



**HEWLETT
PACKARD**

**GRAPHICS
PLOTTERS**

7220C/7220T

7221C/7221T

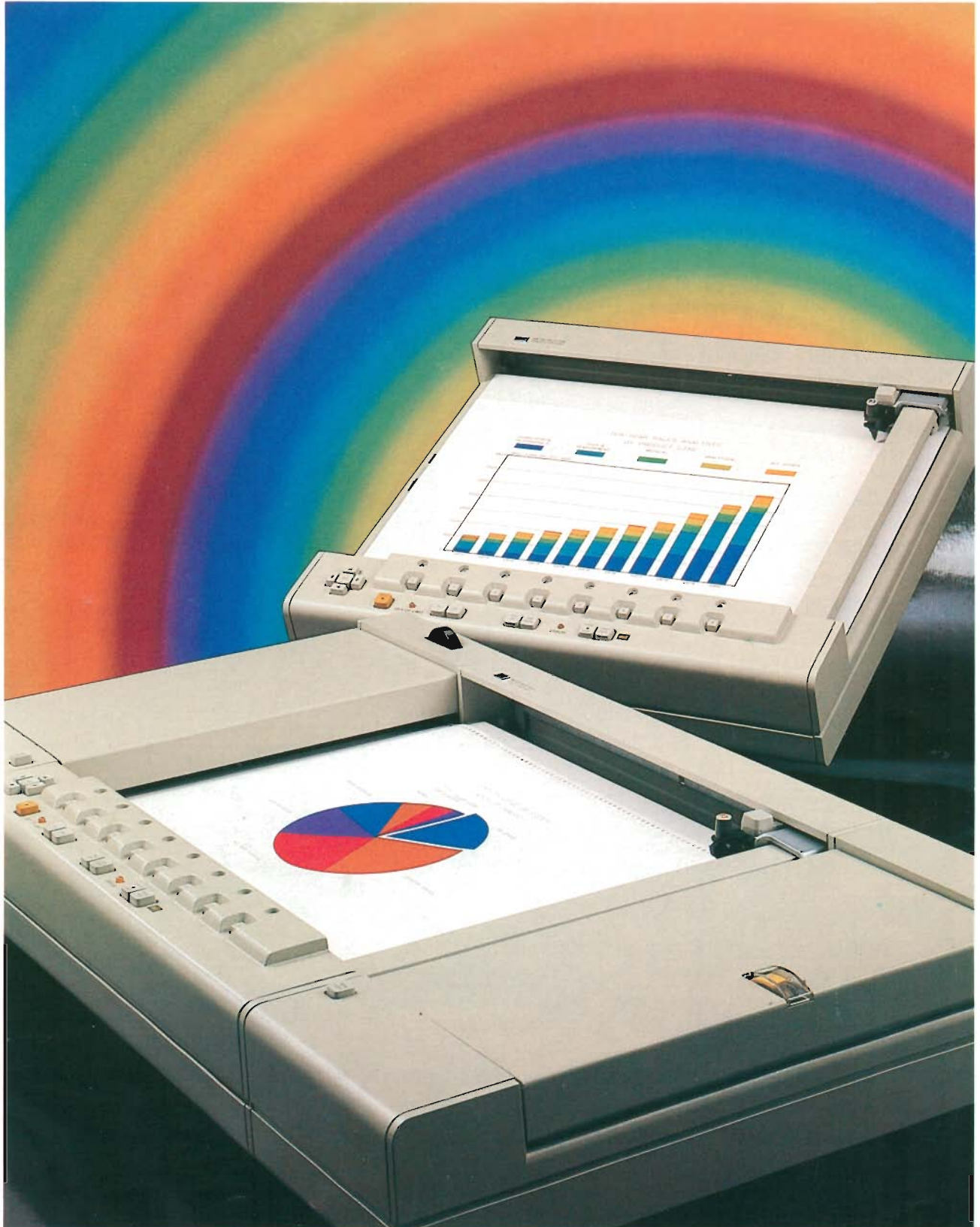
9872C/9872T

RS-232-C/V.24

RS-232-C/V.24



Technical Data, January 1981



HP Computer Museum
www.hpmuseum.net

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HP's colorful 8-pen graphics plotters

