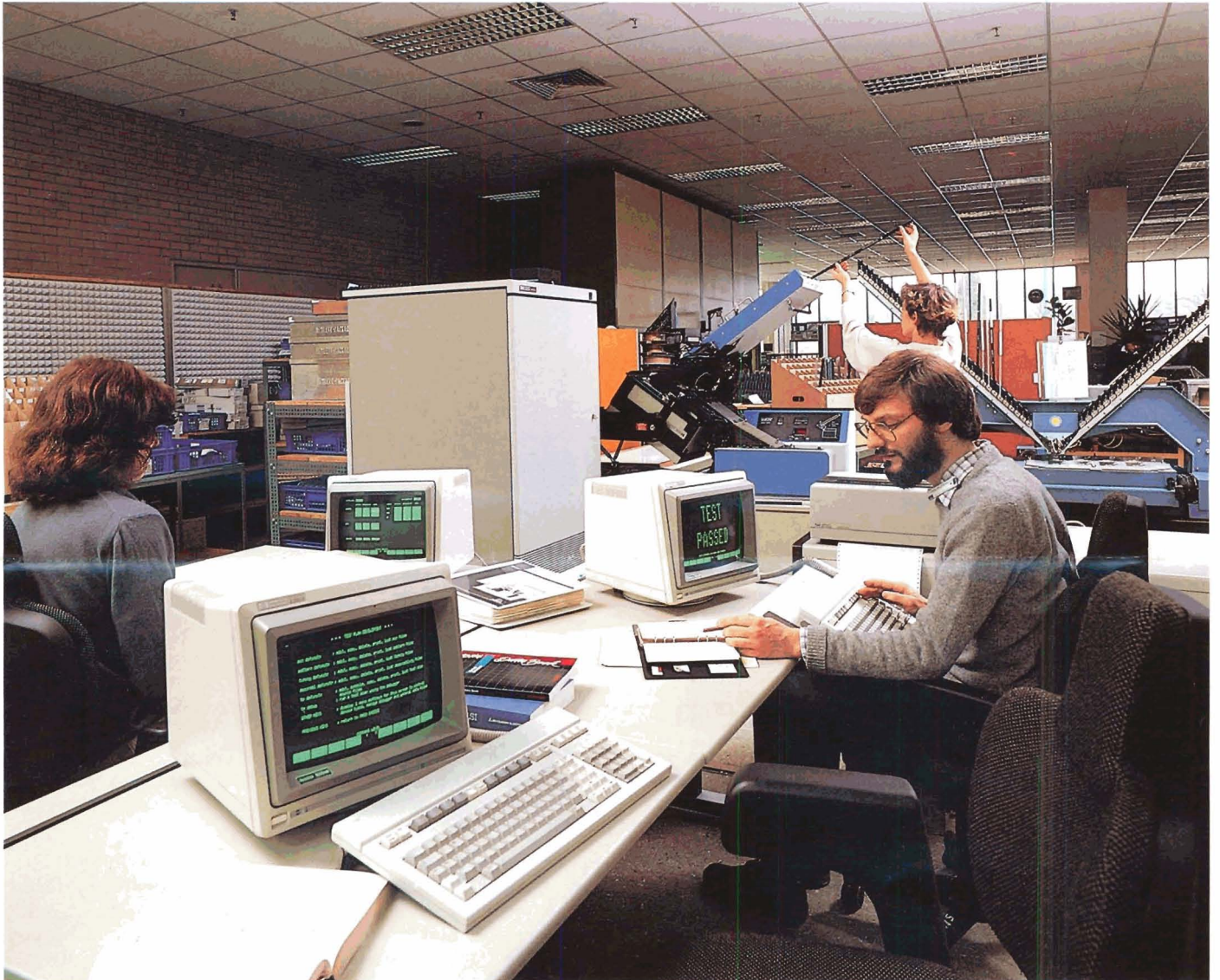


hp MEASUREMENT COMPUTATION **news**

product advances from Hewlett-Packard

JULY/AUGUST 1985



New memory test system combines precision and stability with high versatility

Excellent timing accuracy and long-term stability and new standards in software productivity are offered by Hewlett-Packard's new HP 9430 Memory Test System. This system represents a versatile and economical solution to the testing of all common semiconductor memories in end-user and manufacturing environments.

