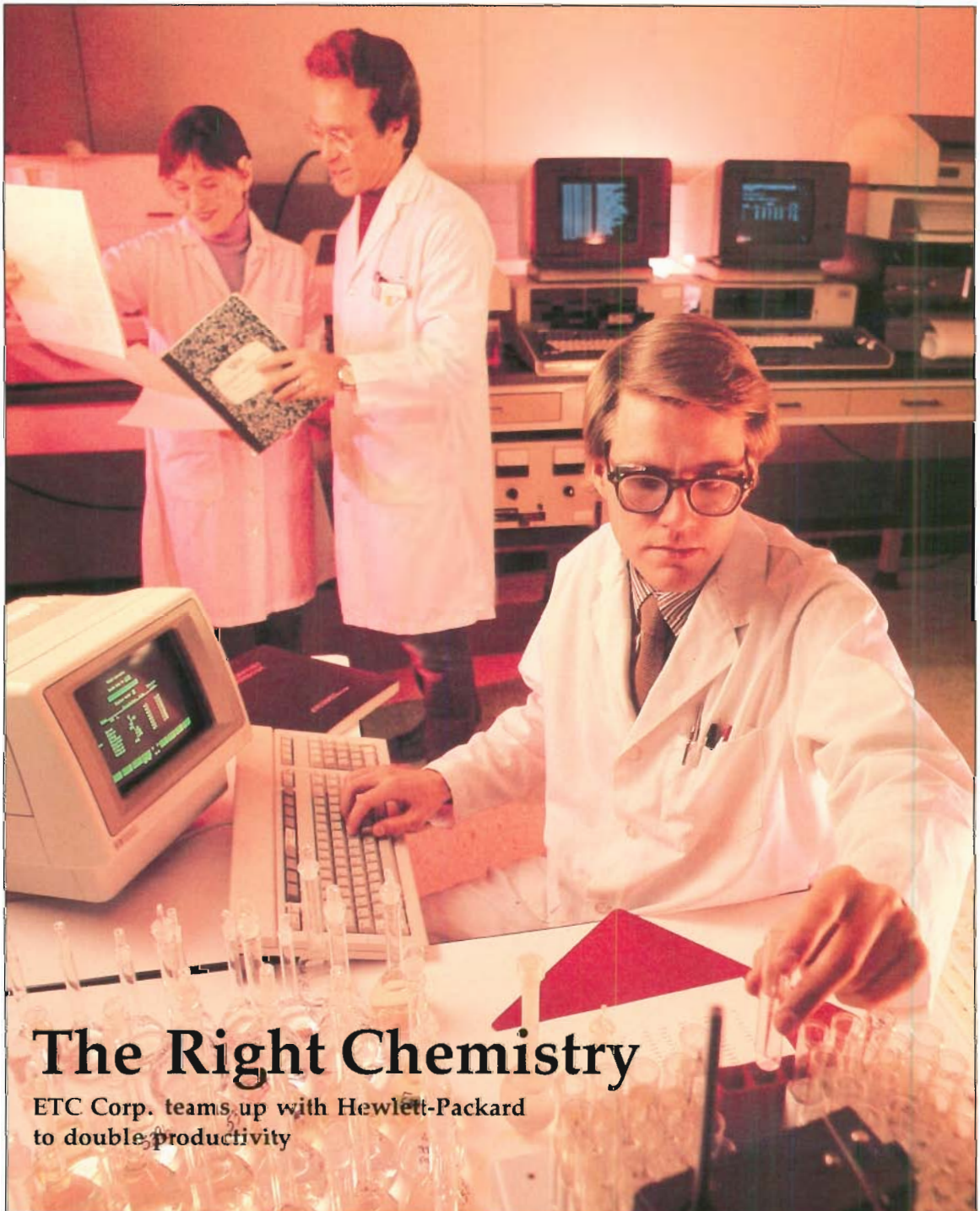
HEWLETT PACKARD

Computer Advances

September/October 1985



The Right Chemistry

ETC Corp. teams up with Hewlett-Packard to double productivity

Charles Wes

Technological innovations will enhance HP's future product offerings

Years of development bring greater integration to HP's computer products and applications, smooth upgrade paths, and resistance to obsolescence

By John Doyle

Several years ago we began a project we called the Spectrum program. Its goal was to develop an architecture for our computers that could unify the broad range of HP's product types, sizes, and application areas.

