



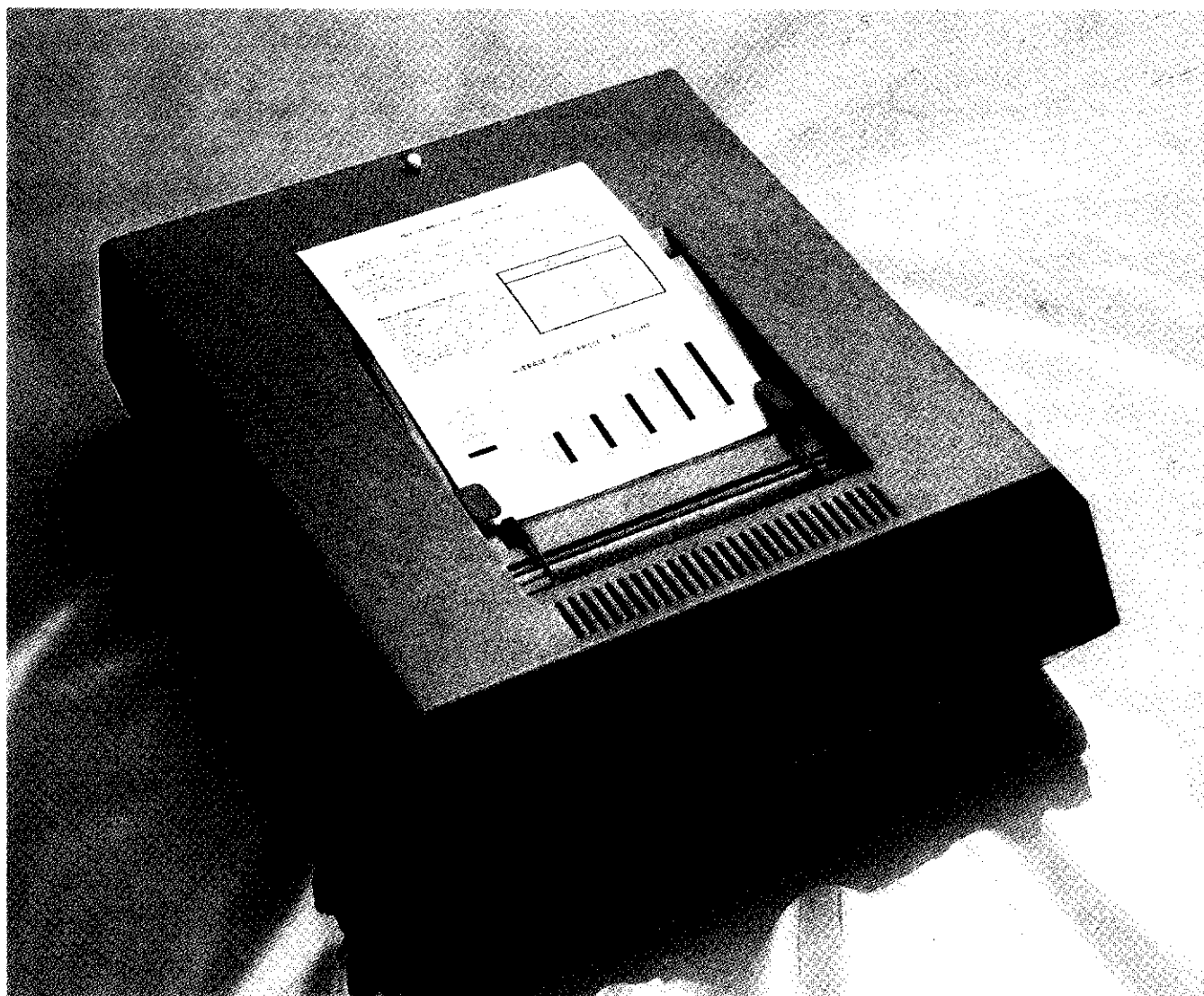
## 7310A Graphics Printer

TECHNICAL DATA, OCTOBER 1979

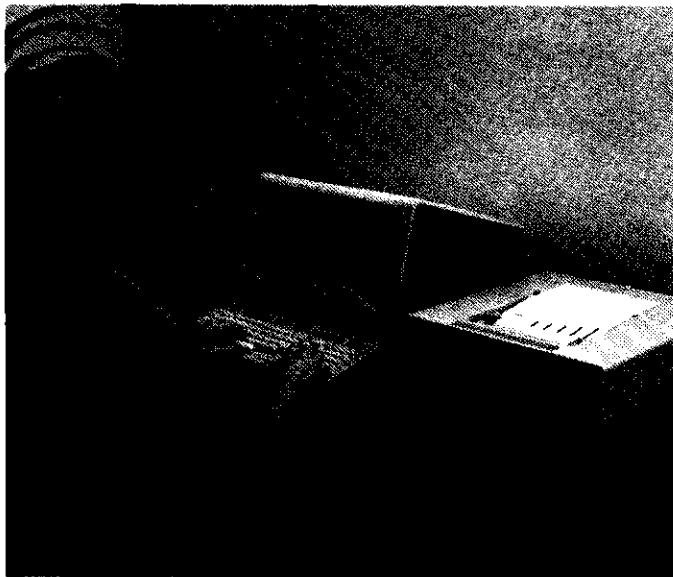


**The Comprehensive Solution to Hardcopy Output**

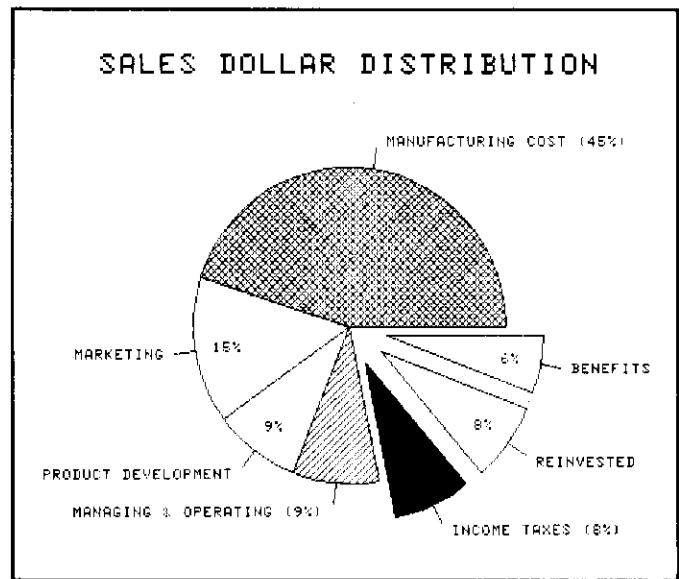
**Graphics...Forms...Text**



- **Simple, High-Speed Operation**
- **Proportional or Fixed Spaced USASCII Printing**
- **Flexible Page Formatting, Paper Cutting and Page Stacking**
- **Interchangeable Character Sets, Bold, Underline, and Reverse Printing**



The 7310A is a high-resolution graphics, forms and text printer. A choice of optional interfaces permits simple connection to HP terminals, desktop computers, and computer systems as well as to many non-HP terminals and systems.



The 7310A print mechanism prints up to 720 dots across the page, exactly the number required for full-image printing with Hewlett-Packard 2647A and 2648A graphics terminals.

### High-resolution Graphics

Graphs in reports present tabular information concisely, clearly, and quickly. Graphs can remove confusion, emphasize important trends, and make reports more interesting and easier to read. In graphics mode, the 7310A makes raster hard copies of images developed on a Hewlett-Packard graphics terminal or desktop computer. Dot-for-dot copies print at up to 31.25 mm (1.23 in.) per second with 40 dots per cm (100 dots per in.) resolution both horizontally and vertically. Twenty-five raster control commands are available to clip, window, center, and justify the image, and to control page formatting.

### Fast, Superior-quality Text Printing

In the text mode, USASCII characters can be printed in fixed spacing with up to 80 characters per line, or in proportional spacing for reading ease and professional presentation. Proportional spacing provides 15% to 20% more characters per line. Spacing is selected either by back panel switch or by a printer instruction entered from the terminal or controller. One complete line at a time is printed at a speed of 200 to 500 lines per minute for fixed-space printing without enhancements, and at a speed of 100 to 250 lines per minute for proportional-space printing. Speed is determined by the line length and character density, with shorter lines and less dense characters printing fastest. Last line visibility on the printer allows you to view the last character line that has been printed without removing or advancing the paper.

