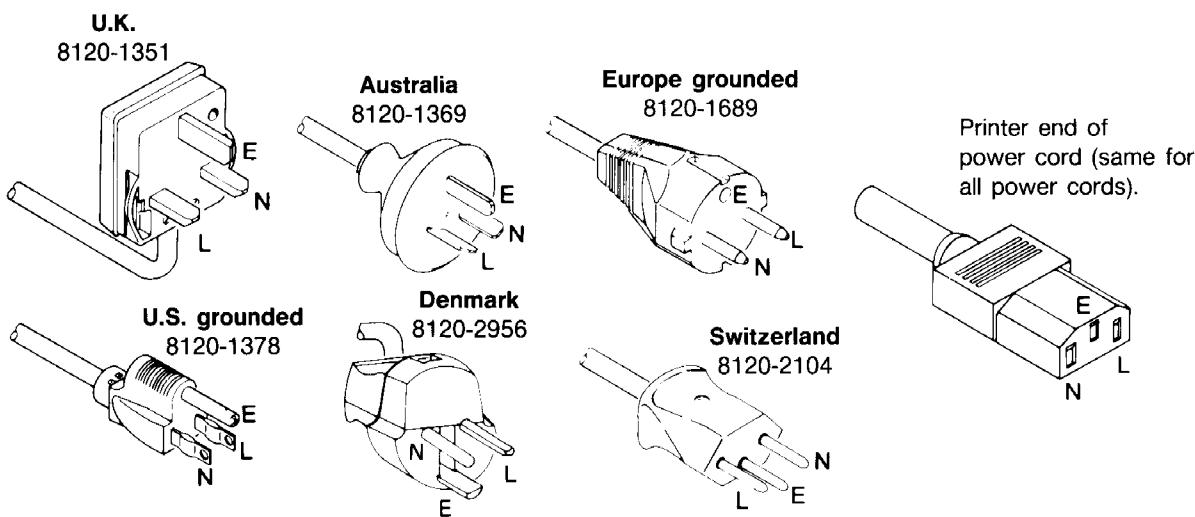
Setting the Top of Form

The top of form, the position in which the first line of print is printed on the paper, is determined when the printer is turned on. Adjust the paper position with the paper feed knob so that the desired line is at print head level and turn the printer on. The paper is now at the top-of-form position.

The top-of-form position can be approximated by moving the top of the paper to the edge of the paper scale and turning on the printer. However, if you will be printing on all 66 lines (for 11-inch paper), an exact top-of-form position should be determined. The following procedure can be used to precisely set the top-of-form position with fanfold paper.

1. Switch off the printer.

2. Make an index mark 22 mm (0.87 inches) above the perforation.

3. Align the index mark with the edge of the paper scale.

4. Switch on the printer.

Note: In skip-over-perforation mode (switch-programmable), the distance in lines skipped for the perforation is the difference between the form length and the text length settings.

Connecting the Printer to a Computer

The HP 82906A Printer is a peripheral device for HP Series 80, 100, 200, and certain other computers that use IEEE Standard 488-1978. This standard, referred to as HP-IB in this manual, enables computers and peripherals to communicate electronically.

If you are connecting your printer to a computer with an integrated HP-IB interface, connect the printer to the computer with an HP-IB Interface Cable (page 6). If your system uses the HP 82937A HP-IB Interface Module for communicating with peripherals, connect the interface cable of the module to the printer.

Setting the Printer Address

Each device used with the HP-IB interface must have a unique address. The device address used for the HP 82906A Printer is preset to 1 at the factory. If it is necessary to change the device address of your printer, read the following material.

The device address switch is located under the switch access cover on the right side of the printer. Before the device address switch can be changed, the switch access cover must be removed.

CAUTION

Several switches are located on the circuit boards of the printer. Electronic components on the circuit board can be damaged by discharges of static electricity. Discharge any static electricity from your hands by touching a grounded object **immediately** before setting the switches. Also be careful not to touch any electronic components other than the switches.

---

1. Turn off the printer.

2. Remove the screw on the top of the switch access cover with a Phillips-type screwdriver.

3. Pull the top edge of the switch access cover away from the printer to free the two tabs from the printer case.

4. Swing the top of the switch access cover out from the printer.
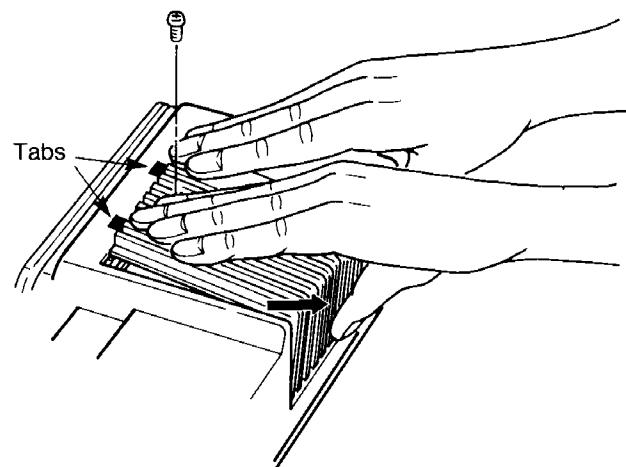
5. Remove the switch access cover.
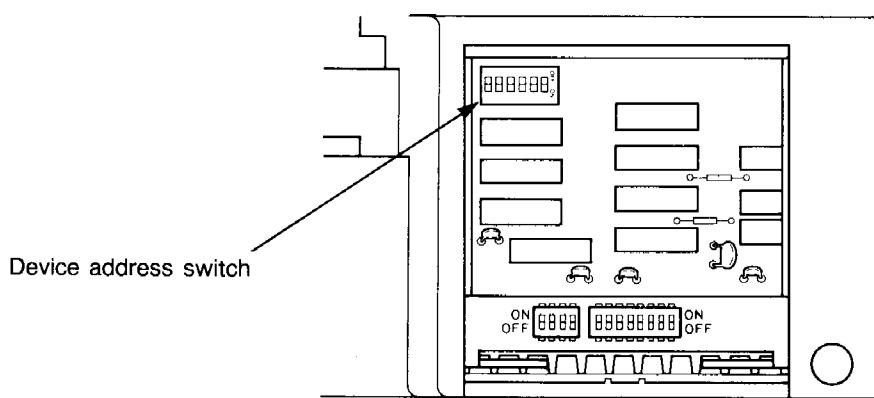
After removing the switch access cover, identify the device address switch. Before changing any switches, verify that the power cord has been disconnected from the power source.

The individual switch segments can be independently set to the ON or OFF position with the tip of a pencil or similar tool. The ON position of each segment corresponds to binary 1 and the OFF position corresponds to binary 0. Segment six is not used so there are 31 (0 through 30) possible addresses. The following table shows the possible switch settings. (LSB stands for least significant bit; MSB is most significant bit.)

Switch Segment					Address
1 (LSB)	2	3	4	5 (MSB)	
0	0	0	0	0	0
1	0	0	0	0	1 —————— Factory Setting
0	1	0	0	0	2
1	1	0	0	0	3
0	0	1	0	0	4
1	0	1	0	0	5
0	1	1	0	0	6
1	1	1	0	0	7
0	0	0	1	0	8
1	0	0	1	0	9
0	1	0	1	0	10
1	1	0	1	0	11
0	0	1	1	0	12
1	0	1	1	0	13
0	1	1	1	0	14
1	1	1	1	0	15
0	0	0	0	1	16
1	0	0	0	1	17
0	1	0	0	1	18
1	1	0	0	1	19
0	0	1	0	1	20
1	0	1	0	1	21
0	1	1	0	1	22
1	1	1	0	1	23
0	0	0	1	1	24
1	0	0	1	1	25
0	1	0	1	1	26
1	1	0	1	1	27
0	0	1	1	1	28
1	0	1	1	1	29
0	1	1	1	1	30

The drawing below shows the switch set to an address of 1:

To replace the switch access cover, use the following procedure.

1. Position the switch access cover so that the projection on the lower side of the cover will rest inside the printer case.

2. Gently lower the switch access cover into place and replace the screw.

Front Panel Switches and Indicators

There are three switches and four indicators (lights) on the printer control panel and a power switch on the left side of the printer case.
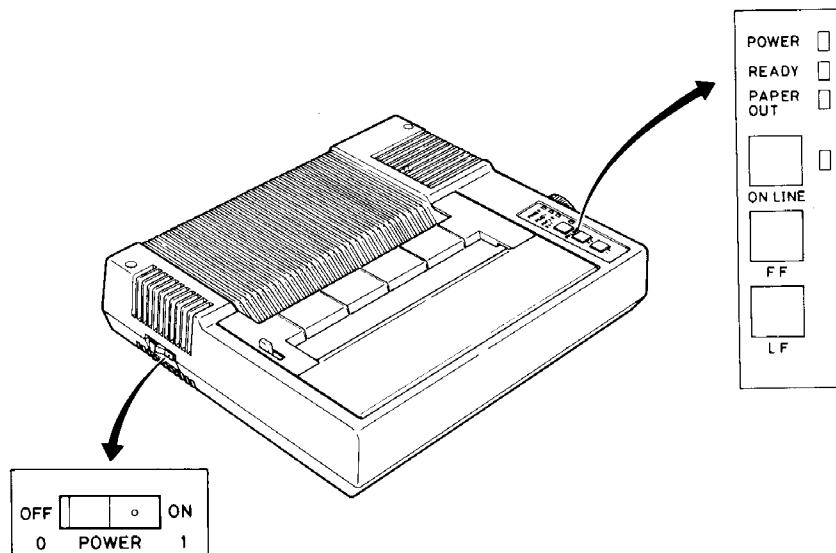
The switches and indicators are listed along with their functions in the following table:

Switch/Indicator	Function
Switch POWER	Controls ac power to the printer.
ON LINE	This switch switches the printer between the remote and local mode. It does not function while the printer is printing.
	If ON LINE is pressed while data is being sent to the print buffer, the printer immediately enters the local mode.
FF (Form Feed)	When you press this switch, the paper advances to the next top-of-form position. The FF switch is operational only in the local mode.
LF (Line Feed)	When you press this switch, the paper advances one line. The LF switch is operational only in the local mode.
Indicator POWER	When this indicator is lighted, the printer is receiving ac power.
READY	When this indicator is lighted, the printer is ready to receive data.
PAPER OUT	When this indicator is lighted, the last page is being printed. If this indicator remains on after loading the paper, check to see if the paper is over the paper detector.
ON LINE	When this indicator is lighted, the printer is in the remote mode and ready to receive data or commands from the computer.

Power On

After all of the system connections are complete, you can turn the printer on using the POWER switch on the left side of the printer case. All of the system components should be turned on before turning on the host computer.

Note: Since the top-of-form position is initialized when power is applied, set the paper to the proper top-of-form position before switching on the printer.

CAUTION

Turning the printer on or off while the computer is communicating with other HP-IB devices will disrupt operation of the interface. Never turn the printer on or off while information is being sent across the HP-IB interface.

Paper Out Detector

The paper out detector (a reed switch on the paper guide) turns on the red PAPER OUT indicator before the paper actually runs out. This informs you that the last page is being printed. Printing is disabled after the last line of text or the skip-over-perforation region is reached. Printing resumes at the top-of-form position when the next paper form is inserted.

Printer Self-Test

The HP 82906A Printer has a self-test feature that is useful in verifying proper operation of the printer. The self-test prints the standard characters provided by the printer. It is a good idea to execute the self-test at the time of installation and at any other time you wish to confirm that the printer mechanism is operating properly.

```
! "#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
```

To execute the self-test, place the POWER switch in the ON position *while* pressing the LF switch. The test will continue to repeat until you place the POWER switch in the OFF position.

Computer Test

To verify that your computer and the HP 82906A Printer are communicating properly, you can conduct a test. If your computer system fails the test, check that the HP-IB cables are securely connected to the computer and printer receptacles. If your system uses the HP 82937A HP-IB Interface Module, verify that the HP-IB interface select code is set correctly and that the interface cable connector is secure.