Effective graphs, practical applications

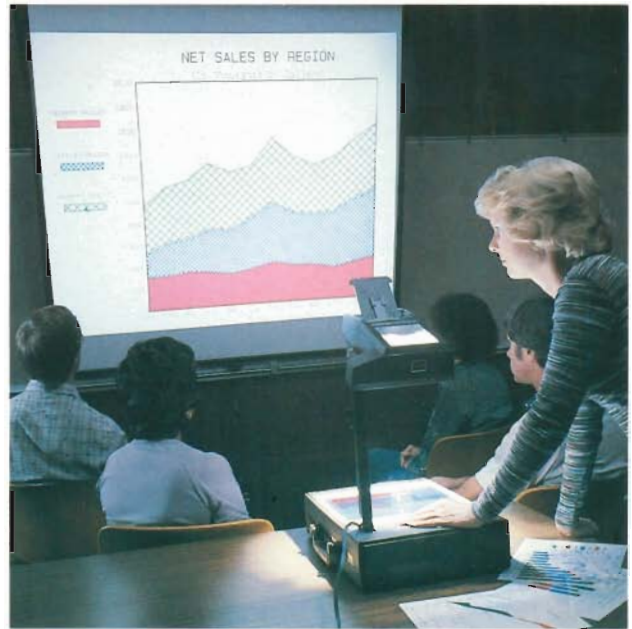
Hewlett-Packard's innovative microprocessor-controlled 8-pen plotters create professional hard copy graphics for business and industry. They are ideal for scores of plotting applications such as chemical analysis, measurement and test data recordings, manufacturing and engineering drawings, numerical control verification, business and financial planning, education, cartography, and computer-aided design. Many practical features have been combined in the 8-pen graphics plotters to provide distinctive, professional graphics from a variety of controllers and computer systems.

Multiple pens, automatic pen changing

Create the exact output you desire on paper or transparency film by choosing from 10 ink colors and 2 pen widths for plotting on paper and 7 colors and 2 widths for creating overhead transparencies. The plotter's automatic pen changing capability makes it possible to use as many as 8 different pens on a single plot without operator intervention. Airtight caps protect the pen tips while they are stored in stables at the front of the plotter until they are ready to be used. The plotter automatically stores one pen and selects the next at the push of a button or upon receipt of a program command.

Sensible pen protection and speed control

An air-cushioned pen mechanism gently lowers the pen to the writing surface, greatly increasing the life of the writing tip without sacrificing pen speed. Programmable pen velocity allows you to select speeds which suit a variety of plotting media.



Varied media, versatile format

The plotter's practical and convenient electrostatic hold-down secures any size paper up to A3 metric (297 × 420 mm) or 11 × 17 inch English (280 × 432 mm) sizes. Use plain or pre-printed paper suited to your application; prepare overhead transparencies for meetings, seminars, and training sessions. To give you application flexibility, the programmer can define graph limits and scale the plotting area for different media sizes; the operator can also define graph limits using front panel controls.

Superior line and character quality

Excellent plotter resolution and repeatability contribute to superior line quality in HP's 8-pen graphics plotters. The smallest addressable move is 0.025 mm (0.001 in.) so lines are straight in all directions and circles are round. Multiple character sets provide for worldwide application and include a newly designed character font for improved readability. The plotter can even change the size, slant, and direction of each character set.

