HEWLETT PACKARD

The 7580A and 7585A Drafting Plotters

RS-232-C

DESIGNED FOR
HP-IB
SYSTEMS

Now HP has two drafting plotters: the 7580A for plots up to A1/D size and the 7585A for plots up to A0/E size.

The HP 7580A and the HP 7585A Drafting Plotters are pen plotters that combine high-quality output and high throughput with features that make them exceptionally easy to use. Both are compact and easy to move; both are low cost. With either of these plotters, you can order the HP-IB (IEEE 488-1978) or the RS-232-C/CCITT V.24 interface option.

The one important difference between these plotters is media size. The 7580A accepts media sizes ranging from ISO A4 through A1 (ANSI A through D). The 7585A accepts media sizes ranging from ISO A4 through A0 (ANSI A through E). Now HP offers you a choice: the 7580A if your plots are A1/D size or smaller, and the 7585A if you need plots that are A0/E size or smaller.

Low Cost

The 7580A and 7585A are low-cost plotters, but that doesn't mean that you must give up quality or through-put. The performance of these plotters compares favorably with plotters costing twice as much. And they offer you some features, such as eight pens and
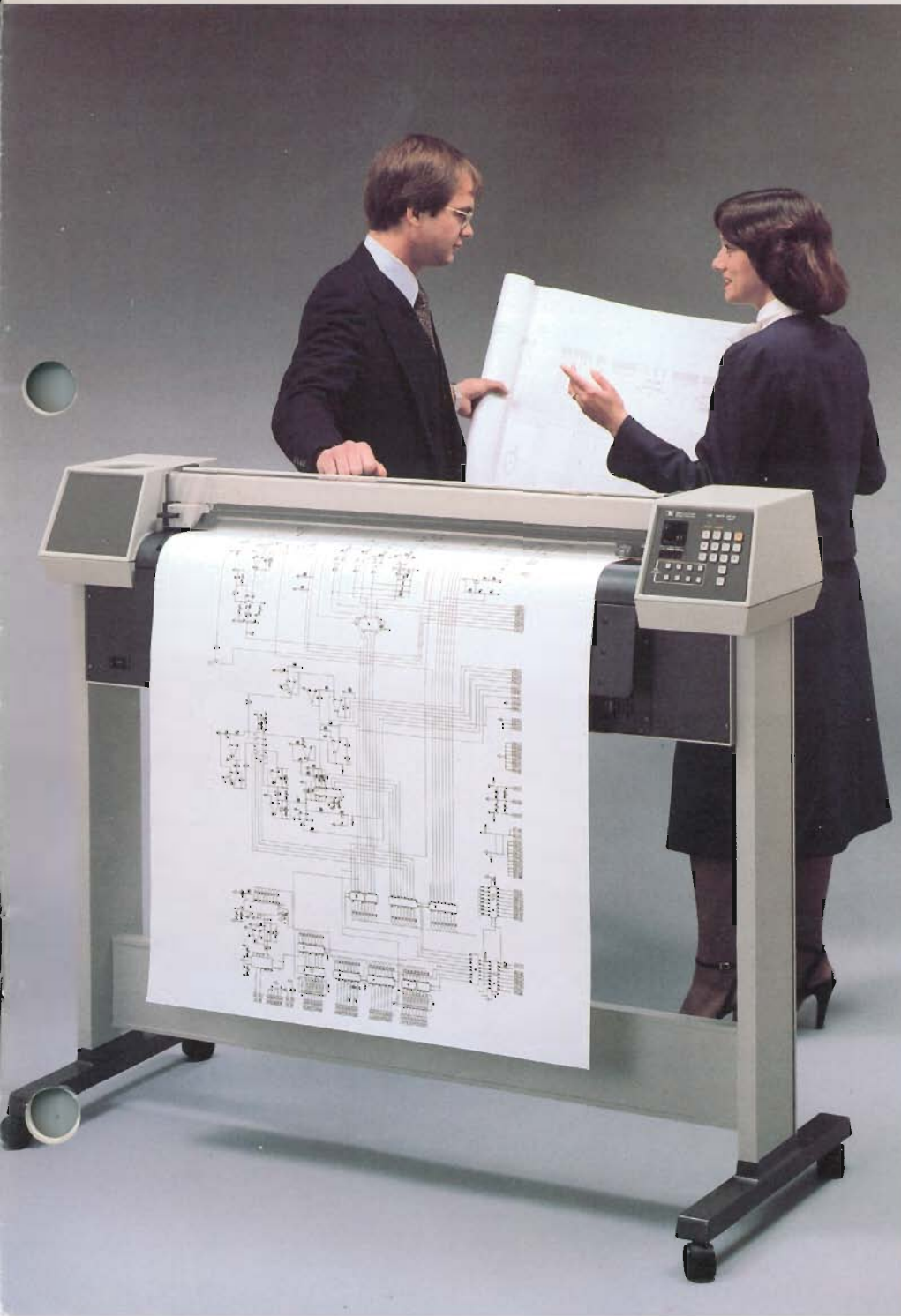
HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