Objectives of the Spectrum program were to develop a basic design that could integrate the major HP computer families in a way that would result in leadership in cost, performance, and function, while at the same time providing a smooth upgrade path for customers using our present machines.

We think we have succeeded in this mission. Over a hundred prototypes in this new family of computers are now in daily use within our company as many of our product divisions are hard at work integrating and testing the new software and migrating the existing applications. We think that the consistency of a unified architecture will significantly reduce our development effort now and in the future. And we think it is going to offer many advantages to customers as well.

Many of the innovations emerging from the Spectrum program seem to fly in the face of conventional wisdom. For example, we found that most computers spend most of their time repetitiously executing a small number of simple instructions. So we decided to create machines that implement the most frequently used instructions directly in hardware, without microcode.

The architecture of this class of machines has come to be known as RISC, or reduced instruction set computer, because, in fact, fewer instructions have turned out to be necessary. RISC technology offers very fast execution of simple instructions without the high cost usually associated with fast machine cycles. The reduced instruction set, however, is not the goal — it is simply a by-product of striving for the most efficient cost/performance ratio.

The new architecture can be implemented in a range of technologies. The architecture thus is substantially resistant to obsolescence by new technologies, which will only expand its applicability. This guarantees our customers a choice of many configurations and offers graceful, modular upgrades as well.

The first products from the Spectrum program to be introduced will include extensions of the HP 3000 business computer line, with a new operating system compatible with the HP 3000's familiar MPE, and extensions of the HP 1000 and HP 9000 lines with HP-UX operating systems, Hewlett-Packard's implementation of the AT&T UNIX™ operating system.

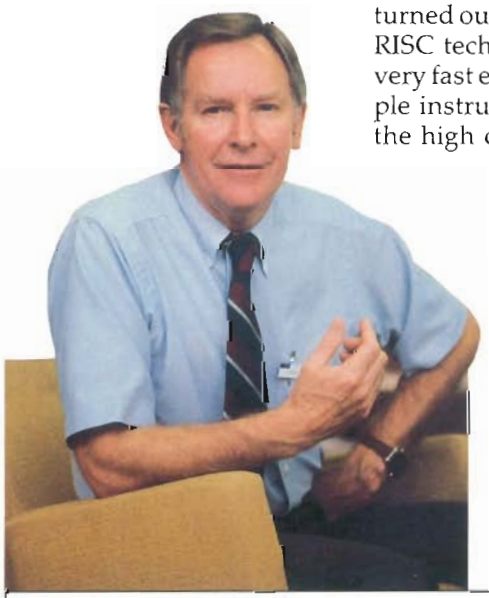
Migration from current HP 3000s to next-generation models will involve much less disruption than the industry has usually seen. Software for current HP 3000s will run unmodified on the first of future products at about the same speed as on present models; with recompilation, applications written in current high-level HP 3000 languages will run at speeds closer to the natural speed of future models. Both unmodified and recompiled software can run concurrently on the new computers. Also, present and future models will run routinely in the same networks. HP will offer trade-up allowances in the same generous range as those now offered on present HP 3000s.

Software for present HP 1000s will transport to next-generation systems using analysis and transport utilities and RTE (real-time executive operating system) emulation. Next-generation real-time products will also offer the advantages of HP-UX, with extensions to add the features needed in real-time applications.

The Spectrum program will play an important part in uniting the instrument and computer product lines of our company; the new architecture is designed to be an effective element in process-control and measurement systems. That union gives us the opportunity to offer unique corporate contributions to the markets we serve. The program will provide a stable foundation for product innovations for many years to come.

For a complete discussion of HP's new computer architecture, see "Beyond RISC: High-Precision Architecture" by Joel S. Birnbaum and William S. Worley, Jr. in the August 1985 issue of the Hewlett-Packard Journal. *Reprints of this article are available free of charge. For your copy, write to the editor of* Computer Advances.