Powerful local intelligence

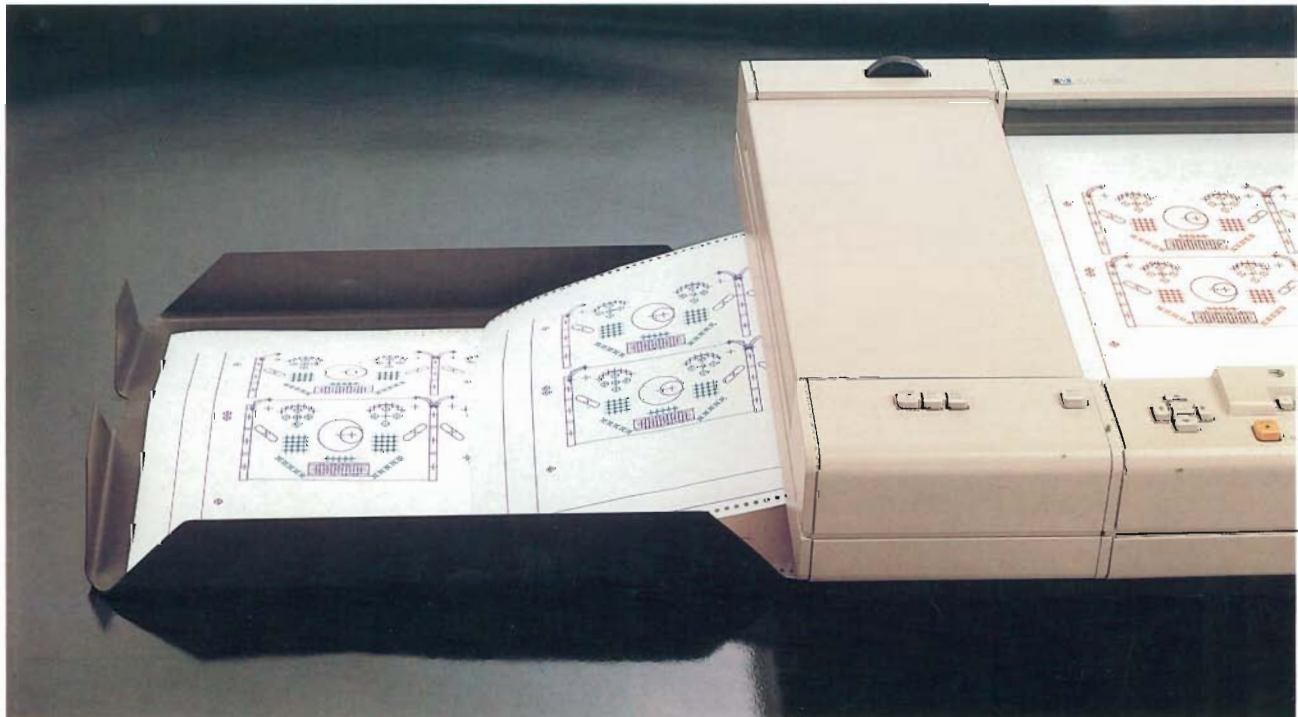
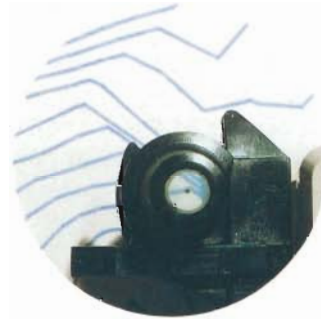
Each of these versatile plotters provides error-free off-scale data handling, internal character generation to enhance plot quality and plotter performance, and line pattern and symbol-mode plotting to provide easy trace identification. Using the digitizing sight, you can extract the desired coordinates of important points on maps or graphs to provide data for detailed computer analysis.

Automatic paper advance with cutting

The T model plotters will automatically advance and cut paper a half or a full page at a time, according to program command. Front panel buttons allow the operator to control page advancing and cutting as well. A switch setting governs whether plots will be cut into metric or English dimensions. This special automatic paper advance feature brings you the time and cost saving advantages of unattended plotting and peripheral sharing.

HP reliability and support

A built-in confidence test makes it easy to confirm proper plotter operation with only a push of a button. Whenever you need routine maintenance, repair, or information, contact your nearest HP sales or service representative. Hewlett-Packard has over 170 sales and service facilities worldwide. You expect and get quality, reliability and support when you own a graphics plotter designed and manufactured by Hewlett-Packard.



Popular interface configurations

The full spectrum of 8-pen plotter graphics is available in the two most popular interface configurations, EIA RS-232-C/CCITT V.24 and HP-IB (ANSI/IEEE 488-1978). The RS-232-C/V.24 models have an I/O buffer, choice of modem or hardwire operation, and switch-selectable parity and baud rate settings (75 to 2400 baud). The HP-IB interface allows simple plug-together connection of several devices, with individual control of each device.