automatic pen capping, that you can't find in more expensive plotters. Whether you're interested in low cost or maximum performance, the HP drafting plotters are cost-effective additions to almost any system.

Suited to Many Applications

The HP drafting plotters are well suited for almost any application that requires large plots that are visually perfect. In addition, they can also be used with media as small as A4/A and will plot on paper, vellum, or double-matte polyester film. The writing system of the 7580A and the 7585A makes them especially useful if your application requires drafting pens or multi-color drawing capability.

The more common uses in industry include computer-aided drafting; computer-aided design of printed circuit boards, integrated circuits, and mechanical parts; architectural or civil engineering design; and mapping applications. In business and management, these plotters are most commonly used to prepare flip-charts or project schedules.

HP drafting plotters read the pen-type code from the carousel and automatically set pen velocity and force.

Eight Pens with Automatic Capping

The 7580A and 7585A are eight-pen plotters. They accept three kinds of pens: fiber tip, drafting, and roller ball. This permits you to choose the pens, colors, and line widths most appropriate for your application.

Pens are loaded into an eight-pen carousel which caps any pens not in use. Capped pens stay fresh; even drafting pens write without repriming and won't dry out for up to several days. This means you don't handle pens as often as with traditional drafting plotters.

There are three different pen carousels — one for each kind of pen. Each carousel is coded so that the plotter electronically senses the carousel type each time a carousel is loaded. After reading the code, the plotter sets the pen velocity and force suitable for pens that match the carousel type. If other values are better suited to your applica-tion, velocity and force can be changed from the front panel or through pro-grammed plotter instructions. Because pen force and velocity can be set for individual pens, different types of pens can be mixed in the same carousel.

As the pen is lowered to the surface of the drawing medium, pen motion is damped so that the pen gently touches the surface with minimum bounce. This protects the pen tip from damage. As a result, pens last longer and plotted lines are uniform. The platen of the HP drafting plotters has a groove under the pen path that causes the pen motion over the medium to be cush-ioned by the air underneath. This cushion is another reason that your pens last longer and that lines drawn by the HP drafting plotters are smooth and consistent.