UNIX is a trademark of AT&T Bell Laboratories.



John Doyle
Hewlett-Packard Executive Vice President
Information Systems and Networks

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

A winning case for office automation

Seeking the best of both worlds, the oldest U.S. law firm uses HP products, network strategy and training to achieve a highly compatible integrated office system. The result: operators can work independently or exchange information inside and out.

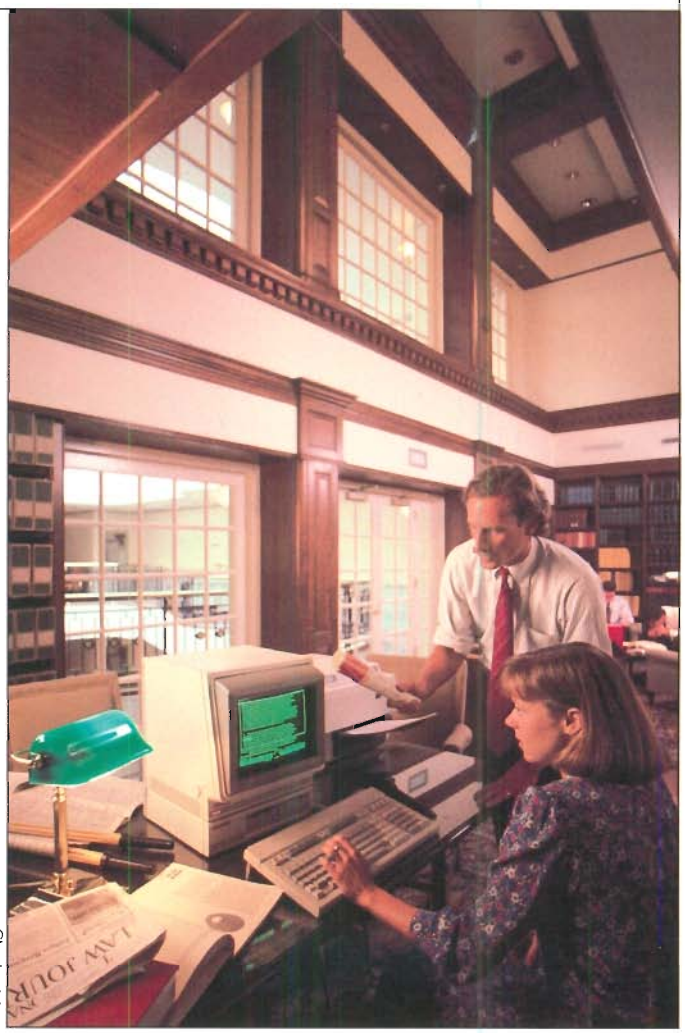
When Cadwalader, Wickersham & Taft, the oldest U.S. law firm, recently undertook automation of its 230-lawyer offices in a new building at 100 Maiden Lane, New York City, it did so with special style. That style, which has won it many legal engagements and considerable prestige since 1792, is thoroughgoing preparation mixed with a dash of daring.

Automating this wholly-owned-and-operated multimillion dollar, 24-story "law center" consists of three overlapping phases: word processing, communications and information retrieval.

Phase one is still underway and involves the installation of 200 HP 150 Touchscreen office workstations and 100 HP LaserJet printers. Every two workstations will share one printer. Ultimately, all of these workstations will be interconnected through a local area network designed to HP's AdvanceNet LAN strategy (based on IEEE 802.3 standard). Key software is Microsoft's WORD®.

The one-source approach to automation had strong appeal to Cadwalader people. Partner Dave Robertson says that good decisions — including the definition of software protocols and type of cabling specified —would flow naturally from regarding the building as a system held together by a local area network. "Using a single and uniform system also ensures us of a supply of trained operators and offers a level of redundancy that is extensive. There is compatibility between machines and between operators. And the use of many high-speed LaserJet printers provides a lot of protection against printing bottlenecks we experienced in the past. All of this adds a level of comfort about reliability that is difficult to match in any large centralized system."