With its expandable design, HP's new system is built to provide an upgrade path for your next-generation memories. The application-oriented, modular software structure can be readily learned and substantially reduces programming costs.

High performance and excellent stability

The HP 9430 offers high pulse performance and timing accuracy to make your test results and data correlation more dependable. Data-driver skews less than ± 400 ps and edge placements within ± 600 ps make possible more thorough and precise device characterization.

Standard patterns and virtually any custom pattern can be generated at a 10-MHz cycle rate with the system's versatile

(continued on page 2)

Laboratory quality data acquisition systems for HP and IBM personal computers

A new software package from Hewlett-Packard Company enables HP and IBM personal computers to control either of two widely used HP data acquisition instruments, the HP 3421A and the HP 3497A data acquisition front ends.

The HP 3055S software permits an HP Touchscreen, HP Touchscreen MAX, HP Touchscreen II (HP 150 and HP 150 II outside North America), IBM PC, IBM PC/XT, or IBM PC/AT personal computer to serve as the nucleus of a powerful, laboratory quality, data acquisition system.

An HP 3055S Personal Computer-Based Data Acquisition System can handle small-to-medium-sized applications with the HP 3421A, gathering data on up to 30 channels. Medium to large applications are better handled with the HP 3497A, which can be configured for up to 100 measurement channels, and up to 1000 channels with extenders.

The HP 3055S Personal Computer-Based Data Acquisition System uses menu-driven software that, regardless of programming experience, enables a user to set up an experiment quickly, gather data, check limits, activate alarms, and store, print, and analyze the data, all by pressing softkeys or entering alphanumeric responses. The HP 3055S analysis software includes channel-vs.-channel, channel-vs.-time, and statistics routines. Data gathered by the system can be fed into the personal computer's Lotus™ 1-2-3™ software package for spreadsheet analysis and graphical display.

Lab quality sensor and transducer measurements are possible because both HP 3055S front ends feature 5½-digit analog-to-digital converters, isolated inputs and outputs, and 1-microvolt sensitivity. These features permit accurate low-level measurements despite common mode and normal mode noise.

For more information, check **B** on the HP Reply Card.

Lotus™ and 1-2-3™ are U.S. trademarks of Lotus Development Corp.



New easy-to-use menu-driven HP 3055S software permits an HP Touchscreen (HP 150) Personal Computer or IBM PC to control an HP 3497A or HP 3421A data acquisition and control system. The HP 3421A shown is an entry-level solution for small to medium applications.

New memory test system (continued from page 1)

algorithmic pattern generator. The HP 9430 has an address range of up to 16M words, eight clock channels, and 12 data channels.

The system is designed for long-term stability without frequent calibration. After each calibration, which typically takes less than four minutes, system performance stays within specifications for at least one year. The system also features excellent stability under extreme temperature conditions and requires no special environmental conditioning.

Compact design

The HP 9430 is compact. All tester hardware, including the controller, mass storage device, and standard and optional measurement hardware, is contained in a single cabinet (plus test head). The result is an intelligent, stand-alone system that requires no external host computer for either testing or program development.

Modular software structure and application-oriented programming

The HP 9430's modular software is designed to reduce program complexity, allowing you to group the various tasks for developing test programs into individual modules. This means you can set up pin assignments, patterns, timing diagrams, and address descrambling in independent editors.

The software modularity permits you to use test patterns and other parameter settings repeatedly when you create new test programs. You can assign user-defined pin names

rather than tester channels when you develop programs. Automatic syntax and context checks with self-explanatory error messages minimize debugging efforts and prevent incorrect entries.

Hardware-independent program development

The HP 9430 can be used for device testing even during the development or modification of test programs. A hardware-simulation technique permits software to be developed and debugged without using the measurement hardware. An interactive debugger allows program execution after program changes without time-consuming recompilation.