### Format Output The Way You Want It

With the many printer instructions available in the 7310A, you can tailor printing to your specifications. For instance, use proportional spacing text as shown here for special reports. Use margin settings to select left and right, top and bottom margins. Tab settings may be used to position columns and tables of data on the page. **Character enhancements** may be used in any combination to **highlight text copy**, or together with variable line spacing and character size to:

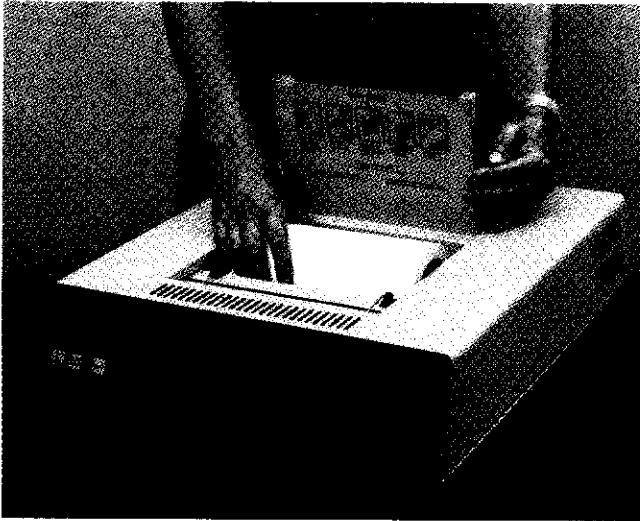
#### Print A Title Line In Tall Characters

1. Print a footnote in short characters.

Although graphic images require the full 80 column page width when printing, you may clip and window the original image, and then offset the printed image to position it anywhere on the page. If you prefer, the 7310A will automatically center the image for you.

Page formatting capabilities and three special enhancement features highlight printing. Bold face type, reverse print (light letters on dark background), and underlining emphasize large or small areas in text and forms. An inverse video CRT screen image is printed in reverse print on the 7310A; blinking and half-bright features are printed in bold.





Paper loading is as easy as 1, 2, 3. There's no complicated series of levers to pull, gates to open, or steps to remember. Simply insert the roll of paper, push two buttons, and the 7310A will automatically feed the paper and position it for the first output page. Even when the printer runs out of paper while printing data it prints to the end of the page, ejects the rest of the roll,



waits until new paper is loaded, then continues on a new page without losing data output. Pages can be removed from the paper stacker all at once or one page at a time, without interrupting the print process. The stacker can hold approximately 35 pages of output under normal office conditions; less in low humidity environments.

### Quality Printing in Blue or Black

Dark, high-contrast characters are easy to read on the printed output. Thermal paper for the 7310A is provided in high-contrast blue and in fade-resistant black printing. As with all Hewlett-Packard papers, this paper is manufactured to controlled specifications to provide high quality output with the least abrasion to the print heads in order to prolong print head life. Dot matrix characters are printed in a 7 x 9 matrix within a 9 x 15 dot character cell. These characters are printed with closely-spaced elements on 250-micron (0.01 in.) centers on the print heads, providing clear, high-quality results.

### Paper Cutter Cuts and Stacks Pages

An internal paper cutter is one of the unique features of the HP 7310A Graphics Printer. It allows pages to be long or short, minimizing paper waste and maximizing application flexibility. Roll paper is available in both English and metric widths. You can set either A4 (297 mm) or 11 inches as the default length for automatic page cutting; you can programmatically control page sizes to your specification; or you can turn off the automatic page cutting feature to manually control page length. Large, 65 mm diameter cores (2.6 in.) reduce the tendency for the roll paper to curl; page lies flat on your desk.