Sample keystrokes are shown for HP Series 80, 100, and 200 computers with BASIC operating or language systems. The following examples assume an HP-IB interface select code of 7 and a printer device address of 1. These are the factory preset settings. If you have changed the HP-IB interface select code or the printer address, modify your keystrokes accordingly.

HP Series 80

1. Switch on the printer and disc drive.

2. Switch on the computer.

3. Verify that paper is loaded in your printer properly and that it is set to ON LINE.

4. Enter these keystrokes: PRINTER IS 701, 80 (END LINE).

5. Enter these keystrokes: PRINT "THIS IS A TEST!" (END LINE).

6. The message THIS IS A TEST! should be printed.

7. You can press the ON LINE switch on the printer followed by FF to bring the message into view.

HP Series 100

1. Verify the system disc is in the default drive.

2. Switch on the printer and disc drive.

3. Switch on the computer.

4. When the welcome screen appears, press the █AIDS█ softkey.

5. Press (f1), the printer control softkey.

6. Specify the printer by locating and pressing its softkey ((f2) through (f4)).

7. Verify that the paper is properly loaded in your printer and that it is set to ON LINE.

8. Enter these keystrokes: THIS IS A TEST!.

9. Press the █COPY LINE█ softkey.

10. The message THIS IS A TEST! should be printed.

11. To bring the message into view, press the printer's ON LINE switch followed by FF.

12. Press (f8) for █COPY LINE█.

13. The message A>THIS IS A TEST! should be printed.

14. To bring the message into view, press the printer's ON LINE switch followed by FF.

15. Press the (MODES) key.

16. Press (f6) for █LOAD OP SYS█ to return your system to the power-on configuration.

HP Series 200

1. If you have a disc-based language system, verify that the system disc is in the default drive.

2. Verify that paper is loaded properly in your printer and that the printer is set to ON LINE.

3. Switch on the printer and disc drive.

4. Switch on the computer.

With BASIC or HPL systems, continue with the following:

5. For BASIC systems, enter PRINTER IS 701 (EXEC). For HPL systems, enter prtsc 701 (EXEC).

6. For BASIC, enter `PRINT "THIS IS A TEST!"` (EXEC). For HPL, enter `prt "THIS IS A TEST!"` (EXEC).

7. The message `THIS IS A TEST!` should be printed.

8. Press the ON LINE switch on the printer followed by FF to bring the message into view.

With Pascal systems, continue with these instructions:

5. Press the (SHIFT) and (ALPHA) keys (dump alpha command) on HP 9826 and 9836 computers. Press the (SHIFT) and (DUMP ALPHA) keys on the HP 9816 computer.

6. The contents of the computer display should be printed.

7. Press the ON LINE switch on the printer followed by FF to bring the message into view.

User-Selectable Features

Introduction

When you switch on your HP 82906A Printer, a character set, a print font with specified modes, and certain text formatting capabilities are in effect. These are called the power-on, or default, settings. Some of these defaults can be programmed by setting switches (page 44). Graphics output can be defined and printed using the method explained on page 41.

> **Note:** Certain software products send control characters and escape sequences to the printer. These commands can disable modes selected prior to running the software.

Two print fonts, each with the following attributes, can be accessed for character printing.

- ROMAN 8 character set (default for font one), ROMAN extension character set (default for font two), and the user-defined character set.

- Horizontal pitches of 5.0, 6.0, 8.5, 10.0 (default), 12.0, and 17.0 characters per inch.

- Subscript, normal (default), and superscript print height.

- Normal (default) or proportional spacing.

- Print boldness settings of normal (default), double-strike, emphasized, and emphasized double-strike.

You can specify different attributes for each print font and then access them with a single command. Print font number one is accessed at power on. The shift out (SO) control character, CHR$(14), enables you to select print font number two. Print font number one can be accessed again with the shift in (SI) control character, CHR$(15). The different attributes of either font are selected with escape sequences.

A specific hierarchy of print font attributes is used by the HP 82906A Printer.This means that print font attributes with higher priority (lower number) can include attributes with a lower priority. The hierarchy of print font attributes is:

1. Character set.

2. Horizontal pitch.

3. Print height.

4. Spacing (normal or proportional).

5. Print boldness.

For example, text printed with proportional spacing is always printed with emphasized print boldness. Specifying a print boldness of normal will not affect proportionally spaced text because spacing has a higher priority than print boldness.

Printer Commands

Settings for the printer are implemented with control characters and escape sequences. All printer commands are embedded in text or graphics data sent to the printer via the HP-IB interface. This diagram shows the organization of commands for the HP 82906A Printer.
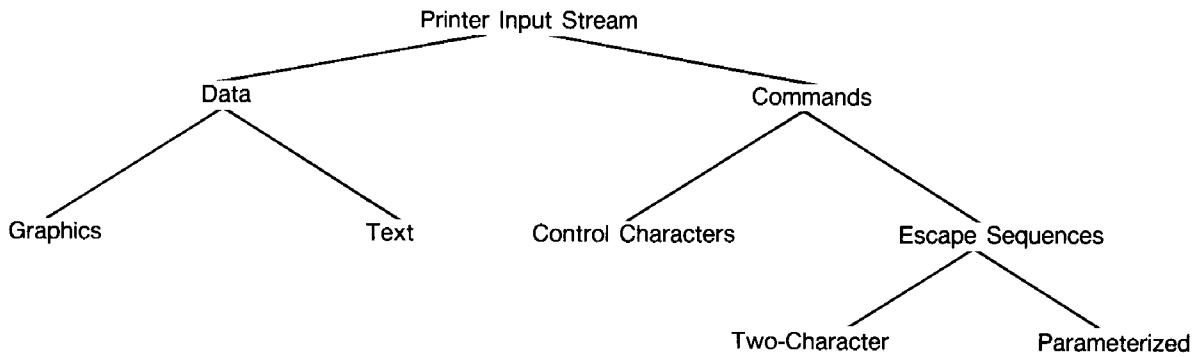
In this manual, BASIC syntax is used for all commands. An example of a control character is decimal code 7 (BEL). Using the CHR$ function, decimal code 7 is expressed as CHR$(7). When this control character is received, the printer's buzzer sounds.* One special control character is *escape*, decimal code 27. When the printer receives the escape (ESC) control character, (CHR$(27)), it interprets subsequent alphanumeric characters as commands. Escape sequences can set a variety of printing conditions. The following escape sequence sets the left margin at column 15:

CHR$(27)&"&a15L"

This escape sequence is called a parameterized escape sequence because different values can be input for the left margin setting. By entering the escape sequence CHR$(27)&"&a50L" the left margin is set at column 50. Note the usage of the ampersand (&) to concatenate the escape control character with escape sequences. Other elements of escape sequences are explained shortly.

Changes to the power-on configuration of the printer are initiated with control characters or escape sequences and remain in effect until the printer is switched off. The two-character escape sequence CHR$(27)&"E" also resets the printer to the power-on configuration.

Format of Commands

When commands are sent to the printer, a specific format must be used. The format used depends on the type of command. The HP 82906A Printer uses three types of commands: control characters, two-character escape sequences, and parameterized escape sequences. Control characters, such as decimal code 7 (BEL), can be expressed with the CHR$ function (page 28). Escape sequences always begin with the escape control character. Subsequent characters in the escape sequence are determined by the type of command.

Two-character escape sequences use the following format:

CHR$(27)&"*X*"

where,

  X is a character from decimal 48 (0) through decimal 126 (~).

---

* The buzzer can be disabled by setting a switch—see page 44.

Parameterized escape sequences use this format:

$$CHR\$(27)\&"X\ y\ \#1\ z1\ \#2\ z2\ ...\ \#i\ zi\ ...\ \#n\ Zn"$$

where,

X is the parameterized character. This character indicates that the escape sequence is parameterized. It may be a character from decimal 33 (!) through decimal 47 (/).

y is the group character. This character specifies the type or group of control being performed. It may be a character from decimal 96 (') through 126 (~).

#i is the value field. This character specifies a value. It may be a character from decimal 48 (0) through decimal 57 (9), decimal 32 (SPACE), decimal 43 (+), or decimal 45 (-). This is an optional string and if it not present, the value is assumed to be zero. The value should be in the range -32767 through $+32767$.

zi is the parameter character. It specifies the parameter to which the value field, if any, applies. It may be a character from decimal 96 (') through 126 (~). It is optional only if one parameter is specified.

Zn is the terminating character. This character is the uppercase equivalent of the parameter character and is used to terminate the escape sequence. It may be a character from decimal 64 (@) through 94 (<).

Combining Escape Sequences

Escape sequences with a common group character may be combined by using a lowercase terminating character to terminate each individual escape sequence and an uppercase character to terminate the entire escape sequence. The escape sequence `CHR$(27)&"&l66p6f1L"`, for example, is a combination of these three escape sequences:

`CHR$(27)&"&l66F"`	Selects a logical page length of 66 lines.
`CHR$(27)&"&l6F"`	Selects a text length of 6 lines.
`CHR$(27)&"&l1L"`	Enables skip-over-perforation.

Command Summary

The next two pages contain functional and alphabetical summaries of the control characters and escape sequences used with the HP 82906A Printer. These summaries list the control character or escape sequence, give a brief description, and provide a page number for obtaining more detailed information.

The functional summary is divided into six categories: vertical control, horizontal control, character formats, character sets, graphics, and miscellaneous. The second summary lists all control characters and escape sequences alphabetically. More detailed information about specific control characters and escape sequences is presented in the remainder of this section.

The following syntax conventions are used:

- # indicates a number -32767 through $+32767$.

- / indicates **either** lowercase for combining (see above) **or** uppercase for termination.

- *ESC* stands for `CHR$(27)`.

Functional Summary		
		Page Number

Vertical Control

CHR$(10)	Line feed (LF).	32
CHR$(12)	Form feed (FF).	32
ESC &a # r/R	Vertical cursor positioning.	32
ESC &l # d/D	Set vertical line spacing.	32
ESC &l # f/F	Set text length.	32
ESC &l # 1/L	Skip-over-perforation.	32
ESC &l # p/P	Set logical page length.	34

Horizontal Control

CHR$(8)	Backspace (BS).	33
CHR$(13)	Carriage return (CR).	33
ESC &a # c/C	Horizontal cursor positioning.	33
ESC &k # w/W	Bidirectional print control.	33
ESC &a # 1/L	Sets the left margin.	33
ESC &a # m/M	Sets the right margin.	33
ESC 9	Clears margins.	34

Character Formats

CHR$(14)	Invokes font two (SO).	27
CHR$(15)	Invokes font one (SI).	27
ESC (s # p/P	Proportional spacing for font one.	35
ESC)s # p/P	Proportional spacing for font two.	35
ESC &k # s/S	Horizontal pitch for both fonts.	34
ESC (s # h/H	Horizontal pitch for font one.	34
ESC)s # h/H	Horizontal pitch for font two.	34
ESC (s # b/B	Boldness for font one.	35
ESC)s # b/B	Boldness for font two.	35
ESC (s # u/U	Height for font one.	36
ESC)s # u/U	Height for font two.	36
ESC &d # U	Enables underline.	37
ESC &d # @	Disables underline.	37
ESC Y	Display functions mode on.	43
ESC Z	Display functions mode off.	43
ESC &p # x/X	Transparent data transfer.	43

Character Sets

ESC (1 @	Selects ROMAN 8 set for font one.	38
ESC (# X	Selects user-defined set for font one.	38
ESC) 1 @	Selects ROMAN 8 set for font two.	38
ESC) 0 E	Selects ROMAN extension set for font two.	38
ESC) # X	Selects user-defined set for font two.	38
ESC (s # w/W	Defines characters.	38
ESC (s # z/Z	Copies the set specified into the user-defined set.	40

Graphics

ESC *r	Prepare for graphics.	41
ESC *b # w/W	Graphics data transfer.	41
ESC *r	Complete graphics.	41

Miscellaneous

CHR$(7)	Sounds the buzzer (BEL).	28
CHR$(27)	Precedes escape sequences (ESC).	28
ESC E	Resets the printer to power-on defaults.	28