Superior Line Quality

Resolution is the most important factor that affects line quality. While the addressable resolution of the HP drafting plotters is excellent at 0.025 mm (0.001 in.), the pen and the drawing medium actually move on an even finer grid to create high-quality lines. These movements are controlled by servos with a mechanical resolution of 0.003 mm (0.00012 in.). The resolu-tion of these plotters is as good as that of plotters costing twice as much.
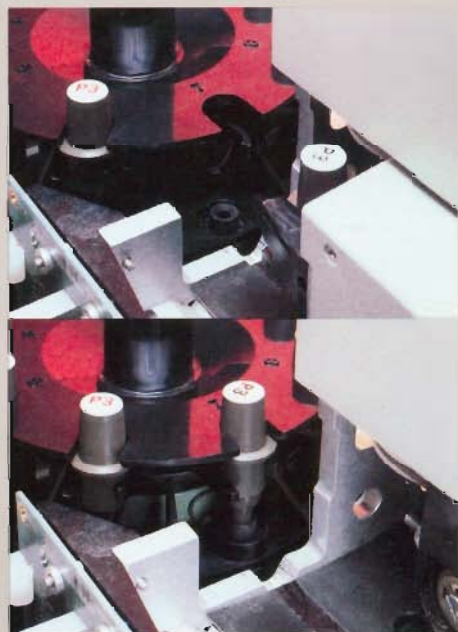
Top: As the pen is returned to its stall, the cap is lowered so that the pen tip is not damaged as the pen is replaced.
Bottom: While stored in the stall, the pen is tightly capped.
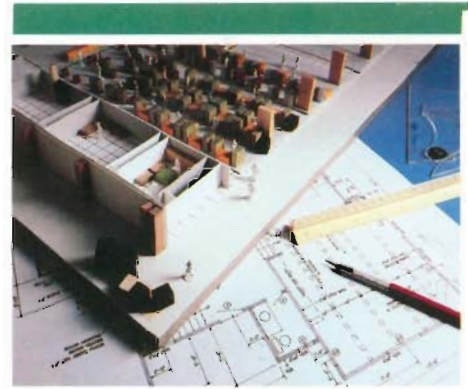
In addition to outstanding resolution, HP drafting plotters offer a feature not found in any other drafting plotter: diagonal lines are the same high quality as lines drawn parallel to the axes. On most plotters, diagonal pen movements have a faster velocity than movements along the axes. With this increased diagonal velocity, line quality may deteriorate. But with the 7580A and 7585A, the microprocessor keeps velocity and acceleration of the pen constant regardless of direction. Lines are therefore drawn with the same high quality in any direction.

High Throughput

At 60 cm/s maximum velocity and 4 g acceleration, the 7580A and 7585A are the fastest plotters in their price range. Even when a slower pen-down speed is required to accommodate the drawing medium, throughput remains high because pen-up movements are executed at maximum speed. Also, pen-lift delays are kept to a minimum

because the pen is lifted slightly for small moves — as when labeling — and to maximum height only on long moves.
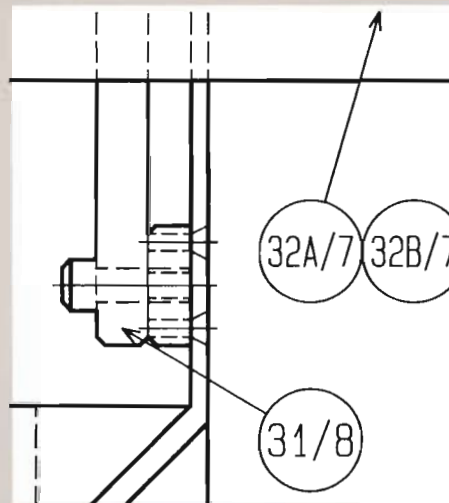

The excellent resolution of the HP drafting plotters gives superior line quality as shown above. This photograph is unretouched and shows a section of a plot drawn on vellum with drafting pens.

HP Reliability and Support

HP has been involved with computer graphics almost from the time that the first idea of a computer-generated picture was conceived, and we have manufactured plotters for over 13 years. All of this experience has gone into building drafting plotters that are reliable. On the 7580A and 7585A, there is a built-in confidence test that lets you know that the plotter is functioning properly.