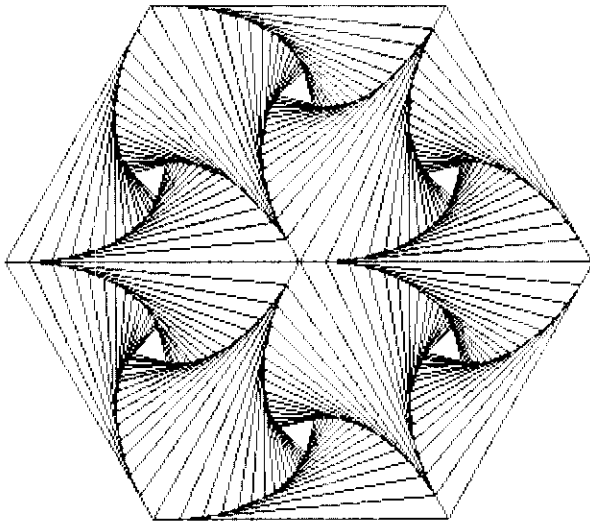
Suitable for office, lab, and other work areas, the fast operation of the 7310A, combined with compact design, make the printer an ideal choice for all working environments. Low-line styling is well-adapted to desk and table-top locations.

```

10 ASSIGN "L " TO #1
20 ON END #1 GOTO 180
30 DIM A$(20)[80]
40 A=0
50 INPUT "List or Search? ",A$(20)
60 IF UPC$(A$(20)[1;1])="S" THEN A=1      ! A=1 is search mode
70 IF A<>1 THEN 90
80 INPUT "Enter file name: ",A$(20)
90 FOR I=1 TO 18
100 A$(19)="FIND FILE "&VAL$(I)&" ON LEFT TAPE"
110 COMMAND A$(19)
120 READ #1;A$(I)
130 IF A<>1 THEN 160                      ! if listing, then report
140 IF A$(I)=A$(20) THEN 210             ! if file found, go report
150 GOTO 170                              ! file not found, next file
160 IF A=0 THEN PRINT "File "&VAL$(I)&": "&A$(I)
170 NEXT I

```

When a program listing is needed the 7310A will print all or part of the program file, as you choose. Save paper by printing short listings on short sheets; maintain the continuity of longer routines by making pages as long as you need. Program debugging is simple when you turn on the display enhancements switch to print the program with its control characters (not shown).



High-contrast, high-resolution printing make raster images sharp and clear on the 7310A.

#### MANUFACTURING SYSTEMS PROJECT SCHEDULE

PROJECT: ON-LINE INVENTORY SYSTEM								
Project Phase	WHO	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Data Entry	Jan	████████████████████						
Interface	Bill	████████████████████			██████████			
File Management	John	████████████████████				████████████████████		
MRF/BAS Report	Jan				████████████████████			
Order Summary	Allen				████████████████████			
Integration	Tom					██████████		
System Test	(all)					████████████████████		
Documentation	Bill				████████████████████			

The 7310A's optional Line Drawing character set provides a good match with the forms capabilities of the HP 2640-series alphanumeric terminals.

## Interface Choices Include HP-IB, RS-232-C/CCITT V.24, RS-423-A, and 8-bit Duplex

The HP-IB interface (ANSI/IEEE Standard 488-1978) is used with Hewlett-Packard 2647A and 2648A graphic terminals and with HP desktop computer systems. HP-IB allows simple plug-together connection of several devices on the same cable, with individual control of each device. The RS-232-C/CCITT V.24 and RS-423-A asynchronous serial interfaces connect the 7310A, as a remote printer peripheral, to a computer system such as an HP 1000 or HP 3000; data transmission speeds range from 110 to 19 200 baud. The 8-bit duplex interface connects to the HP 2640-series alphanumeric terminals and broadens applications to include non-HP computers and graphic display systems. The full capability of the 7310A is available with each interface.

### Configuration Guide

System	System Interface	7310A Interface	Comments
--------	------------------	-----------------	----------