Alphabetical Summary		
		Page Number
CHR$(7)	Sounds the buzzer (BEL).	**28**
CHR$(8)	Backspace (BS).	**33**
CHR$(10)	Line feed (LF).	**32**
CHR$(12)	Form feed (FF).	**32**
CHR$(13)	Carriage return (CR).	**33**
CHR$(14)	Invokes font two (SO).	**27**
CHR$(15)	Invokes font one (SI).	**27**
CHR$(27)	Precedes escape sequences (ESC).	**28**
ESC &a # c/C	Horizontal cursor positioning.	**33**
ESC &a # 1/L	Sets the left margin.	**33**
ESC &a # m/M	Sets the right margin.	**33**
ESC &a # r/R	Vertical cursor positioning.	**32**
ESC &d @	Disables underline.	**37**
ESC &d D	Enables underline.	**37**
ESC &k # s/S	Horizontal pitch for both fonts.	**35**
ESC &k # w/W	Bidirectional print control.	**33**
ESC &l # d/D	Set vertical line spacing.	**32**
ESC &l # f/F	Set text length.	**32**
ESC &l # 1/L	Skip-over-perforation.	**32**
ESC &l # p/P	Set logical page length.	**33**
ESC &p # x/X	Transparent data transfer.	**43**
ESC (1 @	Selects ROMAN 8 set for font one.	**38**
ESC (# X	Selects user-defined set for font one.	**38**
ESC (s # b/B	Boldness for font one.	**35**
ESC (s # h/H	Horizontal pitch for font one.	**35**
ESC (s # p/P	Proportional spacing for font one.	**35**
ESC (s # u/U	Height for font one.	**36**
ESC (s # w/W	Defines characters.	**38**
ESC (s # z/Z	Copies the set specified into the user-defined set.	**40**
ESC) 0 E	Selects ROMAN extension set for font two.	**38**
ESC) 1 @	Selects ROMAN 8 set for font two.	**38**
ESC) # X	Selects user-defined set for font two.	**38**
ESC)s # b/B	Boldness for font two.	**35**
ESC)s # h/H	Horizontal pitch for font two.	**34**
ESC)s # p/P	Proportional spacing for font two.	**35**
ESC)s # u/U	Height for font two.	**36**
ESC *b # w/W	Graphics data transfer.	**41**
ESC *r #	Prepare for graphics.	**41**
ESC *r #	Complete graphics.	**41**
ESC 9	Clears margins.	**34**
ESC E	Resets the printer to power-on defaults.	**28**
ESC Y	Display functions mode on.	**43**
ESC Z	Display functions mode off.	**43**

Text Formatting Capabilities

Various control characters and escape sequences can be used to control the printing of text on the HP 82906A Printer. These commands, when embedded in the input stream, control the formatting of lines and columns of text when printing occurs.

Vertical Control

Line Feed (CHR$(10))

Causes all data stored in the print buffer to be printed and advances the paper one line.

> **Note:** Automatic line feeds are switch-programmable (page 44).

Form Feed (CHR$(12))

Advances the paper vertically to the next top-of-form position.

Vertical Cursor Positioning (*ESC* &a # r/R)

Moves the paper forwards or backwards to a specific line. A plus or minus sign preceding the value indicates the paper will be moved the specified number of lines up (−) or down (+) from the current line. No sign indicates absolute cursor positioning and moves the cursor to a specific line number within the current page. The first line on a page is line zero.

This escape sequence moves the paper backwards five lines: CHR$(27)&"&a-5R".

> **Note:** Do not use vertical cursor positioning to move the paper backwards when using the tractor unit.

Vertical Line Spacing (*ESC* &l # d/D)

Sets the vertical line spacing to the number of lines per inch specified in the value field, #. Acceptable values are: 6, 8, 9, 12, 16, 18, 24, 36, and 72. Defaults of 6 or 8 lines per inch are switch-programmable (page 44).

To set vertical line spacing to 9 lines per inch, use this escape sequence: CHR$(27)&"&l9D".

Set Text Length (*ESC* &l # f/F)

Sets the length of text printed within a logical page. The value field, #, contains the number of lines of text. If a text length of zero or a text length greater than the logical page length is specified, the command is ignored.

For example, to set the form length to 52 lines, use this escape sequence: CHR$(27)&"&l52F".

Skip-Over-Perforation (*ESC* &l # l/L)

Enables or disables skip-over-perforation printing. A 1 in the value field turns on this mode and a 0 turns it off. The default is preset to skip-over-perforation mode off.

This escape sequence enables skip-over-perforation: CHR$(27)&"&l1L".

> **Note:** Skip-over-perforation is switch-programmable (page 44).

Set Logical Page Length (*ESC* &l # p/P)

Sets the length of the logical page. The value field, #, contains the number of lines in the logical page. The maximum number of lines allowed in the logical page is 128. If a page length greater than 128 is specified, the command is ignored. The preset default for page length is 11 inches.

This escape sequence sets the page length to 66 lines: CHR$(27)&"&l66P".

> **Note:** The logical page length is switch-programmable (page 44).

Horizontal Control

Backspace (CHR$(8))

Moves the print head backwards before printing the next character. The print head does not move until the next printable character is received. If the print head is already at the left margin, it is not moved. The distance the print head moves is identical to the width of the last character printed. (In proportional spacing, the width of the space character is used.)

Carriage Return (CHR$(13))

Moves the carriage to the first printing position on the same line. Carriage return (CR) is executed when the next printable character is received.

> **Note:** Automatic line feed after carriage return is switch-programmable (page 44).

Horizontal Cursor Positioning (*ESC* &a # c/C)

Moves the print head right or left before printing the next character. The print head moves when the next printable character is received. The value determines what column the print head moves to. If the number is preceded by a sign, the print head moves the specified number of columns to the right (+) or left (−). If no sign is present, the print head moves to the column indicated by the number. The leftmost column is column zero.

To move the next printing position five columns to the right, use this escape sequence: CHR$(27)&"&a+5C".

Bidirectional Print Control (*ESC* &k # w/W)

Enables or disables bidirectional printing. A value of 0 selects unidirectional (left to right only) printing. Bidirectional printing is restored with a value of 1. At power on, bidirectional printing is enabled.

To disable bidirectional printing, use this escape sequence: CHR$(27)&"&k0W".

Setting Margins

Margins are set by entering the corresponding column number with these escape sequences.

To set the left margin: *ESC* &a # 1/L.

To set the right margin: *ESC* &a # m/M.

The number of characters that can be printed on a line depends on the current horizontal pitch. Note that since margins are specified with column numbers, the columns used by the printer for the left and right margins can change if the horizontal pitch is changed. If the horizontal pitch is changed, the actual margins do not change.

This combined escape sequence can be used to set the left margin to column 15 and the right margin to column 65: `CHR$(27)&"&a15l65M"`.

The left and right margins must be separated by a minimum number of characters that depends on the current horizontal pitch. The default right margin also depends on the horizontal pitch. The default left margin for all horizontal pitches is column zero, the leftmost column. The effect of horizontal pitch on margins is summarized in this table.

Horizontal Pitch	Minimum Text Width (number of columns)	Default Right Margin (column number)
5.0	1	39
6.0	2	47
8.5	2	65
10.0	2	79
12.0	3	95
17.0	4	131

To clear margins, the *ESC* 9 escape sequence can be used. This should be entered as `CHR$(27)&"9"`. The left margin is set to column zero. The right margin setting is determined by the current horizontal pitch (see table).

Character Formats

The configuration of the printer when text is received determines how specific characters will be printed. Characters are printed with a specific width, boldness, and height. Proportional spacing and underline can also distinguish printed characters. Refer to appendix B for samples of different character formats.

Proportional Spacing

Proportional spacing varies the amount of space printed around each character. This makes text easier to read by leaving less room around narrow characters. Proportional spacing is available with normal pica and enlarged pica horizontal pitches and is always printed with emphasized print boldness.

```
This print is normal pica with NORMAL spacing.
This print is normal pica with PROPORTIONAL spacing.

Enlarged pica with NORMAL spacing.

Enlarged pica with PROPORTIONAL spacing.
```

Proportional spacing can be enabled or disabled for a specific print font.

For print font number one: *ESC* (≡ # ᴘ/ᴘ.

For print font number two: *ESC*) ≡ # ᴘ/ᴘ.

A value of 1 specifies that proportional spacing should be enabled. A value of 0 disables proportional spacing. Each backspace control character moves the print head back the distance of one space character. To enable proportional spacing for font one, use this escape sequence: CHR$(27)&"(≡1P".

Print Modes

Three different escape sequences are used to select the print mode of the printer according to the following table.

For both print fonts: *ESC* &k # ≡/S.

For print font one: *ESC* (≡ # h/H.

For print font two: *ESC*) ≡ # h/H.

Mode	Horiz. Pitch	Chars. /Line	Value Field	
			ESC &k # ≡/S	*ESC* (≡ # h/H, *ESC*) ≡ # h/H
Enlarged Pica	5.0	40	1	1 through 5
Enlarged Elite	6.0	48	—	6
Enlarged Condensed Pica	8.0	68	3	7 or 8
Normal Pica	10.0	80	0	9 or 10
Emphasized Normal Pica	10.0	80	9	—
Normal Elite	12.0	96	—	11 or 12
Condensed Pica *switch 1 on pos.*	17.0	137	2	13 and above

Print Boldness

Four different boldness settings are offered on the HP 82906A Printer: normal, double-strike, emphasized, and emphasized double-strike. Normal boldness and emphasized boldness are switch-programmable (page 44). Print boldness is selected for either print font with these escape sequences.

For print font number one: *ESC* (≡ # b/B.

For print font number two: *ESC*) ≡ # b/B.

The following guidelines should help you select the proper boldness:

- With normal print boldness, the print head makes one pass per line at normal speed. This offers the fastest printing speed.

- Double-strike printing is darker and requires two left-to-right passes of the print head. To produce darker print, the paper is offset vertically before the second pass is made.

- With emphasized printing, one pass at reduced speed is required for each line of print. Print darkness is provided by printing each dot twice and offsetting the print head horizontally.

- Emphasized double-strike print has the darkest type and the longest printing time. Emphasized double-strike print provides both vertical and horizontal offsetting of the character dot pattern.

Boldness	Value Field
Normal	0 or 1
Double-Strike	2 or 3
Emphasized	4 or 5
Emphasized Double-Strike	6 or 7

This escape sequence selects double-strike printing for font one: CHR$(27)&"(s2B".

Print Height

Superscript, subscript, or normal print height can be selected for either print font. All superscript and subscript characters are automatically printed with double-strike print boldness. Only emphasized double-strike boldness can be selected with an escape sequence for superscript or subscript print heights.

For print font number one: *ESC* (s # u/U.

For print font number two: *ESC*) s # u/U.

Print Height	Value Field	Example
Superscript	1	THIS IS SUPERSCRIPT PRINT
Subscript	-1	THIS IS SUBSCRIPT PRINT
Normal	0	THIS IS NORMAL PRINT

To specify superscript printing for font one, this escape sequence can be used: CHR$(27)&"(s1U".

Superscript print can also be selected with value field entries of 2 or 3. Subscript type can be selected with -2 or -3.

Underline

This mode automatically underlines all text, embedded spaces, and columns for which no characters have been received. Underline mode affects both print fonts simultaneously. Any valid number (-32767 through +32767) can be used in the value fields of these escape sequences.

To enable: *ESC* &d #   .

To disable: *ESC* &d   @.

To enable underlining for both fonts, this escape sequence can be used: CHR$(27)&"&d10U".

A number of terminating characters can be used for these escape sequences. To enable underlining, use D, E, F, G, L, M, N, O, T, U, V, W, \,], (^) or (_). To disable underlining, @, A, B, C, H, I, J, K, P, Q, R, S, X, Y, Z, or [can be used.