Close to 18.5 miles of coaxial cable link the workstations and mainframes. Cadwalader plans to plug a rooftop satellite antenna into the system in the future to provide connection to various data banks and branch offices in Washington, D.C., and Palm Beach, Florida. Via these channels, all of 200 HP workstations will be able, singly, to tap the outside world through MCI mail, databases such as Dow Jones, The Source, and CompuServe, legal research facilities such as Lexis and Westlaw, as well as standard telex and telegram services. Internally, operaters will have the option of calling up file maintenance and control, electronic mail, litigation support, library assistance, and control of attorney dockets.



Charles West

Legal staffers at Cadwalader can work independently using HP 150 Touchscreen personal computers and LaserJet printers, or interactively via HP 3000 computer-based local area network.

According to Robertson, hardware and system selection was based on a set of specific considerations. "We wanted the best of both worlds — to give operators full independence in creating documents plus very flexible networking for communicating and gathering information," he says. "It's vital in our business to be able to produce a lengthy document on a stand-alone basis. But it's also important to have ready access to each other's information as well as outside sources via a network that is fast, reliable, and unobtrusive."

Ease and quality of production and communication were other important criteria. "To be able to produce a 20- to 30-page legal document in just a few minutes instead of hours was a powerful economic incentive," says Robertson. "The print quality of the LaserJet is superb, and even the 'traditionalists' like it. It's a very quiet machine. What's more, they also appreciate the fact that a letter that used to take two pages can now be printed comfortably and readably on one page. That's handier and less daunting."

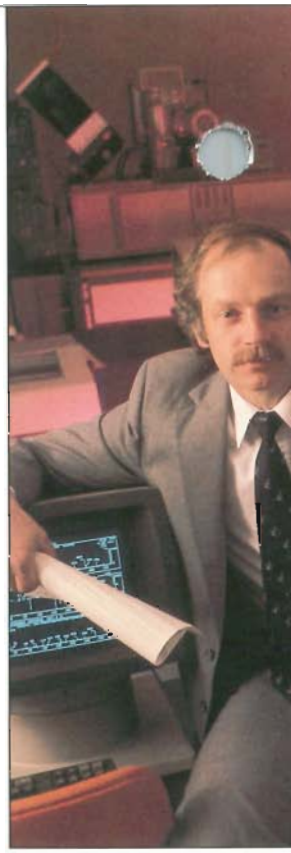
HP involvement in the Cadwalader program of automation began in the early stages of design. Jim Johnson,

continued on page 6

The Right Chemistry

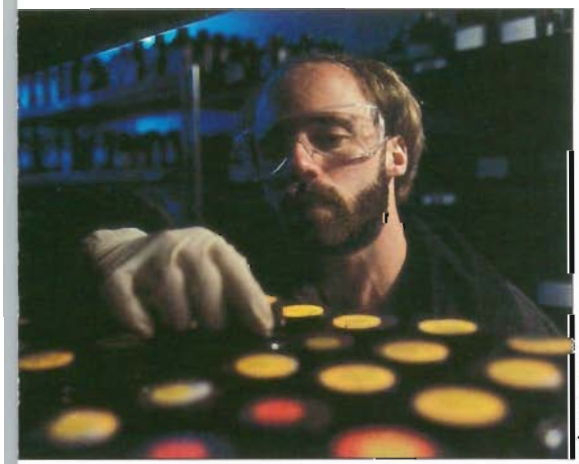
Environmental Testing and Certification (ETC) Corporation of Edison, New Jersey, built its entire organization around an HP productivity network several years ago, convinced that a completely integrated system would help cut costs through steady productivity gains. It did.

Over the years the company has achieved its original productivity goals, and more. In just the last two years, ETC has doubled overall productivity and cut analytical test costs by more than 300 percent.