Closely associated with reliability is the quality support that you will receive should you need information or should your plotter ever need repair. In addition to our standard warranty, HP offers a variety of on-site service plans, which make it possible to meet your specific service needs. Also, HP drafting plotters have a self-test that quickly isolates problems for service personnel, thereby reducing the time it takes to get your plotter back into operation.
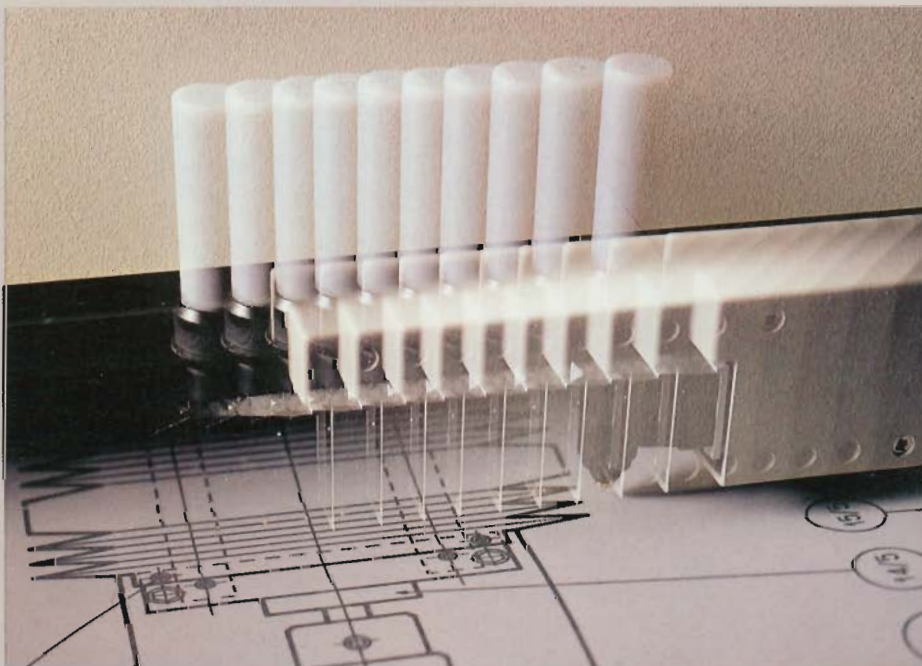
One benefit always comes through: the 7580A and 7585A are easy to use.

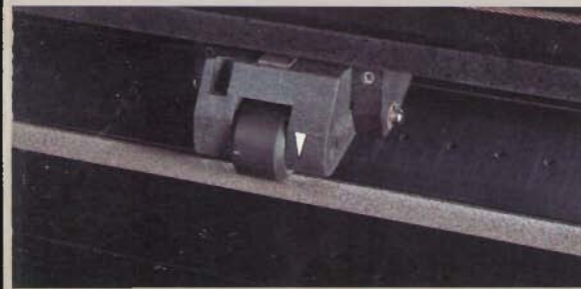## Plotting Limits Automatically Set

The HP drafting plotters plot on sheets of paper, vellum, or double-matte polyester film; they even accept preprinted forms. The 7580A accepts media up to A1/D size; the 7585A, up to A0/E size. Loading the drawing medium is easy: position it against the paper stops, move the adjustable pinch wheel to the right edge of the sheet, and press a button. Both plotters automatically sense the sheet size and establish borders along the edge to restrict pen movement. This ensures that no writing can occur off the medium.

These plotters use small microgrip drive wheels to move the drawing medium. The sheet is gripped between a rubber pinch wheel and a grit-covered wheel. Small particles on the surface of the grit wheel press into the sheet, forming a microscopic track. As the sheet moves back and forth, the particles fall into the same indentations. The low-mass, low-inertia mechanics in this drive system replace the heavy, bulky components of beltbed, flatbed,

and drum plotters. This permits the use of smaller, less expensive motors and lighter, less bulky parts. Yet the grip is firm; the paper does not slip and is free from the media-handling inconvenience of traditional drafting plotters.

Simple Pushbutton Control

Convenience and flexibility are engineered into the front panel controls of HP drafting plotters. Only four buttons are required to operate either plotter. The CHART HOLD and CHART UNLOAD buttons lower and raise the pinch wheels. Either the VIEW or the REMOTE button causes

Specifications for the 7580A and 7585A Drafting Plotters

Plotting Area

Maximum plotting area	Drawing medium less margins
Margin sizes	
Normal mode	Three margins approximately 15 mm each, fourth margin approximately 39 mm
Expanded mode	Three margins approximately 5 mm each, fourth margin approximately 29 mm

Resolution

Smallest addressable move	0.025 mm (0.001 in.)
Mechanical resolution	0.003 mm (0.00012 in.)