Character Sets

Character sets enable your printer to interpret the input stream from the computer as text. Character sets are defined by the one-to-one correspondence of specific characters and decimal codes. The HP 82906A Printer supports three character sets:

- ROMAN 8 set with the standard set and international characters.
- ROMAN extension set with international characters.
- User-defined set for specifying up to 190 characters of your choice.

A complete character set listing is provided in appendix C.

ROMAN 8 Character Set

The ROMAN 8 character set includes the standard characters in decimal positions 0 through 127 (including control characters) and international characters in decimal positions 128 through 255.

ROMAN Extension Character Set

The ROMAN extension character set consists international characters in decimal positions 0 through 127 and blanks in positions 128 through 255. This allows you to access the international characters with the standard key codes available on HP Series 80, 100, and 200 computers.

User-Defined Character Set

Except for control characters, the user-defined set is empty at power on. The remaining 190 decimal codes are available for user-defined characters. Any dot pattern that can be expressed in a 9 by 11 dot matrix can be used as a character.

Selecting Character Sets

At power on, the ROMAN 8 character set is selected for font one, and the ROMAN extension set is selected for font two. Since the character set is a font-selectable attribute, you can change the character set assigned to either print font. The following escape sequences can be used to select character sets for print fonts one and two.

Print Font	Escape Sequence	Character Set Selected
1	ESC (1 @ ESC (# X*	ROMAN 8 User-defined
2	ESC) 1 @ ESC) 0 E ESC) # X*	ROMAN 8 ROMAN extension User-defined

Several other value field entries can be used to select character sets for a specific font. A 0 or 1 can be used to select the ROMAN 8 set for font one. The terminating character U can be used with a value field entry of 0 to select the ROMAN 8 set for either font. Use a value field entry of 0 with an E or @ as the terminating character to select the ROMAN extension set for font two.

Defining Characters

User-defined characters (accessed with the user-defined character set) are specified with the *ESC* (= # W/W escape sequence. One character or a range of characters can be defined with the escape sequence. Information needed to specify a user-defined character includes the following items:

- The decimal code in the user-defined set to be assigned to the character.

- Descender and proportional information.

- The starting and ending positions in the 11-column print matrix.

- Binary representations for each column of print in the character.

Specifying these items enables you to access user-defined characters with decimal or key codes. Since user-defined characters do not appear on the computer display or keyboard, use the CHR$ function with the decimal code or the key that represents the decimal code assigned to the character. For example, if the character (o) is assigned to decimal code 64, you can use CHR$(64) or (@) for accessing it.

The following format is used for the *ESC* (= # W/W escape sequence.*

CHR$(27)&"(= # W"&CHR$(0)&*decimal 1*&*decimal 2*&*data group 1*&*data group 2*& ... &*data group N*

---

* Any valid number, −32767 through +32767, can be used as the value for this escape sequence.

The *decimal 1* and *decimal 2* parameters represent the specific decimal code assigned to the user-defined character. If only one character is being defined, then the same value should be used for both *decimal 1* and *decimal 2*. If a range of decimal values is being defined, then *decimal 1* should be the lower decimal code and *decimal 2* should be the higher decimal code. If isolated assignments are made to the user-defined set, then multiple escape sequences must be used.

> **Note:** User-defined characters can only be specified for decimal codes in the range 32 through 126 and the range 160 through 254. These ranges avoid the control character areas that cannot be used for user-defined characters.

The number of *data groups* included in the escape sequence depends on the number of characters being defined. One data group is needed for each character. If the values for *decimal 1* and *decimal 2* are the same, then only one *data group* should be present. Otherwise, a *data group* should be present for each decimal code in the range specified by *decimal 1* and *decimal 2*. Decimal codes are assigned to the *data groups* in ascending order.

Each *data group* consists of up to 12 bytes of data:

Bit 7			
Bit 6			
⋮			
Bit 1			
Bit 0			

| Byte 1. | Byte 2. | Byte 3. | Bytes 4 through 12. |
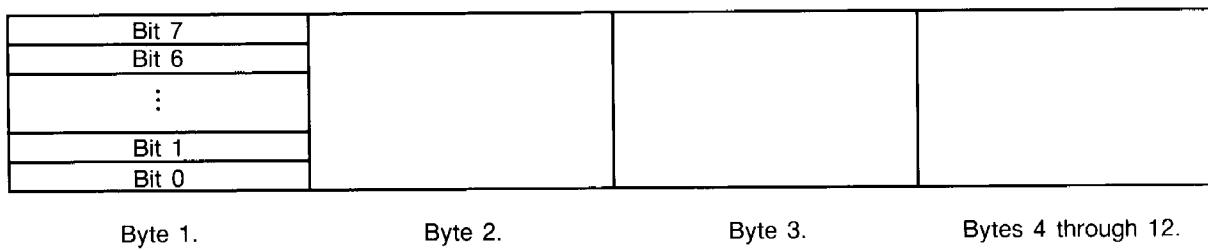
The first byte of the data group contains descender information and the character width to be used in the proportional spacing mode. A specific decimal code, such as CHR$(139), must be selected to represent the information in binary format about descenders and proportional spacing.

A 1 in the most significant bit (MSB) of the first byte of the *data group* instructs the printer to use only the top eight pins of the nine-pin print head when printing user-defined characters. If a 0 is used in the MSB, then only the bottom eight pins of the print head are used.
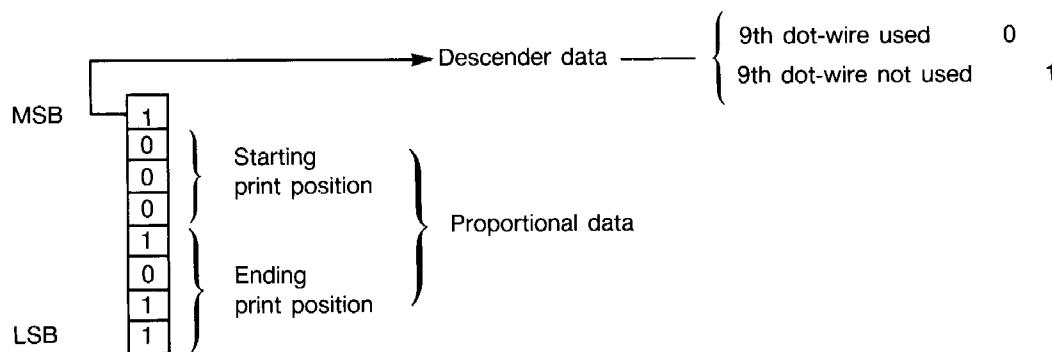
The bits numbered 6 through 0 (0 is the least significant bit or LSB) are used to specify the starting and ending positions in the 11-column print matrix. Each user-defined character can consist of a minimum of 5 through a maximum of 11 columns in the print matrix. Bits 6 through 4 represent the starting print position and bits 3 through 0 represent the ending print position. The binary values in the preceding diagram show a starting print position in the matrix of column 0 (binary 000). The ending print position in the matrix is column 11 (binary 1011).

The remaining eleven bytes in the *data group* are binary representations of each print column used to define the character. Representations for column 0 through the last column printing occurs in must be present. Representations for blank columns after the last printed column can be omitted. The following diagram shows the definition of the character (o). The decimal codes are printed below each column.
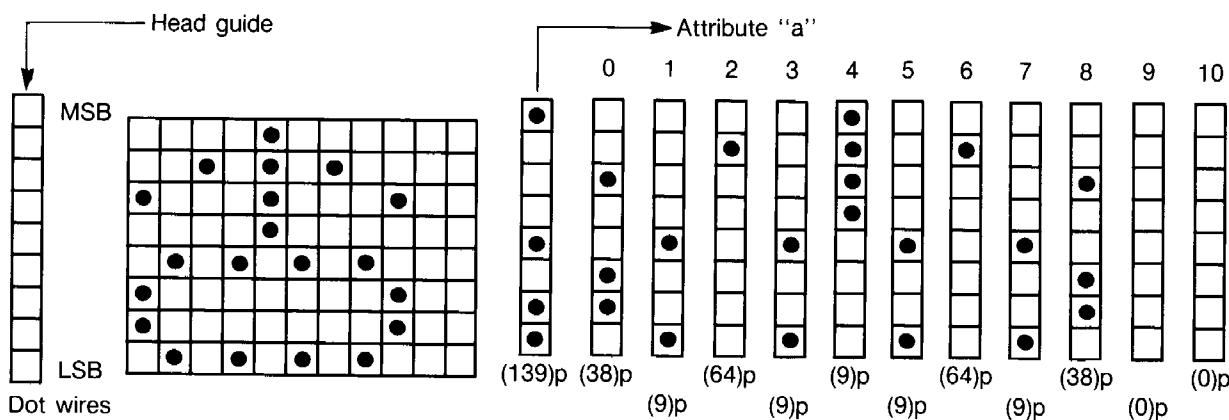
The following escape sequence defines the (δ) character:

```
CHR$(27)&"(sW"&CHR$(0)&CHR$(64)&CHR$(64)&CHR$(139)&CHR$(38)&CHR$(9)
&CHR$(64)&CHR$(9)&CHR$(240)&CHR$(9)&CHR$(64)&CHR$(9)&CHR$(38)
&CHR$(0)&CHR$(0)
```

Note: Although the value field entry is omitted, any valid number can be used.

Customizing Character Sets

The *ESC* (s # z/Z escape sequence allows you to copy a character set or blanks into the user-defined character set. You can then customize the duplicate set by modifying specific characters. A value field entry of 1 copies the ROMAN 8 set into the user-defined set. An entry of 2 copies the ROMAN extension set. A 0 can be used to copy all blanks into the user-defined set. Use this procedure to customize specific character sets:

1. Copy the desired set into the user-defined set with the *ESC* (s # z/Z escape sequence.

2. To modify specific characters, specify them as user-defined characters (page 39).

3. Access the user-defined set with either print font (page 39).

After `CHR$(27)&"(1Y"` is received, for example, any user-defined characters that may have been specified previously are replaced by the ROMAN 8 set.

Graphics Mode

Graphics mode is used for producing any graphics display under software control. The printer uses the HP standard raster scan method. With this method, each pass of the print head prints 576 vertical units across the page with a resolution of 72 by 72 dots.

There are three steps in printing graphics data:

1. Preparation of the printer for graphics data. Any text data in the buffer is printed at this point.

2. Definition of the graphics data using a binary representation. Each line of dots is defined with up to 72 bytes (576 dots) of data. Graphics data is defined horizontally, one line of dots at a time.

3. Completion of graphics. Any graphics data still in the buffer is printed.

Graphics patterns are defined horizontally. The printer accepts eight lines of graphics data before it begins printing. These eight lines of graphics data are printed with one pass of the print head.

Graphics Escape Sequences

Prepare for Graphics (*ESC* ‡r)

Recommended before sending graphics data to the printer. When *ESC* ‡r # ω/ʜ is received, all text currently in the buffer is printed and the paper is advanced one line (nothing occurs if the buffer is empty). Any valid number can entered in the value field.

Graphics Data Transfer (*ESC* ‡b # ω/ʜ)

Initiates the printing of graphics. The number of bytes specified in the value field is interpreted as one line of graphics data. This data should immediately follow the CHR‡(0) after the escape sequence. Since a maximum of 576 dots can be printed on a line, the maximum number of bytes that can be entered is 72. Any additional bytes of graphics data for the same line are ignored.

Each byte of graphics data represents eight dots on the line. The MSB of the first byte of data corresponds to the first dot on the line. The LSB of the last byte of data is the last dot on the line.

Complete Graphics (*ESC* ‡r)

Informs the printer that all graphics data has been sent. Any graphics data still in the buffer is printed. Then the paper is advanced to prevent the overprinting of graphics with text. Any number can be used in the value field.