#### HP TERMINALS

2640B/N/S 2641A 2645A/K/N/S Alphanumeric Terminal	8-bit duplex 13238A I/O, 13232J cable (included in Option 240)	Option 240 printer subsystem	Option 240 requires 1 option slot in terminal. Terminal requires Option 007 integrated dual tape cartridges or 13261A device support firmware.  Order 7310A language option to match terminal: <table style="margin-left: 40px;"> <tr> <td>2640S, 2645S</td> <td>Option 001</td> </tr> <tr> <td>2640N, 2645N</td> <td>Option 002</td> </tr> <tr> <td>2641A</td> <td>Option 009</td> </tr> <tr> <td>2645K</td> <td>Option 008</td> </tr> </table>	2640S, 2645S	Option 001	2640N, 2645N	Option 002	2641A	Option 009	2645K	Option 008
2640S, 2645S	Option 001										
2640N, 2645N	Option 002										
2641A	Option 009										
2645K	Option 008										
2647A Intelligent Graphics Terminal	13296A HP-IB	HP-IB	13296A comes with 1 metre cable. Order additional HP-IB cable accessory desired:  <table style="margin-left: 40px;"> <tr> <td>13061A</td> <td>1.0 metre</td> </tr> <tr> <td>13061B</td> <td>2.0 metre</td> </tr> <tr> <td>13061C</td> <td>4.0 metre</td> </tr> <tr> <td>13061D</td> <td>0.5 metre</td> </tr> </table>	13061A	1.0 metre	13061B	2.0 metre	13061C	4.0 metre	13061D	0.5 metre
13061A	1.0 metre										
13061B	2.0 metre										
13061C	4.0 metre										
13061D	0.5 metre										
2648A Graphics Terminal	13296A HP-IB	HP-IB	13296A comes with 1 metre cable. Order additional HP-IB cable accessory desired (see above). Terminal requires Option 007 integrated dual tape cartridges or 13261A device support firmware.								
2649I Intelligent Terminal <sup>1</sup>	13296A HP-IB	HP-IB	13296A comes with 1 metre cable. Order additional HP-IB cable accessory desired (see above).								

#### HP DESKTOP COMPUTERS

HP 9825A/S	98034A 98032A-071	HP-IB Option 052 8-bit duplex	Preferred interface. General I/O ROM 98212A or equivalent required.
HP 9835A/B	98034A-335 98032A-371	HP-IB Option 052 8-bit duplex	Preferred interface. Order 7310A Option 035; provides binary tape for graphics software support. 98337A plotter ROM must be installed in 9835A/B. 98331A general I/O ROM optional.  Raster graphics is supported over the HP-IB interface.
HP 9845B/T	98034A-445 98032A-471	HP-IB Option 052 8-bit duplex	9845B/T models include graphics display dump capability to external printer. 98432A I/O ROM optional. Graphics ROM 98437A required.  Raster graphics is supported over the HP-IB interface.

#### HP COMPUTER SYSTEMS

HP 1000 <sup>1</sup>	59310B 12966A-001  Via 2645A system console or 2640-series terminals	HP-IB  Option 050 RS-232-C/CCITT V.24  Option 240	HP-IB supported by DVR37. HP-IB is the preferred interface; graphics and text printing speed is not limited by the interface. Installation not included.  RS-232-C/CCITT V.24 supported by DVR05. Installation not included.  8-bit duplex interface requires 1 option slot in terminal. Terminal requires Option 007 integrated dual tape cartridges or 13261A device support firmware. Printer can be addressed directly via DVR05, but display cannot be used during printing. Installation not included.
HP 3000	With 2640-series terminals		See HP TERMINALS section above.
HP 300	Use with 2640-series terminals		See HP TERMINALS section above.

<sup>1</sup> 7310A is not supported on the GRAPHICS/1000 software; raster graphics can be printed from the 2648A graphics terminal.

## Product Ordering Information

### 7310A GRAPHICS PRINTER

HP-IB interface.  
 720-dot resolution graphics and text.  
 1 roll each of blue and black printing paper, in U.S. dimensions (8.5 in. x 246 ft).  
 1 user's manual.  
 Character sets:  
 Default primary—128-character USASCII, fixed and proportional spacing.  
 Default secondary—HP Roman Extensions (for European languages and HP 9825 keyboard special symbols).  
 Space for 3 additional character sets selected from options 008 through 011 below.  
 120-volt, 48-66 Hz line power.



List price—\$4750

### LINE VOLTAGE OPTIONS

Options delete the standard 120-volt line power and add the optional voltage.

	Price
<b>100 Volt, 48-66 Hz Line Voltage—OPTION 014</b>	N/C
<b>220 Volt, 48-66 Hz Line Voltage—OPTION 015</b>	N/C
<b>240 Volt, 48-66 Hz Line Voltage—OPTION 016</b>	N/C

### INTERFACE OPTIONS

Options delete the standard HP-IB interface and add the optional interface.