ETC managers are committed
From left, Dave Speis, gc/ms m
Fitzgerald, vice-president of

ETC Corp. was started in the early 1980s in response to the growing demand for effective systems to monitor and control the buildup of hazardous materials in the environment. The U.S. government passed several laws aimed at controlling the management of toxic chemicals. Because of this legislation, companies with toxic waste sites now had to assemble and manage a mountain of information: measurement of contaminants; data about both stable and variable environmental conditions at the site; related operational factors; and administrative information about budgets, schedules, contracts, and personnel.



Will McIntyre

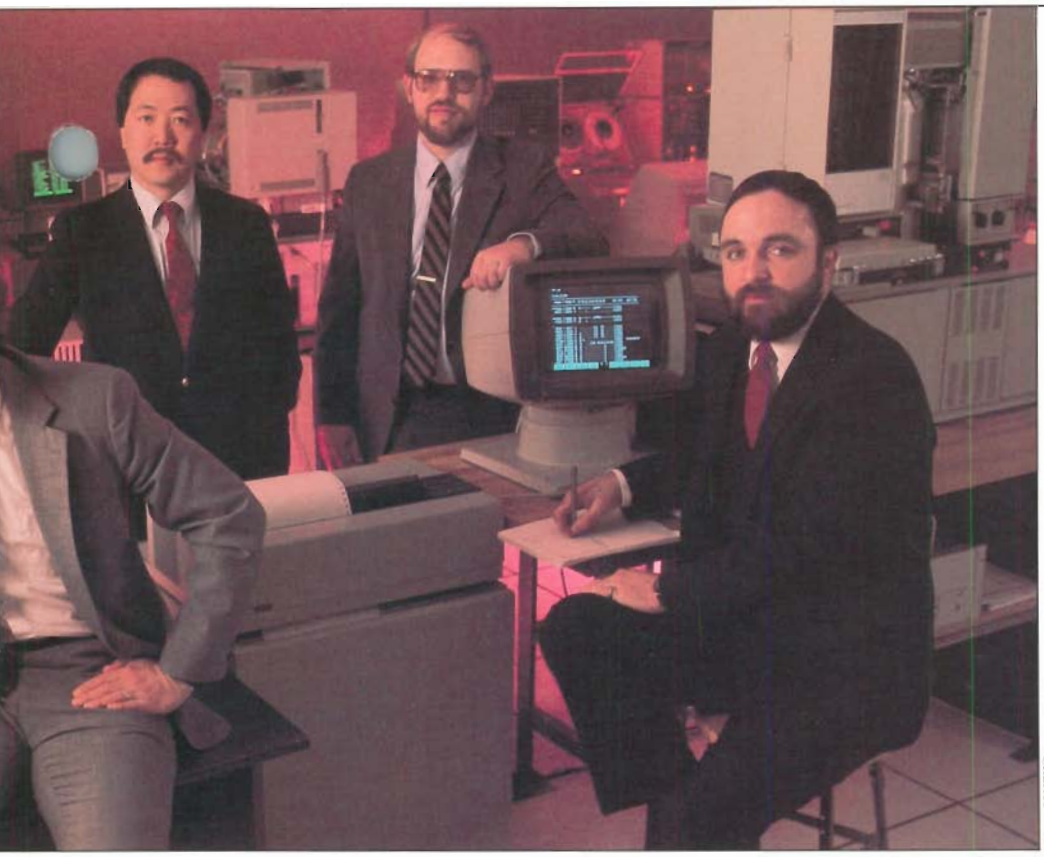
The diversity of samples recently tested at ETC ranges from river and well water to cosmetic creams, paints, plastics and even over-the-counter seafood. ETC also develops and maintains databases for each client so test data is always available when needed.

ETC stepped in with an effective answer: an integrated computerized system capable of handling both information management and lab analysis — all based on a productivity network from Hewlett-Packard. "Back in 1981, our company's founders recognized there was a significant market for quality analytical chemistry and information management services as a consequence of the new legislation," says John Fitzgerald, vice-president and manager of operations at ETC. "However, to form a company like this and to have it succeed, they realized it would need a totally integrated information management system that could grow as the company grew. Our first decision was to form the company, and our second was to construct it around an HP network of technical and business computer equipment.