Defining Graphics Data

This diagram shows a pattern of dots you can print in graphics mode:
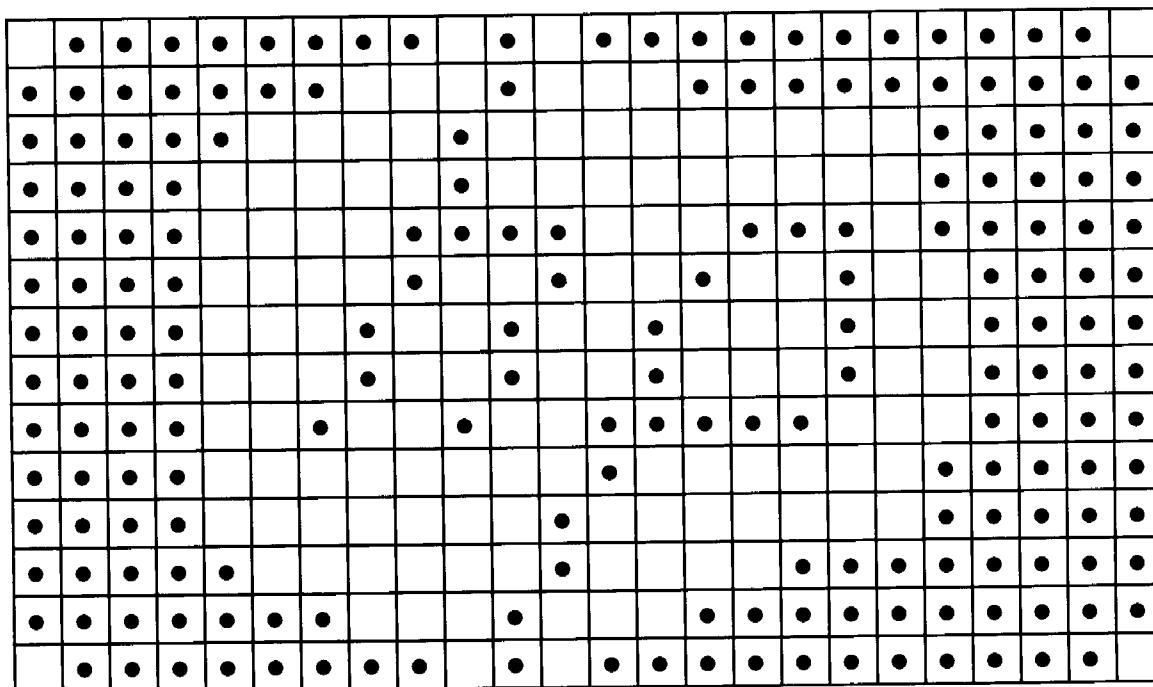
Each group of eight dots on a line is represented by one byte of data. The eight bits of this byte represent the eight dots. A one bit indicates that a dot is printed. A zero bit indicates that no dot is printed. The dot pattern can be printed using this binary representation:

First Byte

MSB			Binary				LSB	Decimal
0	1	1	1	1	1	1	1	127
1	1	1	1	1	1	1	0	254
1	1	1	1	1	0	0	0	248
1	1	1	1	0	0	0	0	240
1	1	1	1	0	0	0	0	240
1	1	1	1	0	0	0	0	240
1	1	1	1	0	0	0	1	241
1	1	1	1	0	0	0	1	241
1	1	1	1	0	0	1	0	242
1	1	1	1	0	0	0	0	240
1	1	1	1	0	0	0	0	240
1	1	1	1	1	0	0	0	248
1	1	1	1	1	1	1	1	254
0	1	1	1	1	1	1	1	127

Second Byte

MSB			Binary				LSB	Decimal
1	0	1	0	1	1	1	1	175
0	0	1	0	0	0	1	1	35
0	1	0	0	0	0	0	0	64
0	1	0	0	0	0	0	0	64
1	1	1	1	0	0	0	1	241
1	0	0	1	0	0	1	0	146
0	0	1	0	0	1	0	0	36
0	0	1	0	0	1	0	0	36
0	1	0	0	1	1	1	1	79
0	0	0	0	1	0	0	0	8
0	0	0	1	0	0	0	0	16
0	0	0	1	0	0	0	0	16
0	0	1	0	0	0	1	1	35
1	0	1	0	1	1	1	1	175

Third Byte

MSB			Binary				LSB	Decimal
1	1	1	1	1	1	1	0	254
1	1	1	1	1	1	1	1	255
0	0	0	1	1	1	1	1	255
0	0	0	1	1	1	1	1	31
1	1	0	1	1	1	1	1	223
0	1	0	0	1	1	1	1	79
0	1	0	0	1	1	1	1	79
0	1	0	0	1	1	1	1	79
1	0	0	0	1	1	1	1	143
0	0	0	1	1	1	1	1	31
0	0	0	1	1	1	1	1	31
1	1	1	1	1	1	1	1	255
1	1	1	1	1	1	1	1	255
1	1	1	1	1	1	1	1	124

The following escape sequences can be sent to print . Note the correspondence between the decimal codes in the preceding diagram and the three bytes of data supplied with each escape sequence.

```
10 PRINTER IS 701
20 SET I/O 7,16,0 ! Disables computer CR-LF (Series 80 only).
30 PRINT CHR$ (27)&"*rA" ! Prepare printer for graphics (recommended).
40 PRINT CHR$ (27)&"*b 3W"&CHR$ (127)&CHR$ (175)&CHR$ (254)
50 PRINT CHR$ (27)&"*b 3W"&CHR$ (254)&CHR$ (35)&CHR$ (255)
60 PRINT CHR$ (27)&"*b 3W"&CHR$ (248)&CHR$ (64)&CHR$ (255)
70 PRINT CHR$ (27)&"*b 3W"&CHR$ (240)&CHR$ (64)&CHR$ (31)
80 PRINT CHR$ (27)&"*b 3W"&CHR$ (240)&CHR$ (241)&CHR$ (223)
90 PRINT CHR$ (27)&"*b 3W"&CHR$ (240)&CHR$ (146)&CHR$ (79)
100 PRINT CHR$ (27)&"*b 3W"&CHR$ (241)&CHR$ (36)&CHR$ (79)
110 PRINT CHR$ (27)&"*b 3W"&CHR$ (241)&CHR$ (36)&CHR$ (79)
120 PRINT CHR$ (27)&"*b 3W"&CHR$ (242)&CHR$ (79)&CHR$ (143)
130 PRINT CHR$ (27)&"*b 3W"&CHR$ (240)&CHR$ (8)&CHR$ (31)
140 PRINT CHR$ (27)&"*b 3W"&CHR$ (240)&CHR$ (16)&CHR$ (31)
150 PRINT CHR$ (27)&"*b 3W"&CHR$ (248)&CHR$ (16)&CHR$ (255)
160 PRINT CHR$ (27)&"*b 3W"&CHR$ (254)&CHR$ (35)&CHR$ (255)
170 PRINT CHR$ (27)&"*b 3W"&CHR$ (127)&CHR$ (175)&CHR$ (254)
180 PRINT CHR$ (27)&"*rB" ! Complete graphics (recommended).
190 SET I/O 7,16,2 ! Enables computer CR-LF (Series 80 only).
200 END
```

Debugging Modes

Two modes, display functions and transparent data transfer, are available as an aid to debugging printer output. When output is printed in a debugging mode, control characters and escape sequences are printed and not executed. All characters are printed with the current horizontal pitch. Control characters are printed with the symbols listed in appendix C. Escape sequences are printed as entered.

In display functions mode, the carriage return control character (CHR$(13)) and the two-character escape sequences that switch display functions mode on and off are executed as a convenience. The *ESC* Y escape sequence turns on display functions mode. The *ESC* Z escape sequence turns off display functions mode.

In transparent data transfer mode, all control characters and escape sequences are printed but none are executed. The escape sequence *ESC* &p # x/X specifies the number of bytes (0 through 32767) to be printed in transparent data transfer mode. Characters to be printed in transparent data transfer mode should immediately follow the escape sequence.

Switch-Programmable Features

Two sets of switches are available for changing the power-on defaults of the HP 82906A Printer. Skip-over-perforation can be enabled by setting a switch, for example. These settings only affect the power-on configuration of the printer.

Before the switch settings can be changed, the switch access cover must be removed. Instructions and cautions for switch access cover removal are provided on page 19. After removing the switch access cover, identify the two sets of switches (switch sets A and B) on the circuit board.

Switch Set B   Switch Set A
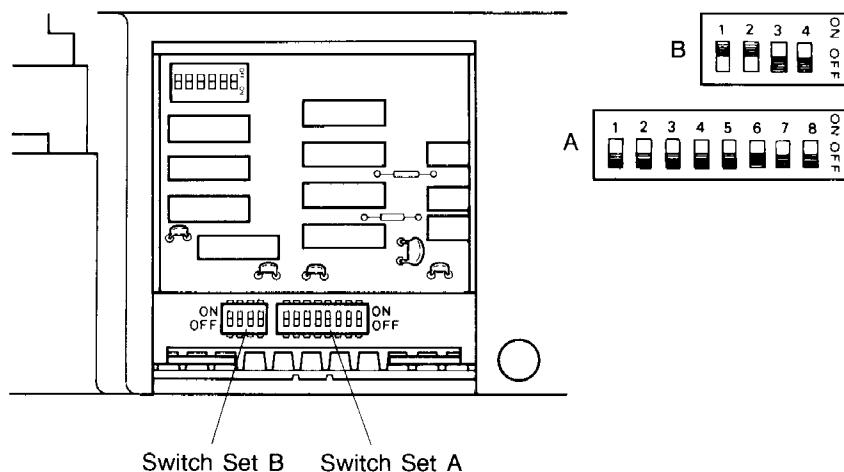
Note: Before changing any switch settings, verify that the printer is turned off.

The following tables list the functions of the switch sets A and B.

Switch Set A

Switch Number	Description	OFF Position	ON Position	Preset Condition
1	Default horizontal pitch.	Normal Pica	Condensed Pica	OFF
2	Zero typeface.	0	0	OFF
3	Default page length.	11 inches	12 inches	OFF
4	Input buffering.*	No Buffering	Buffering	OFF
5	Default boldness.	Normal	Emphasized	OFF
6	Default line spacing.	1/6 inch	1/8 inch	OFF
7	—	—	—	OFF
8	—	—	—	OFF

Switch Set B

Switch Number	Description	OFF Position	ON Position	Preset Condition
1	SLCT IN signal.†	—	—	ON
2	Buzzer.	Disabled	Enabled	ON
3	Skip-over-perforation.	Disabled	Enabled	OFF
4	Auto line feed with CR.	Disabled	Enabled	OFF

---

* The user-defined character set cannot be accessed if input buffering is selected (ON position).

† This switch must be in the ON position for the HP-IB interface to operate properly.

Accessories, Maintenance, and Service

Accessories

The following accessories are supplied with each printer:

- Power Cord.

- Owner's Manual.

- Ribbon Cartridge.

Additional accessories can be ordered as follows:

- HP 92154N Replacement Print Head.

- HP 92156A Ribbon Cartridges (Two-Pack).

Maintenance

The HP 82906A Printer doesn't require any regular maintenance other than cleaning. The printer should be cleaned with a soft brush to remove paper dust and particles approximately every three months. A mild detergent and water solution is recommended for cleaning the exterior printer case.

Parts Replacement

Other than the ribbon cartridge, the printer has only one owner-replaceable part: the print head.