Graphics capabilities

Visual feedback of pin assignments, timing diagrams, patterns, and status information facilitates program verification and debugging. Displaying the DUT's wiring, timing cycles, or memory cell status takes only a few keystrokes. This graphics capability is further enhanced by a set of data analysis functions, including bit map, shmoo plot, wafer map, and bar chart.

Price of the HP 9430 Memory Test System is approximately \$115,000 for a basic system configured for testing 256K x 1 DRAMs. This includes the system controller, disc mass storage, one workstation, and support services.

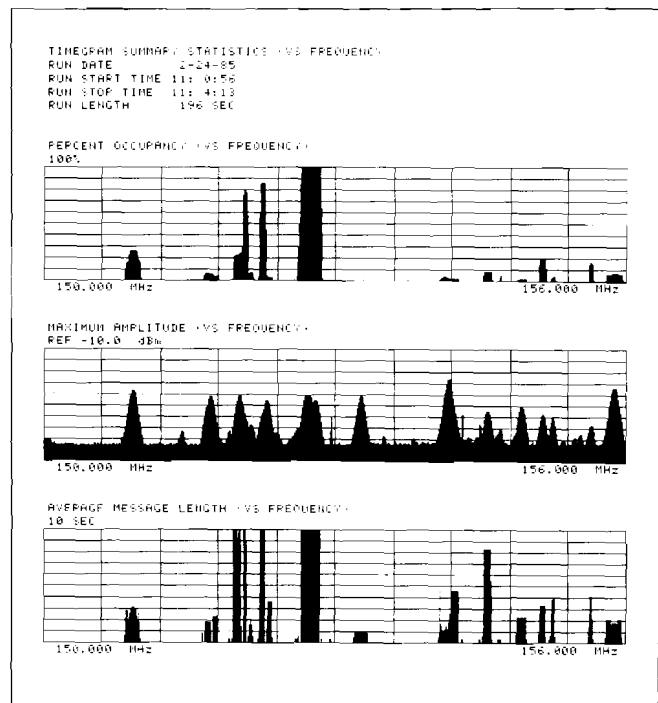
For more information, check **A** on the HP Reply Card.

New software for signal monitoring and broadband surveillance

With the new HP 85865A Signal Monitoring Software and an HP 9000 Model 236 or Model 220 Computer, you can automate an HP 8566B (100 Hz to 22 GHz) or 8568B (100 Hz to 1.5 GHz) Spectrum Analyzer for site surveillance applications and long-term attended or unattended spectrum monitoring. The diverse menu options allow you to create command files that direct the analyzer to perform tasks automatically. The system monitors up to ten frequency bands at one time. Signal data, collected continuously or at intervals over long periods of time, is stored with dates and times to provide comprehensive reports on ambient signal activity.

The HP 85865A software offers advantages in areas requiring long-term monitoring of signal environments. For example, to maintain the quality of a communication system, the program provides information on current band use for management of the frequency spectrum and on signal parameters to assure that transmissions meet specified tolerances.

In surveillance operations, run-mode options permit the spectrum analyzer to search a defined band automatically, tune to a signal, measure frequency and amplitude, and determine modulation format. Data can be recorded selectively using alarm and signal mask functions. With the HP 5180A Waveform Recorder added, the system will measure pulse parameters for radar detection and for system performance testing. Powerful display formats let you view four frequency bands at one time and transform your system's console into an effective tool to analyze and manipulate data. All display formats can be transferred directly to an HP-IB (IEEE 488) X-Y plotter or to an HP-IB printer for customized hard-copy output.



This timegram summary provided by the HP 85865A Signal Monitoring Software provides a graphical representation of two-way communications.

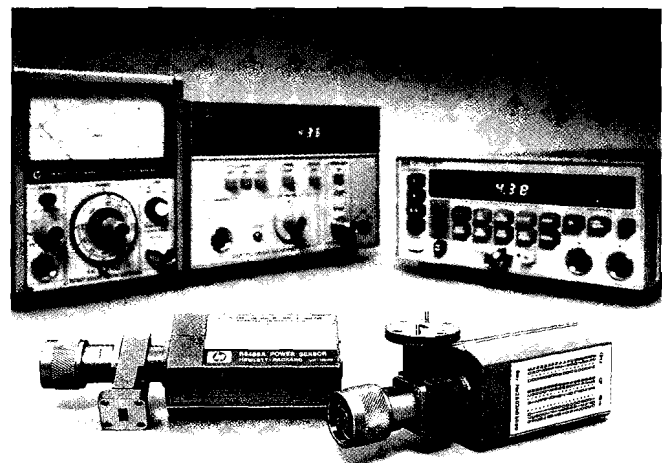
For more information, check **C** on the HP Reply Card.