Efficient programming languages

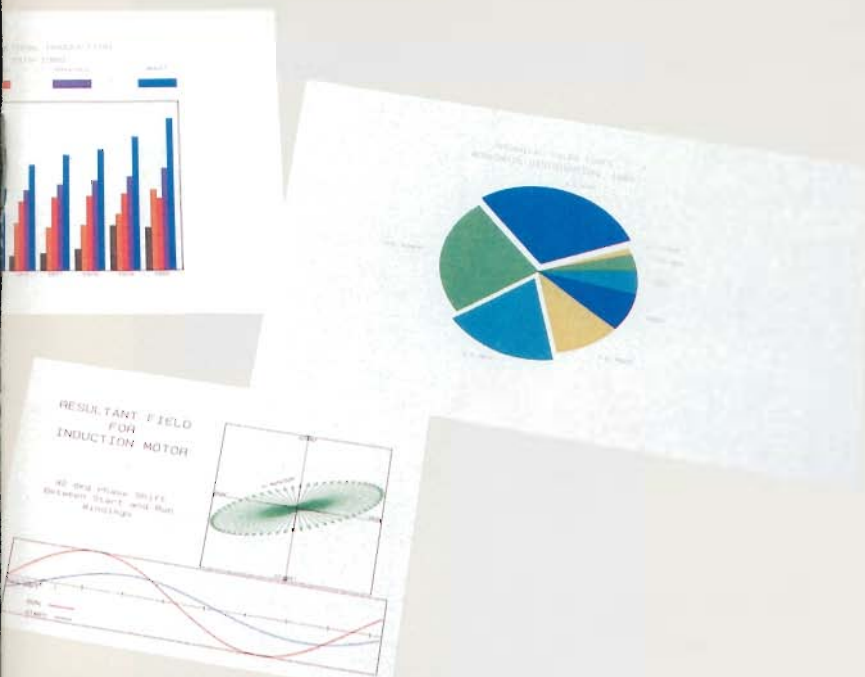
The plotters speak one of two programming languages to provide the most efficient communication method for your computer. The Compacted Binary language is especially advantageous in a data communications environment where transmission efficiency is critical, while the Hewlett-Packard Graphics Language (HP-GL) offers the programmer a set of easy-to-remember mnemonic instructions. The difference in languages is apparent in these commands which initialize the plotter, select pen 3, and move the pen to coordinates 1000,1000:

HP-GL (18 characters): IN;SP3;PA1000,1000

Compacted Binary (9 characters): ~_vCpg40(

Both languages provide graphics commands that cover the full range of plotting needs from basic vector plotting to enhanced graphic presentations. The HP-GL programmer can easily remember and use the mnemonic commands to create sophisticated graphics output. The Compacted Binary programmer can produce a wide variety of graphics, for transmission at low baud rates, using less time and fewer transmitted characters than if HP-GL were used.