Print head
Head cable
Print head unit

Terminal board

Head lock lever

Carriage assembly

Head connector
*Be sure to hold this connector firmly to pull the head cable out straight.
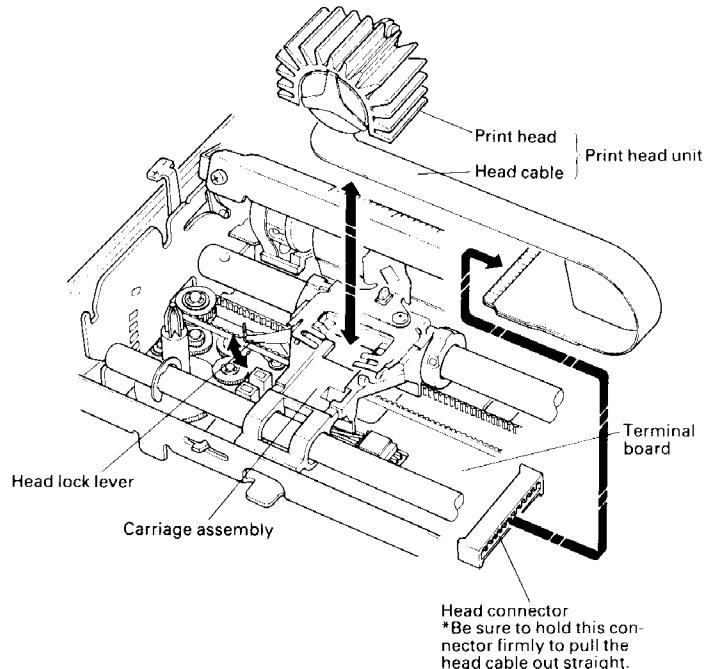
If, for some reason, the print head must be replaced, use the following procedure:

1. Turn off the printer.

2. Remove the ribbon cartridge.

CAUTION

The electronic components of the printer mechamism can be damaged by discharges of static electricity. Discharge any static electricity from your hands by touching a grounded object immediately before touching any of the components mentioned in this procedure.

In addition, the carriage assembly should not be moved while the print head is removed from the carriage.

---

3. Turn the head lock lever clockwise and lift the print head out of the carriage assembly.

4. Carefully remove the cable connecting the print head to the terminal board.

5. Install a new print head on the carriage assembly and return the head lock lever to its original position.

6. Carefully insert the new cable into the terminal board connector.

7. Reinstall the ribbon cartridge.

Service

If at any time you suspect that your printer is malfunctioning (other than the print head), run the self-test (see section 3). The self-test exercises most of the printer's mechanical functions and electronics. If the printer fails the self-test, the printer requires service. However, if the self-test passes, refer to the service information for your computer system. In the case of a printer that is being used with an HP 82937A HP-IB Interface Module, refer to the appropriate owner's manual and programming guide for computer service and to the *HP-IB Interface Owner's Manual* for interface service information.

Warranty Information

The complete warranty statement is included in the information packet shipped with your printer. Additional copies may be obtained from any authorized Hewlett-Packard dealer, or the sales and service office where you purchased your printer.

If you have questions concerning the warranty, please contact:

In the United States: One of the Field Repair Centers listed on the Warranty and Service Information Sheet packaged with the printer.

In Europe:

> Hewlett-Packard S.A.
> 7, rue du Bois-du-Lan
> P.O. Box
> CH-217 Meyrin 2
> Geneva
> Switzerland
> Tel. (022) 82 70 00

In Other Countries:

Hewlett-Packard Intercontinental
3495 Deer Creek Rd.
Palo Alto, California 94304
U.S.A.
Tel. (415) 857-1501

How to Obtain Repair Service

Not all Hewlett-Packard facilities offer service for the HP 82906A Printer. For information on service in your area, contact an authorized HP dealer or the nearest Hewlett-Packard sales and service office.

If your printer malfunctions and repair is required, you can help assure efficient servicing by having the following items with your printer at the time of service:

- A description of the configuration of the system you were using at the time of failure.

- A brief description of the malfunction symptoms for the service personnel.

- Printouts or other material that illustrate the problem area(s).

- A copy of the sales slip or other proof of purchase to establish the warranty coverage period.

Serial Number

Each printer carries an individual serial number. It is a good idea to keep a separate record of this number. Should your printer be stolen or lost, the serial number is required for insurance claims and is often helpful for tracing and recovery. Hewlett-Packard does not maintain records of individual owner's names and printer serial numbers.

General Shipping Instructions

Should you ever need to ship the printer, be sure that all components are packed in a protective package (use the original shipping case), to avoid in-transit damage. We suggest that you always insure shipments.

If you happen to be outside of the country where you bought your printer, contact the nearest authorized dealer or local Hewlett-Packard office for shipping instructions. All customs and duty charges are your responsibility.

Potential for Radio/Television Interference
(For U.S.A. Only)

The HP 82906A Printer generates and uses radio frequency energy and may cause interference to radio and television reception. Your printer complies with the specifications in Subpart J of Part 15 of the Federal Communications Commission rules for a Class B computing device. These specifications provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If the printer does cause interference to radio or television reception, which can be determined by turning the printer off and on, you can try to eliminate the interference problem by doing one or more of the following:

- Reorient the receiving antenna.

- Change the position of the printer with respect to the receiver.

- Move the printer away from the receiver.

- Plug the printer into a different outlet so that the printer and the receiver are on different branch circuits.

If necessary, consult an authorized HP dealer or an experienced radio/television technician for additional suggestions. You may find the following booklet, prepared by the Federal Communications Commission, helpful: *How to Identify and Resolve Radio-TV Interference Problems*. This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

Using the Optional Tractor Unit

The optional HP 92171N Tractor Unit extends the range of fanfold paper widths that can be used with the HP 82906A Printer. With the tractor unit installed, fanfold paper from 4 through 9½ inches in width can be used. (Without the tractor unit the printer accommodates fanfold paper from 9½ through 10 inches in width.)

One sample application is printing on gummed labels. These labels typically come on a roll one label wide and have perforations every 12 inches. Because the paper width is 4¾ inches, the tractor unit is required to provide the correct feeding pin width.

To obtain an HP 92171N Tractor Unit for your HP 82906A Printer, contact a Hewlett-Packard dealer or the nearest sales and service office.

Installation

Follow these instructions to install the tractor unit on your printer. If the tractor unit is already installed, refer to steps 13 through 20 for paper loading instructions.

1. Switch off the printer.

2. Remove all paper in the printer by detaching it from the paper supply and turning the paper feed knob clockwise.

3. Snap off the printer shroud by grasping it in the middle and pulling upwards.

4. Remove the paper separator.

5. Lift up the hinged printer cover so it is in the upright position.

6. Move the scale away from the platen.

7. Push the release lever backward to the locked position.
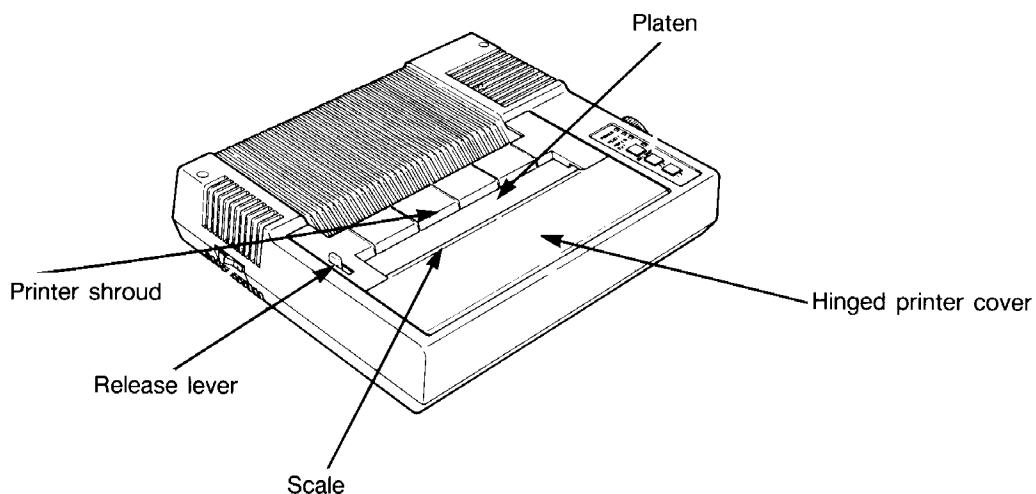
8. Slide the printer's feeding pins outward to the sides and lock the feeding pin lock levers.

9. Hold the tractor unit above the printing mechanism with the paper holding covers facing forward.

10. Lower the notches on the tractor mechanism as shown in the following illustration. The notches should hook into place on the outer sides of the printer's two feeding pin lock levers.
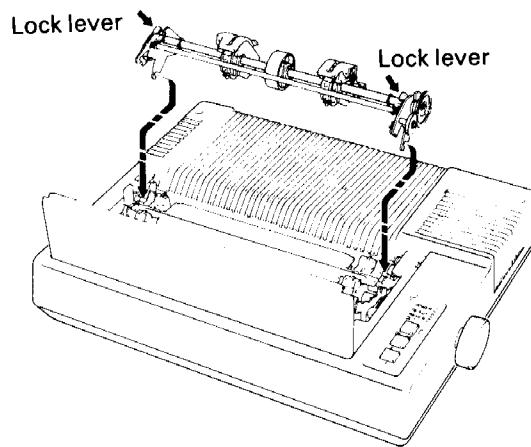
11. Depress both lock levers on the tractor unit and rotate the unit towards the front of the printer so the notches and projections on either side of the printer can hold the tractor unit in place.

12. Release the lock levers and verify that the tractor unit is securely installed.

13. Push the print head to one end of the printer.

14. Widen the feeding pins on the tractor unit to the maximum position, open the paper holding covers, and set the paper guide roller to the middle of the shaft.
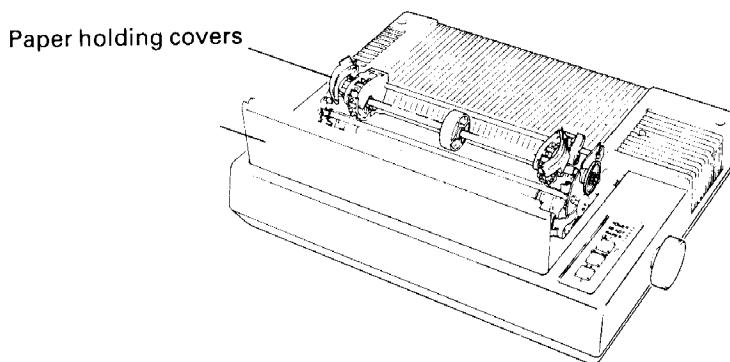
15. Insert the paper into the slot at rear of the printer mechanism as shown in the next illustration. **Avoid inserting the paper into the feeding guides used with the printer's feeding pins.**
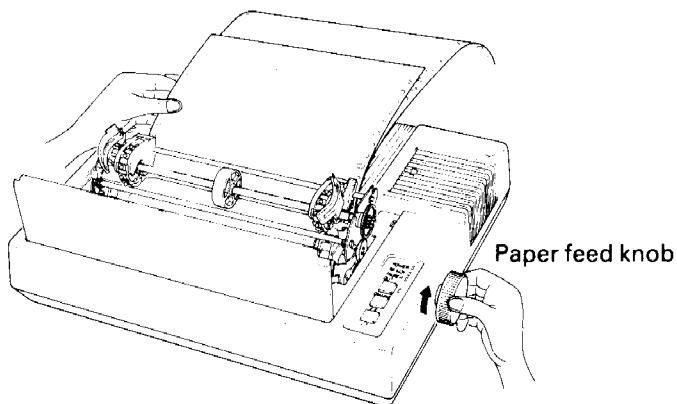
Paper feed knob

16. Advance the paper by turning the paper feed knob clockwise.

    Note: You can slide the print head back and forth to ease the paper past the ribbon mask.

17. Push the scale back into position when the leading edge of the paper passes the scale.

18. Engage the feed holes of the paper on the feeding pins of the tractor unit and close the paper holding covers.

19. Adjust the tension of the paper and lock the feeding pin lock levers.

20. Pull the release lever forward to the unlocked position.

21. Attach the paper separator to the tractor unit in the upside-down position.

22. Close the hinged printer cover.

23. Snap the tractor shroud into place as shown below.
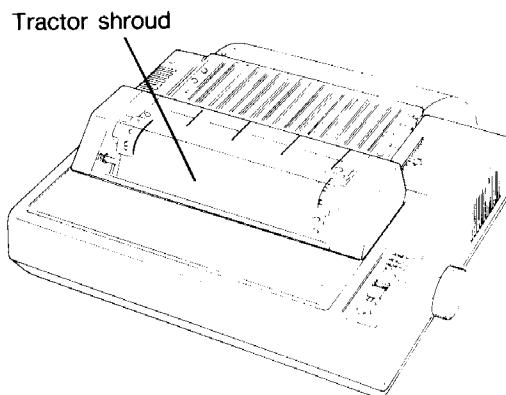
Tractor shroud

24. Store the printer shroud for later use.

    Note: Do not use vertical cursor positioning commands to move the paper backwards when the tractor unit is installed.