New millimeter-wave power sensors are effective to 50 gigahertz

Two new power sensors, the HP R8486A (26.5 to 40.0 GHz) and the HP Q8486A (33.0 to 50.0 GHz), extend the frequency coverage of HP's sensor family to millimeter-wave applications. The sensors are fully compatible with HP's three thermocouple power meters: the HP 438A (digital dual-sensor), the HP 436A (digital), and the HP 435B (analog).

A significant design feature of the sensors is the built-in calibration port (a type-N connector), which accepts the 50-MHz, 1-mW, $\pm 1.2\%$ reference signal available from the three HP thermocouple power meters. Cal factor figures are furnished every gigahertz between 26.5 and 50 GHz, with the factors for eight frequencies directly traceable to NBS power standards.

These waveguide units use thermocouple-sensor technology to take advantage of true-rms detection over the dynamic range of -30 dBm (1 microwatt) to $+20$ dBm (100 mW). The thermocouple elements provide well-matched sensing, which leads to improved power accuracy. SWR is less than 1.4 for the HP R8486A and less than 1.5 for the HP Q8486A.



Two new millimeter power sensors, the HP R8486A for 26 to 40 GHz and the HP Q8486A for 33 to 50 GHz, feature calibrator inputs and work with HP 435A/6A/8A Power Meters.

For more information, check **D** on the HP Reply Card.

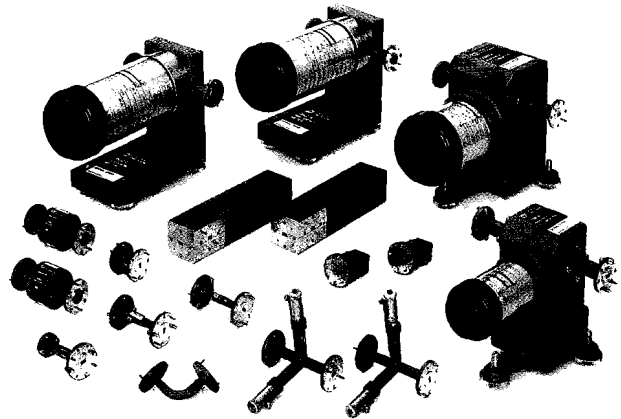
HP announces millimeter-wave measurement accessories to 60 GHz

Microwave system activity has been slowly moving up in frequency for some years now. Some systems, such as high-resolution radars and commercial satellites, are moving to millimeter-wave frequencies (commonly understood as wavelengths smaller than 1 cm, i.e., frequencies above 30 GHz) to take advantage of available spectrum allocations and avoid crowding.

HP now offers a wide line of measurement accessories for frequencies from 33 to 60 GHz. Two waveguide bands are available: Q band, 33.0 to 50.0 GHz, allowing measurements in waveguide size WR-22 (RG-97), and U band, 40.0 to 60.0 GHz, for waveguide size WR-19.

The following product categories are now available in each band: fixed and rotary-vane attenuators, isolators, detectors, directional couplers (3, 10, and 20 dB), E-H tuners, fixed and tunable loads and shorts, frequency meters, several types of 90-degree bends and twists, and straights and a waveguide holder.

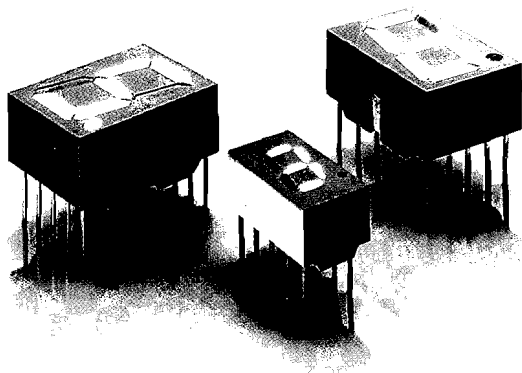
For more information, check **E** on the HP Reply Card.