Repeatability

For a given pen on paper or vellum   0.05 mm (0.002 in.)

Speed

Pen down	
Maximum	60 cm/s (24 in./s) independent of vector direction
From the program	1 to 60 cm/s (0.4 to 24 in./s) in increments of 1 cm
From the front panel	10 to 60 cm/s (4 to 24 in./s) in increments of 10 cm
Pen up	60 cm/s (24 in./s) regardless of pen-down speed

Acceleration

Maximum	4 g (39 m/s^2, 129 ft/s^2)
From the program	1 to 4 g (9.7 to 39 m/s^2, 32 to 128 ft/s^2) in increments of 1 g

Pen Force

From the program or front panel   10 to 66 grams in increments of 8 grams

Power Requirements

Source	100, 120, 220, 240 V~ −10%, +5%
Frequency	48-66 Hz
Consumption	170 W maximum

Environmental Range

Operating	
Temperature	0°C to 55°C
Relative humidity	5% to 95% (0°C to 40°C)
Nonoperating	
Temperature	−40°C to 75°C
Relative humidity	5% to 95% (0°C to 40°C)

Interfaces

HP-IB (IEEE 488-1978)	Implements the following HP-IB functions as defined in IEEE 488-1978: SH1, AH1, T6, L3, SR1, RL0, DC1, DT0, C0, PP0 for listen-only, PP1 for address greater than 7, and PP2 for address of 7 or less
or	
RS-232-C/CCITT V.24	Asynchronous serial ASCII with switch selectable baud rates of 110, 150, 300, 600, 1200, 2400, 4800, and 9600

Buffer

Size   1024 bytes

Pens

Number	8, automatic pen changing from carousel
Type	Fiber tip, drafting, roller ball

Media

Most standard paper, vellum, and double-matte polyester films which are 3 or 4 mil thick

Accessories Supplied with Plotters	HP Part No.
Interfacing and Programming Manual	07580-90014
Operator's Manual	07580-90013
Reference Card	07580-90012
Pen carousels	
Fiber tip	07580-60035
Drafting pen	07580-60081
Roller ball	07580-60082
Digitizing sight	07585-60191
Drafting pen bodies (4)	07580-60025
Drafting pen tips	
0.35 mm tip	9260-0588
0.70 mm tip	9260-0579
Drafting pen cleaning syringe	9282-0905
Drafting ink — black (3/4 oz container)	9260-0596
Drafting pen cleaning solution (5.2 oz container)	9282-0908
Fiber-tip pens with 0.3 mm tips	
Package of 4 (1 each — black, green, blue, and red)	5060-6810
Package of 6 (1 each — burnt orange, lime green, gold, brown, turquoise, and violet)	5060-6894
Roller-ball pens	
Package of 4 (black)	5061-5033
Package of 4 (red)	5061-5034
Package of 4 (green)	5061-5035
Package of 4 (blue)	5061-5036
Media sampler* (each sampler — 50 sheets of chart paper and 5 sheets of polyester film)	
For 7580A	
A1-size media	9280-0524
D-size media	9280-0523
For 7585A	
A0-size media	9280-0586
E-size media	9280-0585
Grit-wheel brush	8710-1386
Supplies organizer	4040-1953
Power cord (cord appropriate to destination of plotter)	
Male-to-male Interface Cable (supplied only with option 001)	8120-3258

*Metric or English media is included depending on the destination of the plotter.

Specifications for the 7580A and 7585A Drafting Plotters (Continued)

Accessories Available

The items supplied with your plotter will allow you to begin using your plotter as soon as it arrives. A service manual and other accessories are available. For example, fiber-tip pens come in two line widths, drafting pen tips come in six widths, and chart paper comes in sizes ranging from A4/A to A0/E. For a complete list of supplies, see the Computer Users Catalog, which is available from your local HP sales and support office.

Software

HP-ISPP (Hewlett-Packard Industry Standard Plotting Package), Model 17580A, is a separate product. Refer to the HP-ISPP data sheet (P/N 5953-4086) for information on the capabilities of the software and the versions available.