<b>RS-232-C/CCITT V.24—OPTION 050</b>	\$ 50
Asynchronous serial interface. Selectable baud rates (110 to 19 200) and parity. For hardwired installations only; no modem control.	
<b>RS-423-A—OPTION 051</b>	\$ 50
Asynchronous serial interface. Selectable baud rates (110 to 19 200) and parity. For hardwired installations only; no modem control.	
<b>8-BIT DUPLEX—OPTION 052</b>	N/C
General purpose interface. Provides compatibility with HP 2640-series terminals using the duplex register interface, and with HP desktop computers using the GP I/O (I98032A interface).	
<b>PRINTER SUBSYSTEM—OPTION 240</b>	\$155
For HP 2640-series alphanumeric terminals having dual tape cartridges or device control firmware installed, and using the terminal duplex register interface. Provides 7310A Option 052 interface. Adds 13232J printer cable and 13238A duplex register module interface for the terminal. Installation of 13232J and 13238A not included.	

### CHARACTER SET OPTIONS

**NOTE:** Only one of options 001 through 008 or 025 may be ordered to establish default primary and alternate character sets. HP Roman Extensions (European Language and HP 9825 symbols) remain accessible by program command.

SWEDISH/FINNISH primary, USASCII secondary— <b>OPTION 001</b>	N/C
NORWEGIAN/DANISH primary, USASCII secondary— <b>OPTION 002</b>	N/C
FRENCH primary, USASCII secondary— <b>OPTION 003</b>	N/C
GERMAN primary, USASCII secondary— <b>OPTION 004</b>	N/C
BRITISH primary, USASCII secondary— <b>OPTION 005</b>	N/C
SPANISH primary, USASCII secondary— <b>OPTION 006</b>	N/C
HP 9825 SYMBOLS primary, USASCII secondary— <b>OPTION 025</b>	N/C
JASCII primary, adds KATAKANA as secondary— <b>OPTION 008</b> . Option 009 may not be ordered when Option 008 is ordered.	\$150
Adds APL programming language characters— <b>OPTION 009</b> . Option 008 may not be ordered when Option 009 is ordered.	\$150
Adds HP 2640-series MATH SYMBOLS— <b>OPTION 010</b>	\$150
Adds HP 2640-series LINE DRAWING SYMBOLS— <b>OPTION 011</b> (forms characters)	\$150

### USAGE OPTIONS

<b>METRIC PAPER—OPTION 020</b>	N/C
Replaces English paper with metric, 1 roll each of blue and black printing paper for ISO A4 size (210 mm x 75 m).	
<b>9835A BINARY TAPE—OPTION 035</b>	N/C
For use with HP 9835A Desktop Computer. Provides for generation of graphics images via memory-based raster array and 98337A plotter ROM. ROM not provided.	

### SUPPLIES

	Part No.	Price
<b>PAPER</b> is supplied in boxes of six rolls.		
Blue metric for ISO A4 (210 mm x 75 m)	9270-0681	\$ 66
Black metric for ISO A4 (210 mm x 75 m)	9270-0680	\$ 78
Blue English (8.5 in. x 246 ft)	9270-0683	\$ 66
Black English (8.5 in. x 246 ft)	9270-0682	\$ 78
<b>HP-IB CABLES</b>		
1 metre (3.3 ft) cable	13061A	\$ 60
2 metre (6.6 ft) cable	13061B	\$ 65
4 metre (13.1 ft) cable	13061C	\$ 75
0.5 metre (1.6 ft) cable	13061D	\$ 60

# Specifications

## GENERAL

**Printing Technique:** Fixed element thermal, with 6 individually replaceable print head assemblies.

**Page Length:** 297 mm metric or 11.0 inch English, as selected by rear panel switch. Programmable length from 55 mm to 512 mm (2.1 to 20.2 in.).

**Paper Size:** Continuous roll, 210 mm x 75 m metric for ISO A4, or 8.5 in. x 246 ft English, unsprocketed and unperforated. Black- or blue-on-white printing.