HP's millimeter-wave measurement accessories for Q band (33 to 50 GHz) and U band (40 to 60 GHz) include adapters, couplers, detectors, frequency meters, tuners, isolators, loads, mixers, and other components.

Components

Low-drive-current displays deliver brightness for less power



New low-current seven segment displays place lower demands on batteries and save power, cost, and heat

Now you can save on power, cost, and heat with HP's new low-current seven-segment displays that use only 3 milliwatts of power per lighted segment, and are just as bright as high-efficiency red displays at higher drive currents. With only 2 mA of drive current, the typical intensity is 350 μ cd per segment.

These displays can be driven at higher drive currents and can be strobed, making them ideal for applications requiring long strings of numbers. They're compatible with monolithic LED display drivers.

Now you can save on power supply and circuitry costs, get longer life from your battery, use smaller batteries and save space, or give your present design a battery back-up.

Both 0.3-in (7.6-mm) and 0.56-in (14.2-mm) digit sizes are available in high-efficiency red (HDSP-7510 and HDSP-5550 Series, respectively).

For more information, check **F** on the HP Reply Card.

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

Use color to make your message clear with new bar graph arrays

Bright new 101-element bar graph arrays from HP give clear, color-associated messages that are readable from a distance. Ideal for process variable or setpoint indications, the new arrays make critical and noncritical signals easy to recog-



new bar graph arrays have 101 individually addressable elements in 106 mm of length. They come in green and high-efficiency red.

nize. Colors available are green (HDSP-8835) and high-efficiency red (HDSP-8825).

The arrays are 4.2 inches (106 mm) long and have 101 LED elements for high resolution and precise indication. Their microprocessor interface and individually addressable elements give you flexibility in design. These high-brightness bar graph arrays can also be driven at low currents to save power.

Reliability is high. Both the green HDSP-8835 and high-efficiency red HDSP-8825 displays were temperature cycled between -40°C and $+85^{\circ}\text{C}$ with no failures at 1000 cycles.

For more information, check **G** on the HP Reply Card.

Computers, Peripherals, and Calculators

New graphics and data entry terminals offer low cost and ergonomic design

Two new HP terminals provide high-quality, low-cost solutions for computer users' display terminal needs.

HP 2393A Graphics Terminal

Designed for both business and technical applications, the HP 2393A Graphics Terminal provides full graphics and alphanumeric and supports a variety of input/output options. It is a high-quality yet affordable graphics terminal for the users of HP 3000, HP 1000, and HP 9000 Computers. It also works on Digital Equipment Corporation VAX computers and can emulate a Tektronix Corporation graphics terminal.

Features of the HP 2393A include bit-mapped vector graphics in two resolution modes (512 by 390 or 640 by 400 pixels), 11 line types, 10 area fills, graphics text of different sizes and orientations, and rubberband line. Users can daisy-chain up to four different input devices—touchscreen, graphics tablet, bar code reader, and mouse—directly to the terminal via the HP-HIL interface. This saves the peripheral port for output devices.

The HP 2393A's optional peripheral port offers users a choice between RS-232-C serial, Centronics-type parallel, or HP-IB interfaces. The monochrome monitor can be replaced with other video devices such as film recorders or large-screen projectors.

Besides its extensive graphics features, the HP 2393A provides full alphanumeric capabilities, including math, italic, bold, and line-drawing characters, up to twelve pages of memory, and enhanced vertical scrolling for 160-column text.

The HP 2393A is available in 16 different language versions.

HP 2394A Data Entry Terminal

Departing from traditional data entry methods that require repeated downloading of forms from the computer, the HP 2394A Data Entry Terminal offers local forms cache. Users can store the forms they need in terminal memory to be recalled to the display immediately when required.

Extensive local edit checks, modified data tag, and menu-driven forms design further improve data entry throughput.