"HP was the only vendor who could automate both the analytical and business sides of our operation and combine those systems into one communications network. Also, we saved over $1 million in capital investments by going with HP. Other vendors' solutions required almost three times the equipment to achieve the same results as our HP network," says Fitzgerald.

Streamlining information flow doubles productivity

The HP system at ETC links an HP Laboratory Productivity Network (including lab automation software, five HP 1000 computers, and eighteen HP analytical instruments) with an HP 3000 Series 68 business computer used to generate technical reports and manage information. With HP's productivity network in place, lab techni-



Charles West

o quality. To that end, every department in the company relies on Hewlett-Packard systems and support. nager; Denis Lin, vice-president of marketing; Jim Bower, manager of technical support services; and John erations.

cians at ETC rarely have to pick up a piece of paper. Using software developed with HP's Rapid/3000 application development tools, samples can be tested and the results transferred electronically to the main database on the HP 3000. These and other reports are stored in the computer's memory and can be printed out on one of ETC's HP 2680 laser printers. "Essentially, we've moved away from a paper-intensive process. Since our HP system now tracks information electronically from the lab to the business sector, and allows us to view information, anytime and anywhere, we need fewer people to handle paperwork," says Fitzgerald. "We've been able to put about 12 percent more of our support staff into direct production functions." The results are significant: nearly double the productivity in a two-year period — from roughly 60,000 analytical runs a quarter in 1983, to 100,000 a quarter in 1984.

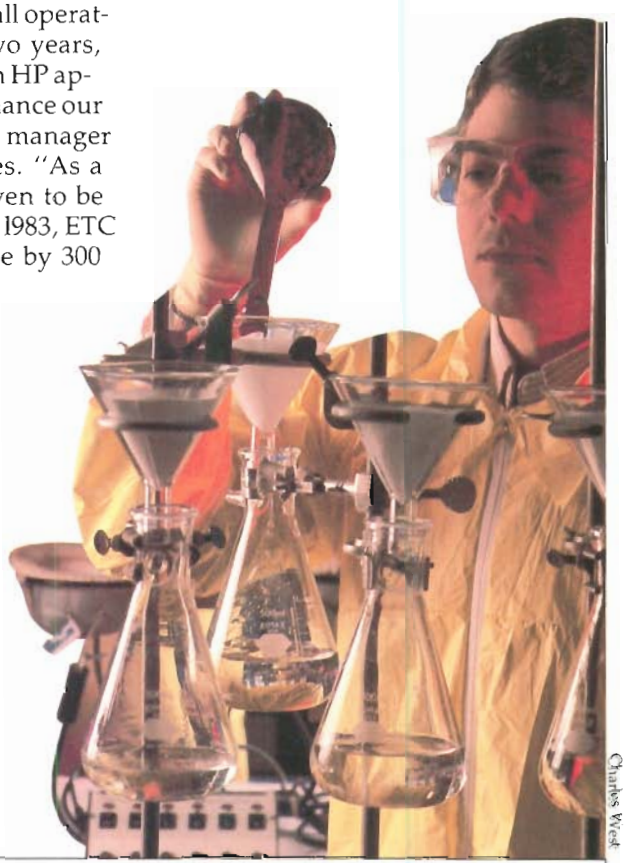
Bottom line performance

The HP productivity network also has enabled ETC to reduce overall operating costs. "Over the last two years, we have continued to add on HP application tools to further enhance our network," says Jim Bower, manager of technical support services. "As a result, our system has proven to be incredibly cost effective." In 1983, ETC reduced the cost per sample by 300 percent. During 1984, they further reduced the per-sample cost by another 23 percent, a fact that is all the more remarkable because of the volume ETC handled that year: nearly double the number of samples with no increase in staff. "Clearly, our partnership with HP has directly contributed to our bottom line," says Fitzgerald.

Outstanding reliability and support

"From day one HP has responded to our needs quickly and effectively. HP delivered the hardware ahead of schedule, and within a week of delivery all our systems were up and running — no small task, since we went from a dirt floor to a fully operating business in six weeks," says Fitzgerald. "We consider our HP support people as members of our staff and trust their advice, especially with a system like ours that runs 24 hours a day, 7 days a week. With downtime costing us $30,000-$40,000 an hour, our system's near 100 percent reliability has been critical to our success."