Ordering Options

Interface options

001	RS-232-C/CCITT V.24 inteface
002	HP-IB (IEEE 488-1978) interface

Manual options*

025	for use with HP 9825 desktop computer
026	for use with HP 9826 desktop computer
036	for use with HP 9836 desktop computer
045	for use with HP 9835A/B or HP 9845A/B desktop computer
047	for use with the HP 2647 graphics terminal
085	for use with the HP-85 personal computer
100	for use with HP 1000 computer
145	for use with HP 9845C desktop computer
300	for use with HP 3000 computer

*Use the manual option numbers to indicate the system you will be using with your plotter. If a programming guide is available for that system, it will be shipped with your plotter.

Specifications for the 7580A Drafting Plotter

Size of Medium

Width	267 mm (10.5 in.) to 622 mm (24.5 in.), which includes standard sizes A4/A, A3/B, A2/C, and A1/D
Length	203 mm (8 in.) to 1190 mm (46.85 in.)

Plotter Size

Height	1188 mm (46.8 in.)
Width	1087 mm (42.8 in.)
Depth	557 mm (21.9 in.)

Weight

Net weight	59.1 kg (130 lb)
Shipping weight	approximately 114 kg (250 lb)

Specifications for the 7585A Drafting Plotter

Size of Medium

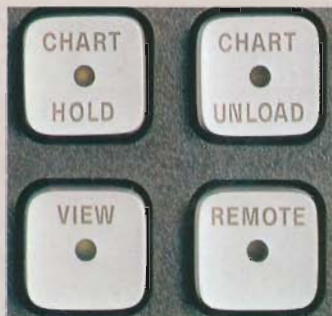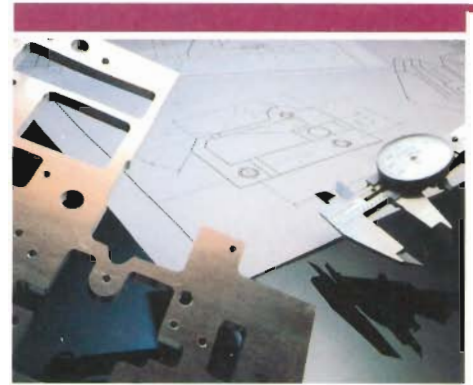|	
Width	267 mm (10.5 in.) to 298 mm (11.75 in.), which includes standard sizes A4/A and A3/B; **and** 546 mm (21.5 in.) to 927 mm (36.5 in.), which includes standard sizes A2/C, A1/D, and A0/E
Length	203 mm (8 in.) to 1190 mm (46.85 in.)

Plotter Size

Height	1188 mm (46.8 in.)
Width	1392 mm (54.8 in.)
Depth	557 mm (21.9 in.)

Weight

Net weight	70.4 kg (155 lb)
Shipping weight	approximately 131 kg (290 lb)

Data Subject to Change

FOR TECHNICAL AND DRAFTING APPLICATIONS (smooth)
REQUIRING UNIFORM CELL SIZE: 0123456789

Or proportional spacing and arc-generated a2C@
characters for high-quality text in any size
(coarse)

⊡⊙△+×◇✦∩⊃⊂∪ ¯≡≅≈~ a2C@
⊠⊠⊻⊼⋇⊠✿→↑←↓∫÷*∇°

the plotter to sense the size of the drawing medium and set all plotting parameters appropriate for that size. In addition, pushing REMOTE causes the plotter to process plotting instructions from the buffer. The VIEW button interrupts plotting and causes the sheet to be fully extended with no loss of incoming instructions.

Other buttons on the front panel allow you to override the automatically set parameters or the program instructions. The scaling points, P1 and P2, can be changed to adjust your plot size. Your plot can be rotated 90 degrees or the plotter's axes can be aligned with those on a preprinted form. Pens can be changed, raised or lowered, and pen velocity and force can also be changed from the front panel. And for your convenience, there is a digital display which indicates the current pen number and its velocity and force.