The HP 2394A is specially designed to operate in either HP 3000 VPlus or HP/IBM Interactive Mainframe Facility environments.

The HP 2394A offers ergonomic features such as built-in tilt and swivel and smooth scrolling. With eight pages of memory standard, data communication speeds up to 19,200 bits per second, and ANSI compatibility, the HP 2394A is an ideal alphanumeric terminal for a variety of applications.

For more information, check **H** on the HP Reply Card.



HP's family of low-cost terminals consists of (left to right) the HP 2392A Display Terminal, the HP 2393A Graphics Terminal, and the HP 2394A Data Entry Terminal. All feature built-in tilt and swivel and smooth scrolling.

New mass storage alternative for HP 1000 and HP 9000 systems

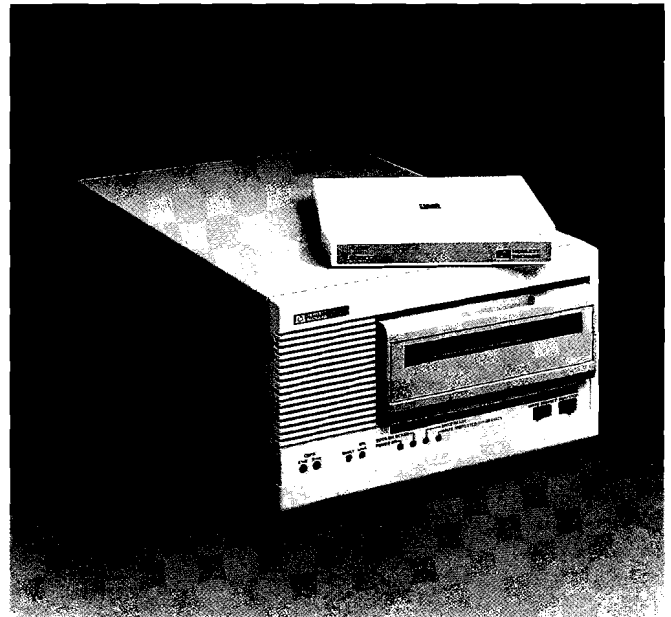
Now users of HP 1000 and HP 9000 Computer systems have an alternative to mass storage devices that combine a fixed disc with 1/4-inch cartridge tape (HP 7942A/46A). The HP 7907A is a new fixed/removable disc drive that offers high performance and special features at a very affordable price.

The HP 7907A Disc Drive has a total of 41 megabytes of storage capacity, half of it removable on an easy-to-handle 8-inch cartridge. This complete mass storage subsystem features a small lightweight package, off-line store/restore capability that can be completed in 2 to 3 minutes, and 19-inch EIA rack mount option. The drive is capable of 22 I/O operations per second and has an environmentally rugged design.

Among the benefits of the HP 7907A are:

- A fixed/removable alternative for HP 9000 users
- Dramatic increase in tolerance to shock and vibration over its predecessor, the HP 7906A
- Completely user installable
- Data security provided by removability of the cartridge
- Great reduction in system downtime for backups and data interchange compared with a 1/4-inch cartridge tape (the HP 7907 is up to five times faster)
- Affordable data interchange/backup alternative to fixed Winchester with 1/4-inch tape cartridges.

For more information, check I on the HP Reply Card.



The HP 7907A provides users of HP 1000 and HP 9000 computer systems with 41 megabytes of data storage capacity, half on a fixed disc and half on a removable disc cartridge.

Powerful TECAP software shortens integrated circuit design cycle

To generate precise circuit simulations for IC design, you need accurate transistor model parameters. TECAP—Transistor Electrical Characterization and Analysis Program—gives you these model parameters quickly and easily. TECAP shortens your IC design cycle and saves valuable engineering and production resources.



TECAP (Transistor Electrical Characterization and Analysis Program) benefits semiconductor designers by making measurements, extracting model parameters, simulating device performance, and plotting results. The hardware can be configured as a benchtop system.

TECAP system hardware performs I-V and C-V measurements on your developmental wafers or discrete transistors. TECAP software transforms the measured data into transistor model parameters. Because the model parameters match your fab technology, they provide the most accurate basis for circuit simulation and yield better IC designs.