**Size:** 162 x 451 x 534 mm (6.38 x 17.75 x 21.0 in., H x W x D).

**Weight:** 24.9 kg (55 lb) net. Shipping weight: 29.5 kg (65 lb).

**Environmental Range:** Temperature 0°C to 55°C; relative humidity 5% to 95% at 40°C maximum.

**Power Requirements:** Source 100, 120, 220, 240 V +5%, -10% as specified by option. Voltage is set internally by jumpers and can be reset by qualified service personnel. Frequency 48-66 Hz. Consumption 100V/4.9A, 120V/4.2A, 220V/ 2.4A, 240V/2.2A, 250W (855 Btu/hr) maximum.

## GRAPHICS MODE

**Print Speed:** 4.55 to 31.25 mm/s (0.176 to 1.23 in./s), depending on dot density.

**Resolution:** 40 dots/cm (100 dots/in.) horizontally and vertically.

## TEXT MODE

**Print Speed:** 200 to 500 lines per minute for fixed space characters without enhancements. Proportional space characters typically print 50% as fast or less. Speed depends on number of characters per line and character density.

**Character Size:** 7 x 9 dot matrix, 2.3 mm (0.09 in.) default height; height is programmable from 1.15 mm (0.05 in.) to 4.6 mm (0.18 in.).

**Character Cell:** 9 x 15 matrix.

**Line Length:** Fixed character spacing—80 characters. Proportional printing provides 15% to 20% more characters per line. Automatic wrap-around of lines exceeding column width.

**Text Formatting:** Line Spacing—6.6 lines per inch, programmable from 1.0 to 13.0 lines per inch. Column addressing and horizontal tabbing for up to 80 tab positions. Programmable top, bottom, left, and right margins. Character height from 50% to 200% of default character height; affects all characters in the line. Programmable page formatting and cutting.

**Character Sets:** 128-character USASCII with fixed and proportional spacing, HP Roman Extensions with European language and HP 9825 keyboard symbols.

**Optional Character Sets:** HP 2640-series terminal Math and HP 2640-series terminal Line Drawing (forms) sets, APL programming language, and Katakana character sets.

**Character Enhancements:** Reverse print (light on dark background), underline, and bold face in any combination; can be selected on a per character basis.

## INTERFACE

**Standard Interface:** HP-IB (ANSI/IEEE Standard 488-1978) bit parallel, byte serial interface.

### Optional Interface:

**Option 050— RS-232-C/CCITT V.24 asynchronous serial interface for hardwired connection to remote computer systems and terminal.**

Data Rate: 110 to 19 200 baud and external clock control  
Transmission: Full duplex protocol  
Parity: Odd, even, or none  
Data Handshake: ENQ/ACK, X-ON/X-OFF, and "Printer Busy" signal as selected by rear panel switch  
Connector: 25-pin female connector.

**Option 051— RS-423-A asynchronous serial interface for hardwired connection to remote computer systems and terminal.**

Data Rate: 110 to 19 200 baud and external clock control  
Transmission: Full duplex protocol  
Parity: Odd, even, or none  
Data Handshake: ENQ/ACK, X-ON/X-OFF, and "Printer Busy" signal as selected by rear panel switch  
Connector: 37-pin female connector.

**Option 052— General purpose 8-bit duplex interface. Data transfer accomplished in a bit parallel, byte serial mode controlled by asynchronous control line handshake.**

Data Rate: 35 kilo-bytes per second maximum  
Transmission: 8-bit duplex  
Parity: None  
Data Handshake: 2-wire or 4-wire flag and control  
Connectors: 37-pin male connector.

For more information, call your local HP sales office or East (301) 948-6370 • Midwest (312) 255-9800 • South (404) 955-1500 • West (213) 877-1282. Or write, Hewlett-Packard, 1501 Page Mill Rd., Palo Alto, California 94304. In Europe, Hewlett-Packard S.A., 7, rue du Bois-du-Lan, P.O. Box, CH-1217 Meyrin 2, Geneva, Switzerland. In Japan, Yokogawa-Hewlett-Packard Ltd., 29-21, Takaide-Higashi 3-chome, Suginami-ku, Tokyo 168.

5953-4048D

Domestic U.S.A. Prices

Printed in U.S.A.

Prices & Data Subject to Change