High level software support

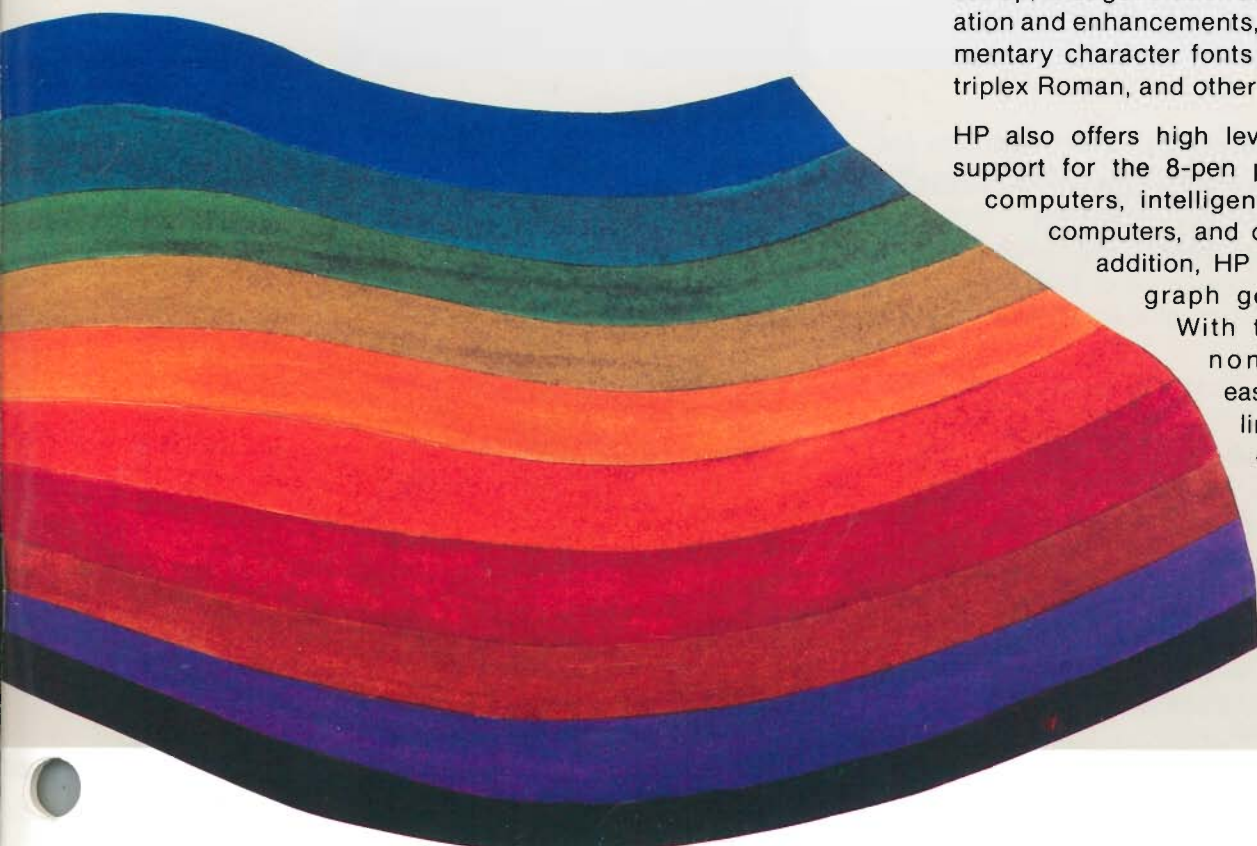
HP offers a wide range of graphics software support for the 8-pen plotters. More information on current software offerings, including ISPP and HP-PLOT/21, is available from your HP sales and service office.

ISPP (17580A), HP's Industry Standard Plotting Package, supports the 7220C and 7220T plotters in addition to other HP models. The package includes the basic PLOT, FACTOR, NEWPEN, SYMBOL, NUMBER, PLOTS, LINE, AXIS, SCALE, WHERE, OFFSET, and plotter initialization subroutines. ISPP is written entirely in FORTRAN (ANSI X3.9-1966), is compatible with most popular ASCII-based computer systems, and is designed to offer transportability of existing application software.

HP-PLOT/21 (72021C) provides over 70 user-callable subroutines for the 7221C and 7221T plotters. FORTRAN subroutines include plotter set-up, axes generation and labeling, plot generation and enhancements, area shading, supplementary character fonts including Gothic and triplex Roman, and other useful features.

HP also offers high level graphics language support for the 8-pen plotters on many HP computers, intelligent terminals, personal computers, and desktop computers. In addition, HP offers user-interactive graph generation packages.

With these packages the non-programmer can easily produce attractive line, bar, pie and other chart formats by filling in menus or by responding to short, easy-to-understand questions from the computer.



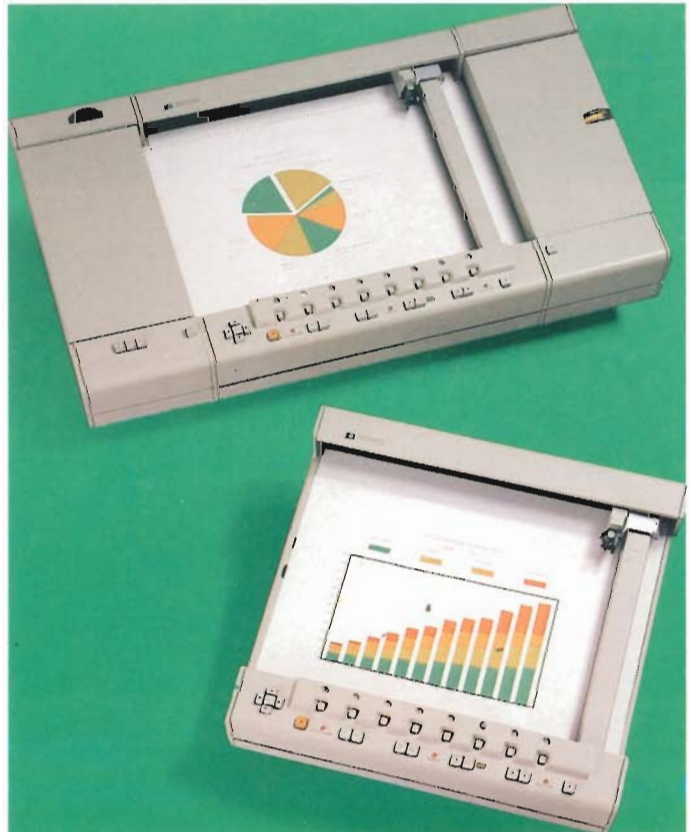
Which plotter is the one for you?