The TECAP software uses the computing power of the HP 9000 Series 200 Pascal workstations. The software, written in Pascal 3.0, is menu-driven and requires no programming expertise. Measurement, parameter extraction, device simulation, and plotting routines are included in one unified program.

Choose the system that's right for you

TECAP supports a wide range of measurement hardware. The HP 4145A Semiconductor Parameter Analyzer is used for I-V measurements and the HP 4280A C-Meter takes care of C-V measurements. TECAP can also run on the HP 4062B or HP 4063A Semiconductor Parametric Test Systems. TECAP supports automatic wafer probers, switching matrices, disc drives, printers, and plotters to give you increased flexibility.

For more information, check J on the HP Reply Card.

Diagraph now available for HP 9000 Series 200 workstations

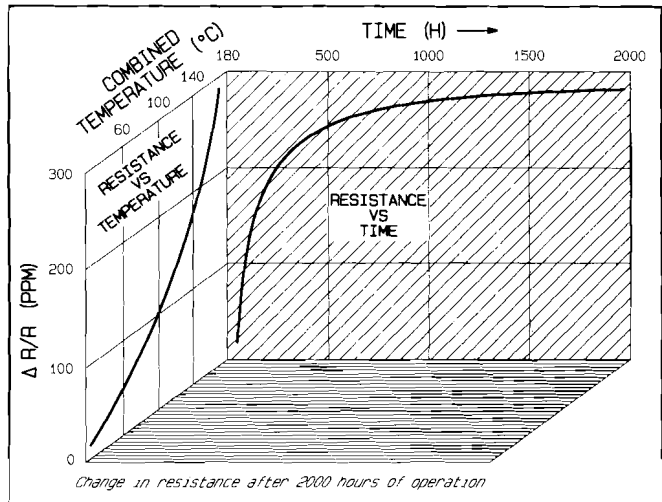
Diagraph™, a powerful, interactive presentation graphics software package, is now available for HP 9000 Series 200 Computers.

Diagraph is ideal for the preparation of organizational charts, forms, signs, word charts, flowcharts, and presentation aids. You can choose from a library of over 1,600 symbols organized into categories including graphic aids, geometrics, signs, icons, and pictorials. Any symbol can be moved, sized, stretched, rotated, and copied. You can connect symbols and draw freeform lines using the graphics cursor. Text can be added in any of 13 type fonts. It is possible to move, size, stretch, and rotate the text anywhere on the Diagraph.

Series 200 Diagraph provides its own Pascal operating environment, so no particular language environment or installation is required. It runs on HP 9000 Models 216, 217, 220 (requires 98204B video interface card), and 236A/C with 512K bytes of memory and supports a wide range of peripherals. Diagraph is available worldwide; however, it will work with the keyboard in U.S. mode only.

For more information, check **K** on the HP Reply Card.

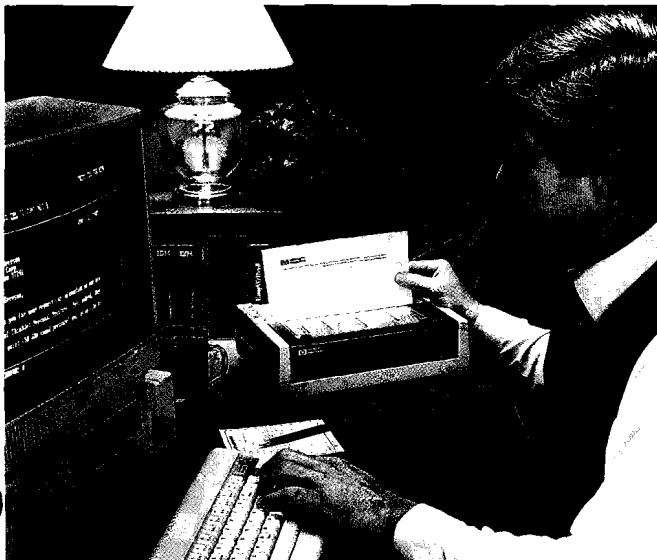
Diagraph™ is a trademark licensed to Computer Support Corporation.