Concludes Fitzgerald, "HP's productivity tools really do work. As we continue to grow, we plan on expanding with additional HP equipment."



Charles West

Analysts applaud Hewlett-Packard's new information access software

"With HP Access, HP has leapfrogged other office automation vendors. This is the closest thing to a real distributed processing system I've seen."

Jan Lewis, senior analyst with InfoCorp, a Cupertino, California, industry research firm.

Industry analysts have been saying for years that "The way to get the best return on your investment in personal computers is by integrating these systems with the larger computers owned by your company." The advantages are clear:

- the power of personal computer tools like spreadsheets, graphics, and personal databases;
- access to the information stored in your firm's larger computer systems.

HP Access — software that links personal computers to key company databases — gives you these advantages and more, expanding your ability to bring the right information to your desk when you need it.

Access and its companion software product, HP Access Central, give HP 150 Touchscreen computer users access to information from a variety of sources, including the HP 3000 database system (IMAGE/3000) and personal computer databases such as CONDOR and dBASE II™. Using HP Access products, users can draw information from several information systems, which appear to operate as a single database.

Future enhancements promise even more accessibility to information, including a link to IBM mainframes. Working in conjunction with Cullinet Software, Inc., HP plans to integrate these products with Cullinet's Information Center Management System mainframe software package.

HP Access "is the best tool I've seen for tapping internal or external databases."

Andria Rossi, associate editor of the *Seybold Report on Office Systems*.

HP Access "provides the level of integration knowledge workers need in the office. This shows HP understands user needs, which can be a major competitive advantage. In our opinion HP could be a dominant force in the office market by 1986."

The Gartner Group Report (May 15, 1985).

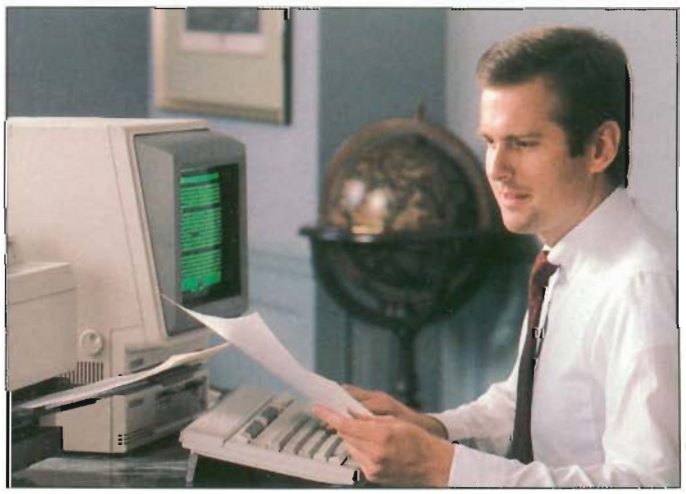
Because personal computers offer better price/performance ratings than mainframes and minicomputers, it makes sense that PCs should be doing as much computing as possible. The excitement generated by the HP Access products rests in large part on HP's effective use of the personal computer and the flexibility to support individual choices of software tools — such as Lotus® 1-2-3®, Multiplan®, dBASE II™, and CONDOR — while still providing a direct, time-saving link to all the company information you need.

Winning Case *continued from page 3*

legal account manager in the Hewlett-Packard Manhattan office, arranged product and system demonstrations for more than 60 people over a period of one year.

Training has been the most immediate need. Cadwalader and HP have completed the training of inside trainers — 40 key supervisors and department representatives have received intensive one-week courses presented by HP trainers. Reaction has been highly favorable. "I kept looking for problems, thinking this was going to be very difficult," commented one graduate. "But now I feel very good about it. It was fun."

Field service maintenance by HP is cited by Robertson as being "first rate at reasonable cost. "Compared to previous and other possible commitments," he says, the contract cost of HP's on-site maintenance program is "considerably less on a per-unit basis."