Interface	EIA RS-232-C/CCITT V.24		HP-IB (ANSI/IEEE 488-1978)
Language	HP-GL	Compacted Binary	HP-GL
Plotter with Paper Advance	7220C 7220T	7221C 7221T	9872C 9872T

Get brilliant graphics with an HP 7220C or 7220T

The 7220C and 7220T graphics plotters contain the full complement of features common to all of the 8-pen plotters plus these additional ones:

- RS-232-C/V.24 asynchronous serial ASCII interface
- Baud rate and parity selection (75, 110, 150, 200, 300, 600, 1200, and 2400 baud)
- Hardwire or modem connection
- 928 byte data buffer (with additional 2048 bytes optional)
- HP-GL instruction set
- 5 character sets (standard ASCII, HP 9825 keyboard, European, Scandinavian, Spanish/Latin American sets)
- Single command arcs and circles
- ISPP software support





Get plug-in compatibility with an HP 9872C or 9872T

The colorful 9872C and 9872T graphics plotters make plotting versatile and easy by adding these special features:

- HP-IB interface
- HP-GL instruction set
- 5 character sets (standard ASCII, HP 9825 keyboard, European, Scandinavian, Spanish/Latin American sets)
- Software support on HP desktop and personal computers, HP computer systems, HP intelligent graphics terminals, and HP instrumentation systems



Get maximum communications efficiency with an HP 7221C or 7221T

The 7221C and 7221T graphics plotters add these features to the long list of exciting 8-pen plotter capabilities:

- RS-232-C/V.24 asynchronous serial ASCII interface
- Baud rate and parity selection (75, 110, 150, 200, 300, 600, 1200, and 2400 baud)
- Hardwire or modem connection
- 1110 byte data buffer (with additional 1928 bytes optional)
- Compacted Binary instruction set
- 6 character sets (standard ASCII, HP 9825 keyboard, European, Scandinavian, Spanish/Latin American, and graphics symbols sets)
- Single command arcs and circles
- Macroinstruction capability
- HP-PLOT/21 software support and software support on HP computers

SPECIFICATIONS

PLOTTING AREA: Y axis — 285 mm (11.2 in.); X axis — 400 mm (15.75 in.)

Accommodates media sizes up to ISO A3 (297 × 420 mm) and 280 × 433 mm (11 × 17 in.).

PLOTTING ACCURACY: ±0.2% of deflection ±0.2 mm (0.008 in.) [Includes linearity and repeatability and assumes the plotter has been "zeroed" exactly to the lower left (0.0) coordinates.]

REPEATABILITY: For a given pen — 0.10 mm (0.004 in.); Pen-to-pen — 0.20 mm (0.008 in.)

ADDRESSABLE RESOLUTION: Smallest addressable move — 0.025 mm (0.001 in.)

SPEED:

Maximum — 360 mm/s (14 in./s) in each axis, 509 mm/s (20 in./s) on 45° angle

Programmable — Pen speed may be adjusted to any one of 36 speeds from 10 mm/s (0.4 in./s) to 360 mm/s (14 in./s) in 10 mm/s (0.4 in./s) increments.

Environmental Range: Temperature — 0° C to 55° C; Relative humidity — 5% to 95% (below 40° C)

SIZE/WEIGHT:

	C model	T model
Height —	189 mm (7.4 in.)	210 mm (8.3 in.)
Width —	497 mm (19.5 in.)	858 mm (33.7 in.)
Depth —	477 mm (18.7 in.)	477 mm (18.7 in.)
Net Weight —	18 kg (39 lb)	30 kg (66 lb)
Shipping Weight —	31 kg (69 lb)	50 kg (110 lb)

POWER REQUIREMENTS:

Source — 100 V, 120 V, 220 V, 240 V -10%, +5% [Line voltage is factory set to the nominal value for the area to which the plotter is shipped.]