Diagraph software for HP 9000 Series 200 Computers provides symbols from a library, freeform lines, and text in any orientation.

New ThinkJet Printer is compatible with many personal computers

You can use a new model of the Hewlett-Packard ThinkJet Personal Printer with many personal computers manufactured by Hewlett-Packard, International Business Machines, and Apple Computer. The new HP 2225D Printer is the RS-232-C serial interface version of the printer, and like the other



A variety of interfaces and extensive software support allow you to use the ThinkJet Printer with most major personal computers.

members of the ThinkJet family of printers it offers quiet, clean printing at fast operating speeds.

The HP 2225D printer is supported on the following personal computers:

- Hewlett-Packard 150 (Touchscreen) family
- IBM PC, IBM PC AT, and IBM PC XT
- Apple Macintosh, Apple IIc, and Apple IIe.

It is also compatible with the HP 2392A, HP 2623A, HP 2628A, HP 2627A, and HP 2624B Terminals. (On terminals, the HP 2225D supports text only. There is no line-drawing character set for graphics support.)

Now you can order the ThinkJet printer with any of four connections to your computer. The HP 2225A has an HP-IB (IEEE 488) interface for HP computers and instruments, and the HP 2225B uses an HP-IL interface for HP calculators and portable computers. The HP 2225C has a Centronics parallel interface, which allows you to connect the printer to personal computers from IBM, Apple, Compaq, and Texas Instruments.

A special software driver developed for Hewlett-Packard by SoftStyle, Inc. also allows the printer to be used with the Apple Macintosh for applications such as MacPAINT and MacWRITE.

For more information, check **L** on the HP Reply Card.

JetStart™ is a trademark of SoftStyle, Inc.®

Low-priced computer family designed for small businesses

If you use Hewlett-Packard measurement instruments or technical computers, you are already aware of their high level of quality. You depend upon them to give you accurate data and to perform calculations quickly with a minimum of servicing. But have you thought about putting this same quality, reliability, and performance into your front office?

The new HP 260 Small Business Computer System is designed for the company that requires a powerful and reliable, yet easy-to-use system. It is uncomplicated to install and operate and has full-screen display forms that are tailored to resemble standard business forms.

The HP 260 is especially suited to business tasks such as bookkeeping, payroll, order processing, and inventory control. It can be used simultaneously for interactive program development, batch processing, data communications, and special applications.

Three models available

All three models of the HP 260 are fully compatible with its predecessor, the HP 250. The same system processing unit (SPU, Model 45261D) is provided with each of the models, which differ primarily in the amount of available disc storage.

The SPU uses a 16-bit HP proprietary processor. Included as standard are 512K bytes of memory (192K bytes of system memory and 320K bytes of user memory), four HP-HIL ports, and a peripheral interface channel (HP-IB parallel interface). An asynchronous serial interface is also available, which provides RS-232-C, RS-422, and current loop ports. Finally, an intelligent network processor can be added to the system for synchronous communication with HP 3000 systems and for emulation of IBM 2780 and 3780 terminals.

Growth and reliability

The HP 260 can grow with the businesses it serves. A wide range of peripherals—including disc drives, printers, data capture terminals, and personal workstations—offers an economical way to expand without an expensive upgrade.

The high quality and reliable operation of the HP 260 result in maximum uptime and low maintenance costs. The system does not require air-conditioning and can fit readily into most work environments. Its quiet operation allows it to be placed into an area without disturbing nearby workers.



Each of the models of the HP 260 Small Business Computer System allows small, growing companies the flexibility to automate many of their daily business operations.

System and application software

Comprehensive system software is a key strength of the HP 260. The IMAGE/260 Data Base Management System offers flexibility and security for this multiuser, multitask computer system. BASIC/260, the programming language for the HP 260, is closely integrated with the system software and provides a high-level development tool for value-added systems suppliers or for in-house programmers.

Because the HP 260 is fully compatible with the HP 250, a broad range of application software is available. Packages are offered for manufacturing management, distribution management, financial accounting, medical administration, purchasing management, data communication, office support, etc.

For more information, check **M** on the HP Reply Card.

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