Tractor Unit Removal

Follow these instructions to remove the tractor unit from the printer.

1. Switch off the printer.

2. Remove all paper from the printer.

3. Remove the paper separator from the tractor unit.

4. Depress both lock levers on the tractor unit and lift the unit out of the printer. The unit must be rotated backwards so the notches on the rear of the tractor can be detached from the printer.

5. Put the tractor unit and tractor shroud in a safe storage location.

6. Install the paper separator.

7. Snap on the printer shroud.
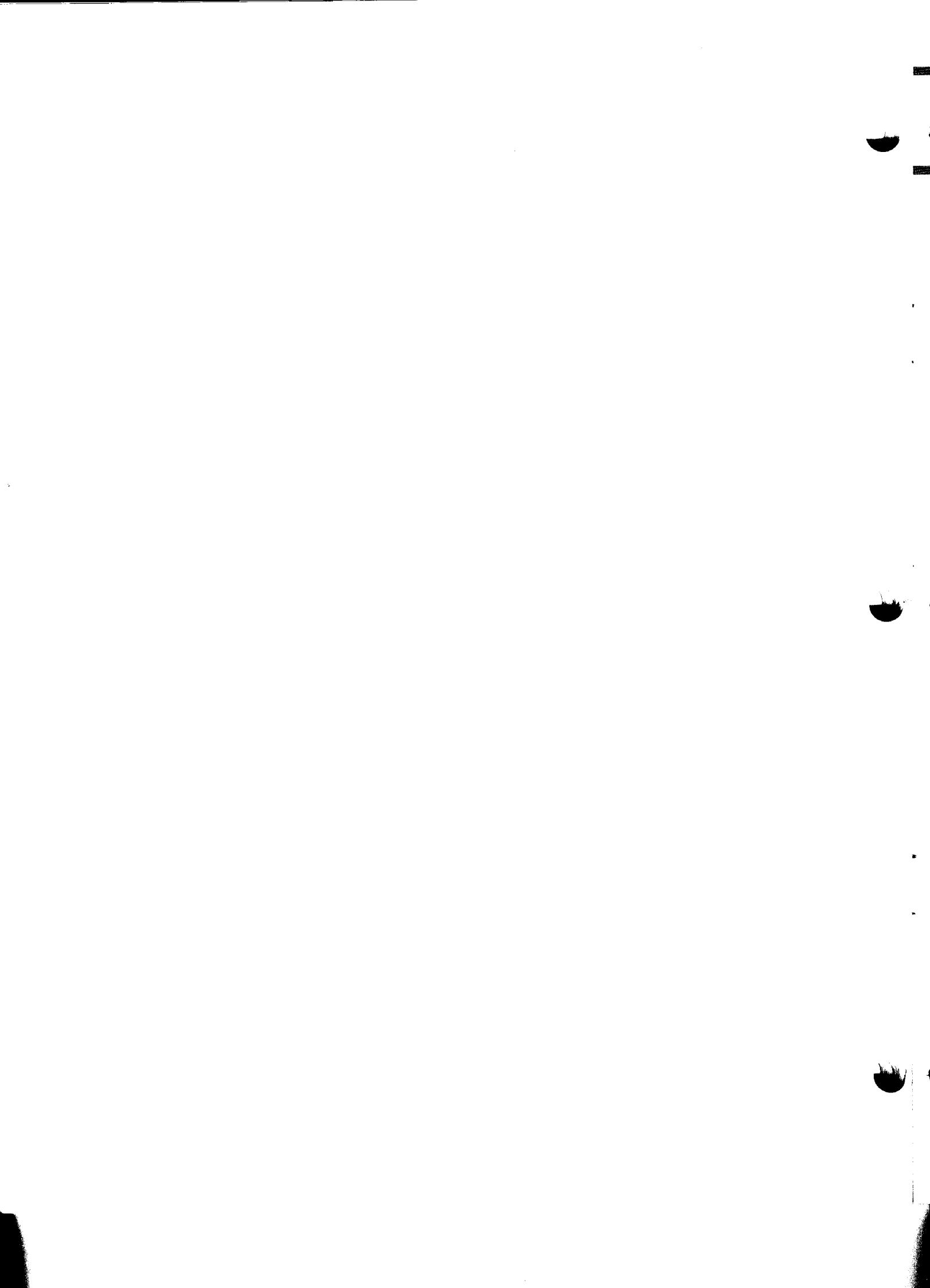
Character Formats

The following table shows samples of different character formats available on the HP 82906A Printer. The escape sequences to specify each character format for font one are also provided. To print the samples shown below, verify that the ROMAN 8 character set is selected on your printer. The escape sequence CHR$(27)&"(1⊕" can be used to select the ROMAN 8 set for font one. For print font two, replace the ⟨⊆ in the escape sequences below with ⟩⊆. The hierarchy of print font attributes is: character set, horizontal pitch, print height, proportional spacing, and print boldness. Refer to section 4, **User-Selectable Features**, for additional information.

Escape Sequence	Sample
CHR$(27)&"(s10huB"	Normal Pica
CHR$(27)&"(s12huB"	Normal Elite
CHR$(27)&"(s17huB"	Condensed Pica
CHR$(27)&"(s10hu4B"	Emphasized Normal Pica
CHR$(27)&"(s10hu2B"	Double-Strike Normal Pica
CHR$(27)&"(s12hu2B"	Double-Strike Normal Elite
CHR$(27)&"(s17hu2B"	Double-Strike Condensed Pica
CHR$(27)&"(s10hu6B"	Emphasized Double-Strike Normal Pica
CHR$(27)&"(s5huB"	Enlarged Pica
CHR$(27)&"(s6huB"	Enlarged Elite
CHR$(27)&"(s8huB"	Enlarged Condensed Pica
CHR$(27)&"(s5hu4B"	Emphasized Enlarged Pica
CHR$(27)&"(s5hu2B"	Double-Strike Enlarged Pica
CHR$(27)&"(s6hu2B"	Double-Strike Enlarged Elite
CHR$(27)&"(s8hu2B"	Double-Strike Enlarged Condensed Pica
CHR$(27)&"(s5hu6B"	Emphasized Double-Strike Enlarged Pica
CHR$(27)&"(s10h1uB"	Superscript Normal Pica

Escape Sequence	Sample
CHR$(27)&"(s121uB"	Superscript Normal Elite
CHR$(27)&"(s17h1uB"	Superscript Condensed Pica
CHR$(27)&"(s10h1u4B"	Superscript Emphasized Normal Pica
CHR$(27)&"(s5h1uB"	
CHR$(27)&"(s6h1uB"	Superscript Enlarged Elite
CHR$(27)&"(s8h1uB"	Superscript Enlarged Condensed Pica
CHR$(27)&"()s5h1u4B"	Superscript Emphasized Enlarged Pica
CHR$(27)&"(s10hu1P"	Proportional Normal Pica
CHR$(27)&"(s5hu1P"	Proportional Enlarged Pica
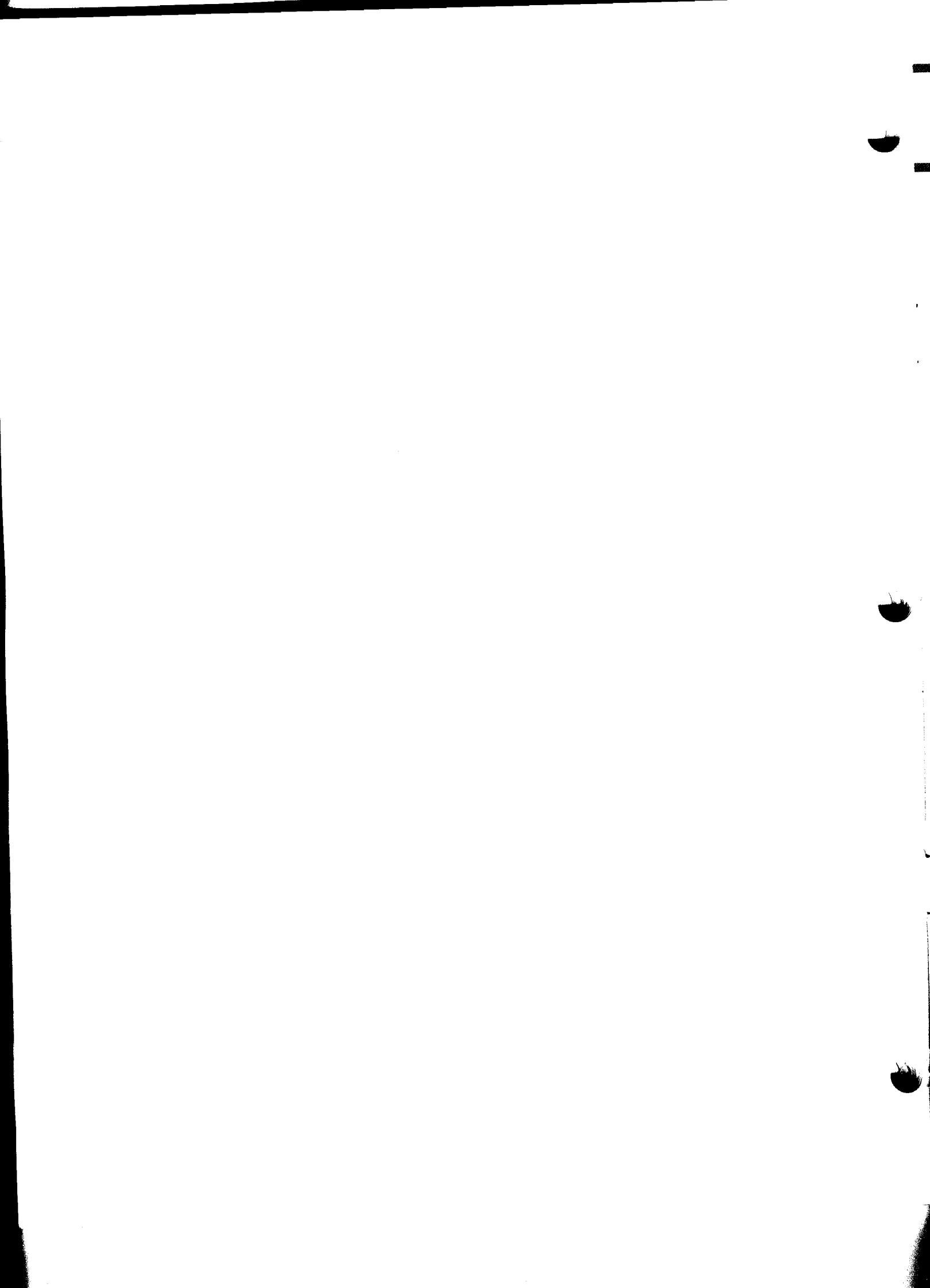
Character Sets

The following table lists the character sets for the HP 82906A Printer. These include the ROMAN 8 and RO-MAN extension character sets. Since the user-defined set depends on your specifications, you will need to record it separately.

The ROMAN 8 character set permits easy access to standard characters (decimal codes 0 through 127) and provides additional international characters (decimal codes 128 through 255). The ROMAN extension set provides access to the same international characters, but with decimal codes 0 through 127 instead of 128 through 255. The lower group of decimal codes permits you to use standard keyboard characters to access the international characters. All character sets access the same standard control characters.

Using the CHR$ function with the decimal code of a desired character is an alternative method for accessing any character. This method must be used for entering the decimal codes 128 through 255. For instance, CHR$(191) accesses the cent sign (¢) of the ROMAN 8 character set.