Frequency — 48-66 Hz single phase

Consumption — 100 V/2.3 A max, 120 V/2.1 A max, 220 V/1.2 A max, 240 V/1.1 A max, 180 watts max

INTERFACE:

7220C/7220T — EIA RS-232-C/CCITT V.24

7221C/7221T — EIA RS-232-C/CCITT V.24

9872C/9872T — HP-IB (ANSI/IEEE 488-1978)

ADDITIONAL T MODEL SPECIFICATIONS:

Page advance — 10 to 12 seconds typical

Page-to-page advance error — ±0.4 mm (0.16 in.) non-cumulative

Page registration — ±2 mm (0.080 in.)

Page cutting accuracy — at 50% relative humidity +1, -2 mm (+0.04, -0.08 in.)

ACCESSORIES SUPPLIED

Item	Part No.
Digitizing Sight	09872-60066
Operating and Programming Manual	
7220C/T	07220-90003
7221C/T	07221-90024
9872C/T	09872-90011
Pocket Guide	
7220C/T	07220-90005
9872C/T	09872-90013
Dust Cover	
C model	9222-0742
T model	9222-0741
Male to Male Interface Cable	
7220C/T	07221-60157
7221C/T	07221-60157
Paper Tray Assembly, T models only	17072-60251
Fiber Tip Plotter Pens	
5-pen pack, black	
Quantity 1, regular tip (0.3 mm)	5060-6787
Quantity 1, broad tip (0.7 mm)	5060-6890
4-pen pack (1 pen each of black, red, blue, green)	
Quantity 2, regular tip (0.3 mm)	5060-6810
Quantity 1, broad tip (0.7 mm)	5060-6858
6-pen pack (1 pen each of gold, brown, burnt orange, lime green, turquoise, violet)	
Quantity 1, regular tip (0.3 mm)	5060-6894
Quantity 1, broad tip (0.7 mm)	5060-6895
Plotter Paper (Metric or English sized paper is included with each plotter depending on area to which the plotter is shipped).	
C model:	
300 sheets, unprinted, 279 × 420 mm (11 × 16.5 in.)	9280-0518
and 300 sheets, unprinted, either 210 × 297 mm (metric), or 8½ × 11 in. (English)	9280-0519 9280-0517
T model:	
300 sheets, unprinted 279 × 420 mm (11 × 16.5 in.)	9280-0518
and 1 roll, unprinted, either 297 mm × 61 m (metric) or 279 mm × 61 m (11 in. × 200 ft. English)	9280-0494 9280-0493

ACCESSORIES AVAILABLE

For a complete list of accessories see the HP Computer Supplies Catalog (P/N 5953-2450) which is available from your local HP sales and service office.

Item	Part No.
Overhead Transparency Kit	17055A
Kit includes these parts:	
4 fiber tip pens (1 each of black, red, blue, green)	
0.3 mm tip	5060-6818
0.6 mm tip	5060-6834
4 fiber tip pens (1 each of black, orange, brown, violet)	
0.3 mm tip	5060-6819
0.6 mm tip	5060-6835
Solvent, 29.6 ml (1 fl oz)	5060-6828
100 sheets transparency film	9270-0639
(kit includes 2 packages of film)	

ORDERING INFORMATION

Voltage will be set and power cables and metric or English paper will be supplied in accordance with area to which the plotter is shipped.

Model 7220C **Model 7220T**
001, Additional 2048-character buffer expansion

Model 7221C **Model 7221T**
001, Additional 1928-character buffer expansion

Model 9872C **Model 9872T**
(The following options are for purposes of documentation)
025, For use with HP 9825
045, For use with HP 9835 and HP 9845B
085, For use with HP 85
100, For use with HP 1000
145, For use with HP 9845C
300, For use with HP 3000

For more information, call your local HP Sales Office or nearest Regional Office: Eastern (301) 258-2000; Midwestern (312) 255-9800; Southern (404) 955-1500; Western (213) 877-1282; Canadian (416) 678-9430. Or write Hewlett-Packard, 1501 Page Mill Road, Palo Alto, CA 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 Takaido-Higashi 3-chome, Suginami-ku, Tokyo 168.