Using the joystick, the pen can be easily positioned anywhere within the plotting limits of the drawing medium. With the digitizing sight installed in the pen holder, the plotter becomes a point digitizer so that you can enter your own data from charts and maps.

Six Character Sets in Two Fonts

The HP drafting plotters have six character sets that provide a wide range of labeling and annotation capabilities, including mapping symbols, special centered symbols, and foreign-language characters. These six sets are contained in two fonts that give you a choice of character style according to your plotting application. One font provides high resolution "stick" characters with equal spacing between characters. The second font uses arc-based characters with proportional spacing. In the second font, characters can be changed from a very smooth and refined quality to a coarser quality. The highest quality characters — which resemble characters produced by LEROY* lettering equipment — provide superior resolution, even in large sizes, but take longer to plot. The coarser characters plot quickly to provide working-quality output.

*LEROY is a registered trademark of Keuffel & Esser Company.

Fits into Most Work Areas

The unique design of HP drafting plotters increases not only the ease with which you can operate these plotters, but also allows you to move these plotters directly into work areas where you need a plotter — when you need it. These plotters are compact, taking less room than most tables, and are lightweight, making it easy to roll them from one area to another.

Low Power Consumption

Maximum power consumption for HP drafting plotters is 170 watts. Comparable drafting plotters require from three to ten times as much power. So not only do you save money on your initial investment with the 7580A or 7585A, but you also save on operating costs.

Many plotting operations can be achieved with single instructions.

Simple, Powerful Instruction Set

Programming is easy using the Hewlett-Packard Graphics Language (HP-GL). The HP drafting plotters accept 60 HP-GL instructions that are simple, yet powerful. You can easily remember the function of each instruction because each two-letter mnemonic suggests the English letter description of the corresponding plotter action. For example, the instruction SP selects a pen from the carousel, LT sets the line type, and PR plots relative to the current pen position.

The HP drafting plotters are vector plotters, which require only the end points in order to draw a line. Other plotting operations can also be achieved with single instructions. There are instructions to draw a circle or arc; to position labels; to change character size, slant, or direction; and to digitize. These plotters are even smart enough to adjust dashed line patterns to fit between any two points. They can rescale the plotting area in convenient user-defined units, rotate the plot 90 degrees, or change the graphic limits by creating "windows" that allow you to draw a portion of the original plot.

HP-GL is particularly effective when used in subroutine calls. These subroutines make it easier to write and debug the program since plotter functions are confined to specific sections of the program.

Software Support

HP drafting plotters are supported on HP computer systems, desktops, personal computers, and intelligent graphics terminals at two levels: graphics software for programmer support and graphics application software. Graphics software for programmer support gives you high-level, device-independent programming tools, such as graphics ROM commands and extensions to HPL, BASIC, and PASCAL. Graphics application software gives you a packaged solution to a specific graphics output need.

If you already have graphics application software that uses standard plotting subroutines, HP-ISPP (Hewlett-Packard Industry Standard Plotting Package) is available to make it easy to add an HP drafting plotter to your system. This package has 12 callable subroutines written in standard FORTRAN: PLOTS, PLOT, OFFSET, FACTOR, NEWPEN, WHERE, SYMBOL, NUMBER, SCALE, LINE, AXIS, and HPINIT.

Ask your HP sales representative for specific information about graphics software support for your system.

``PUPA``;X;``,``;Y	**With pen up, moves to the coordinate X,Y**
``CI300``	**Draws a circle with a radius of 300 plotter units**
``PUPA``;X+300;``,``;Y	**With pen up, moves to the edge of the circle**
``PDPR``;L;``,0``	**Puts the pen down and draws a line the length of L**
``PR-250,125,250,-125,-250,-125``	**Draws the arrowhead relative to the end point of the line**

These strings of HP-GL instructions might be part of a subroutine. When combined with statements that output to the plotter, they plot this figure in the location indicated by X and Y with a line length of L. To plot this example, the following were used: X = 0,

Y = 0, which put the center point of the circle at the origin and L = 2000, which designated the number of plotter units in the line length. Different system format conventions may cause these strings to be slightly different for your system.

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