Normal Mode	Debugging Mode	Numeric Codes	
		Binary	Decimal
NUL		0000 0000	0
SOH		0000 0001	1
STX		0000 0010	2
ETX		0000 0011	3
EOT		0000 0100	4
ENQ		0000 0101	5
ACK		0000 0110	6
BEL*		0000 0111	7
BS*		0000 1000	8
HT		0000 1001	9
LF*		0000 1010	10
VT		0000 1011	11
FF*		0000 1100	12
CR*		0000 1101	13
SO*		0000 1110	13
SI*		0000 1111	14
DLE		0001 0000	16
DC1		0001 0001	17
DC2		0001 0010	18
DC3		0001 0011	19
DC4		0001 0100	20
NAK		0001 0101	21
SYN		0001 0110	22
ETB		0001 0111	23
CAN		0001 1000	24
EM		0001 1001	25
SUB		0001 1010	26
ESC*		0001 1011	27
FS		0001 1100	28
GS		0001 1101	29
RS		0001 1110	30
US		0001 1111	31

All Modes		Numeric Codes	
ROMAN 8	ROMAN Extension	Binary	Decimal
SPACE	SPACE	0010 0000	32
!	À	0010 0001	33
"	Â	0010 0010	34
#	È	0010 0011	35
‡	Ê	0010 0100	36
%	Ë	0010 0101	37
&	Î	0010 0110	38
'	Ï	0010 0111	39
(	´	0010 1000	40
)	`	0010 1001	41
*	^	0010 1010	42
+	¨	0010 1011	43
,	~	0010 1100	44
-	Ù	0010 1101	45
.	Û	0010 1110	46
/	£	0010 1111	47
0	—	0011 0000	48
1		0011 0001	49
2		0011 0010	50
3	·	0011 0011	51
4	Ç	0011 0100	52
5	ç	0011 0101	53
6	Ñ	0011 0110	54
7	ñ	0011 0111	55
8	¡	0011 1000	56
9	¿	0011 1001	57
:	¤	0011 1010	58
;	£	0011 1011	59
<	¥	0011 1100	60
=	§	0011 1101	61
>	ƒ	0011 1110	62
?	¢	0011 1111	63

---

* Executed in normal mode.

All Modes		Numeric Codes	
ROMAN 8	ROMAN Extension	Binary	Decimal
@	à	0100 0000	64
A	é	0100 0001	65
B	ô	0100 0010	66
C	û	0100 0011	67
D	á	0100 0100	68
E	é	0100 0101	69
F	ó	0100 0110	70
G	ú	0100 0111	71
H	à	0100 1000	72
I	è	0100 1001	73
J	ò	0100 1010	74
K	ù	0100 1011	75
L	ä	0100 1100	76
M	ë	0100 1101	77
N	ö	0100 1110	78
O	ü	0100 1111	79
P	Å	0101 0000	80
Q	î	0101 0001	81
R	Ø	0101 0010	82
S	Æ	0101 0011	83
T	å	0101 0100	84
U	í	0101 0101	85
V	ø	0101 0110	86
W	æ	0101 0111	87
X	Ä	0101 1000	88
Y	ì	0101 1001	89
Z	Ö	0101 1010	90
[	Ü	0101 1011	91
\	É	0101 1100	92
]	ï	0101 1101	93
^	ß	0101 1110	94
_	Ô	0101 1111	95

All Modes		Numeric Codes	
ROMAN 8	ROMAN Extension	Binary	Decimal
`	Á	0110 0000	96
a	Ã	0110 0001	97
b	ã	0110 0010	98
c	Ð	0110 0011	99
d	đ	0110 0100	100
e	í	0110 0101	101
f	ì	0110 0110	102
g	ó	0110 0111	103
h	ò	0110 1000	104
i	õ	0110 1001	105
j	õ	0110 1010	106
k	š	0110 1011	107
l	š	0110 1100	108
m	Ú	0110 1101	109
n	Ÿ	0110 1110	110
o	ÿ	0110 1111	111
p	Þ	0111 0000	112
q	þ	0111 0001	113
r		0111 0010	114
s		0111 0011	115
t		0111 0100	116
u		0111 0101	117
v	—	0111 0110	118
w	¼	0111 0111	119
x	½	0111 1000	120
y	ã	0111 1001	121
z	º	0111 1010	122
{	«	0111 1011	123
		▮	0111 1100	124
}	»	0111 1101	125
~	±	0111 1110	126
█	▓	0111 1111	127

* Printed only in debugging modes.

Normal Mode	Debugging Mode	Numeric Codes	
		Binary	Decimal
NO ACTION	SPACE	1000 0000	128
NO ACTION	SPACE	1000 0001	129
NO ACTION	SPACE	1000 0010	130
NO ACTION	SPACE	1000 0011	131
NO ACTION	SPACE	1000 0100	132
NO ACTION	SPACE	1000 0101	133
NO ACTION	SPACE	1000 0110	134
NO ACTION	SPACE	1000 0111	135
NO ACTION	SPACE	1000 1000	136
NO ACTION	SPACE	1001 1000	137
NO ACTION	SPACE	1010 1001	138
NO ACTION	SPACE	1000 1011	139
NO ACTION	SPACE	1000 1100	140
NO ACTION	SPACE	1000 1101	141
NO ACTION	SPACE	1000 1110	142
NO ACTION	SPACE	1000 1111	143
NO ACTION	SPACE	1001 0000	144
NO ACTION	SPACE	1001 0001	145
NO ACTION	SPACE	1001 0010	146
NO ACTION	SPACE	1001 0011	147
NO ACTION	SPACE	1001 0100	148
NO ACTION	SPACE	1001 0101	149
NO ACTION	SPACE	1001 0110	150
NO ACTION	SPACE	1001 0111	151
NO ACTION	SPACE	1001 1000	152
NO ACTION	SPACE	1001 1001	153
NO ACTION	SPACE	1001 1010	154
NO ACTION	SPACE	1001 1011	155
NO ACTION	SPACE	1001 1100	156
NO ACTION	SPACE	1001 1101	157
NO ACTION	SPACE	1001 1110	158
NO ACTION	SPACE	1001 1111	159

All Modes		Numeric Codes	
ROMAN 8	ROMAN Extension	Binary	Decimal
SPACE	SPACE	1010 0000	160
À	SPACE	1010 0001	161
Â	SPACE	1010 0010	162
È	SPACE	1010 0011	163
Ê	SPACE	1010 0100	164
Ë	SPACE	1010 0101	165
Î	SPACE	1010 0110	166
Ï	SPACE	1010 0111	167
´	SPACE	1010 1000	168
`	SPACE	1010 1001	169
^	SPACE	1010 1010	170
¨	SPACE	1010 1011	171
~	SPACE	1010 1100	172
Ù	SPACE	1010 1101	173
Û	SPACE	1010 1110	174
£	SPACE	1010 1111	175
—	SPACE	1011 0000	176
SPACE	SPACE	1011 0001	177
SPACE	SPACE	1011 0010	178
°	SPACE	1011 0011	179
Ç	SPACE	1011 0100	180
ç	SPACE	1011 0101	181
Ñ	SPACE	1011 0110	182
ñ	SPACE	1011 0111	183
¡	SPACE	1011 1000	184
¿	SPACE	1011 1001	185
¤	SPACE	1011 1010	186
£	SPACE	1011 1011	187
¥	SPACE	1011 1100	188
§	SPACE	1011 1101	189
ƒ	SPACE	1011 1110	190
¢	SPACE	1011 1111	191

All Modes		Numeric Codes	
ROMAN 8	ROMAN Extension	Binary	Decimal
à	SPACE	1100 0000	192
ê	SPACE	1100 0001	193
ô	SPACE	1100 0010	194
û	SPACE	1100 0011	195
á	SPACE	1100 0100	196
é	SPACE	1100 0101	197
ó	SPACE	1100 0110	198
ú	SPACE	1100 0111	199
à	SPACE	1100 1000	200
è	SPACE	1100 1001	201
ò	SPACE	1100 1010	202
ù	SPACE	1100 1011	203
ä	SPACE	1100 1100	204
ë	SPACE	1100 1101	205
ö	SPACE	1100 1110	206
ü	SPACE	1100 1111	207
Å	SPACE	1101 0000	208
î	SPACE	1101 0001	209
Ø	SPACE	1101 0010	210
Æ	SPACE	1101 0011	211
å	SPACE	1101 0100	212
í	SPACE	1101 0101	213
ø	SPACE	1101 0110	214
æ	SPACE	1101 0111	215
Ä	SPACE	1101 1000	216
ì	SPACE	1101 1001	217
Ö	SPACE	1101 1010	218
Ü	SPACE	1101 1011	219
É	SPACE	1101 1100	220
ï	SPACE	1101 1101	221
ß	SPACE	1101 1110	222
Ô	SPACE	1101 1111	223

All Modes		Numeric Codes	
ROMAN 8	ROMAN Extension	Binary	Decimal
Á	SPACE	1110 0000	224
Ã	SPACE	1110 0001	225
ã	SPACE	1110 0010	226
Ð	SPACE	1110 0011	227
đ	SPACE	1110 0100	228
í	SPACE	1110 0101	229
ì	SPACE	1110 0110	230
Ó	SPACE	1110 0111	231
Ò	SPACE	1110 1000	232
Õ	SPACE	1110 1001	233
õ	SPACE	1110 1010	234
Š	SPACE	1110 1011	235
š	SPACE	1110 1100	236
Ú	SPACE	1110 1101	237
Ÿ	SPACE	1110 1110	238
ÿ	SPACE	1110 1111	239
Þ	SPACE	1111 0000	240
þ	SPACE	1111 0001	241
SPACE	SPACE	1111 0010	242
SPACE	SPACE	1111 0011	243
SPACE	SPACE	1111 0100	244
SPACE	SPACE	1111 0101	245
—	SPACE	1111 0110	246
¼	SPACE	1111 0111	247
½	SPACE	1111 1000	248
ª	SPACE	1111 1001	249
º	SPACE	1111 1010	250
«	SPACE	1111 1011	251
▦	SPACE	1111 1100	252
»	SPACE	1111 1101	253
±	SPACE	1111 1110	254
		1111 1111	255

Index

Repair Information Form

If you are shipping your product for repair, please fill out this form and enclose it with your shipment. Repair cannot begin until we have this information.

If you are telephoning for on-site service, please fill out the reverse side of this form before you call.

Who is returning the equipment?

Company/Institution _____ Date _____

Person to Contact _____ Phone _____

Alternate Contact _____ Phone _____

Return Shipping Address: Special Shipping Instructions:

_____   _____

_____   _____

_____   _____

How will the repair be paid for?

Check one of the boxes:

☐ Warranty

    Purchased/Received Date _____

    Enclose copy of proof of purchase or receiving document indicating original received date.

☐ Maintenance Contract

    Contract No. _____

☐ Order

    Except for contract and warranty repairs, a purchase order number and/or authorized signature must accompany your request for service. If standard repair prices do not apply, a minimum purchase order is required. Standard repair prices may be obtained by contacting the Repair Center.

    Purchase Order No. _____

Billing Address: Special Billing Instructions:

_____   _____

_____   _____

_____   _____

Authorized Signature _____ Phone _____

What is being sent?

Model No. _____ Serial No. _____

Please list the equipment shipped but not connected to the main unit (plug-in modules, cables, etc.). Be sure that you have followed the test procedures described in the product manuals—so that you are returning the failed unit from your system. Do not ship accessories which are not required to complete the repair (manuals, cleaning supplies, etc.).

1. _____   3. _____

2. _____   4. _____

What needs to be done?

1. Describe how the failure appears.

   _____

   _____

   _____

2. Perform the tests described in the product manuals. What error messages were displayed during the tests? Please attach any relevant plots or printouts.

   _____

   _____

   _____

3. If failure is intermittent, how long does it take between failures?

   _____

4. Is the unit connected to any of the following? (Give manufacturer and model number.)

   a. Disc Unit _____   e. Acoustic Coupler _____

   b. Plotter _____   f. ROMs _____

   c. Printer _____   g. Other _____

   d. Modem _____   _____

5. Additional comments:

   _____

   _____

   _____

   _____

Thank you.

HEWLETT PACKARD