Production of legal documents at Cadwalader is now a matter of minutes rather than hours, using HP office automation systems.

HP Portable PLUS — bigger screen, more memory, and lower price

The full-featured HP Portable PLUS provides computing power for traveling professionals.

A new version of The HP Portable, The Portable PLUS, offers mobile professionals significant improvement in take-along computing — larger screen, new software options, easier connections to desktop and mainframe computers, and a fast, reliable information storage system.

A major enhancement is the anti-glare LCD (liquid-crystal display) screen, which displays as much information as the screen of a desktop computer. High-resolution and a fully-adjustable screen work together to produce a readable display.

With an optional Portable/Desktop Link, The Portable PLUS directly accesses a desktop computer plus printers and disc drives. It also functions as an intelligent terminal to an HP 3000 business computer or IBM mainframe for access to applications, databases, and electronic mail. An optional internal modem links The Portable PLUS to data communications services anywhere phone lines go.

New computer terminal displays full-color graphics

The HP 2397A, a new color graphics terminal with all the features and software support of the monochrome HP 2393A graphics terminal (see "Innovative displays: new low-priced terminals from HP," *Computer Advances*: July/August 1985), is a useful tool for business, technical, and industrial color applications.

The HP 2397A is a flexible color graphics workstation for business, technical, and industrial applications.

The HP 2397A color graphics terminal can be used with a variety of options such as HP Touch, mouse, graphics tablet, and bar code reader. The terminal works with the HP 3000, HP 9000 and HP 1000 computers. It also works with the DEC VAX™ minicomputer and can emulate a Tektronix 4010/4014 terminal. With an optional port, you can output information to a variety of printers and plotters. And, because of the HP 2397A's modular design, you can replace the monitor with other video devices such as film recorders or large screen projectors.

New desktop link to HP financial management systems

HP Application Link — a software program that connects personal computers to information on larger computer systems — is specifically designed to meet the information needs of business executives. Now you can access HP financial management systems information residing on the HP 3000 business computer from a personal computer and use spreadsheet programs such as VisiCalc® and Lotus® 1-2-3® for business analysis. You can schedule information retrieval in advance for analysis on a regular basis; monitor expenses to evaluate actual versus target costs; and prepare graphics and reports on the latest changes and trends without having to depend on your data processing staff.

HP Application Link is thoroughly integrated into HP financial management systems. Its menu-driven operation, together with HELP screens, provides maximum ease of use for both novices and experienced users.

VisiCalc® is a US registered trademark of VisiCorp.
Lotus® and 1-2-3® are US registered trademarks of Lotus Development Corporation.

HP film recorder produces professional slide presentations in-house

The new HP 7510 film recorder produces brilliant high-resolution computer-generated 35mm slides and 3½ × 4½-inch prints for technical presentations.

The new HP 7510 color film recorder uses vector technology to produce 35-mm slides and prints for professional presentations.

Having this in-house color film recorder eliminates the long wait and expense usually experienced with a service bureau. Slide production is fast and lead time short. The cost of buying an HP 7510 equals that of producing twelve 30-slide presentations at an average-priced vendor.

The HP 7510 color film recorder can be connected to virtually any personal computer, minicomputer or mainframe. As an option, it also produces 3½ × 4½-inch Polaroid instant prints with the same high resolution.

IN BRIEF

- Proctor and Gamble, a long-time customer of HP, recently added another HP 3000 computer to its worldwide network of HP systems — bringing the total number of HP 3000s now in service at the $13 billion multinational company to more than 80. This sale is a major milestone for the HP 3000, representing the 20,000th installation of this flexible business computer in diverse businesses around the world. Proctor and Gamble plans to use the new system for manufacturing and office automation applications, including electronic mail (HP DeskManager) and word processing (HPWord).

- HP has a new weapon to track down bacteria and fight disease. Doctors at the Center for Disease Control in Atlanta, Georgia are using HP's Microbial Identification System to identify bacteria. What once took weeks is being done in a few hours, updating a procedure that's been in effect since the days of Louis Pasteur. An HP gas chromatograph analyzes the bacteria, and an HP 9000 Series 200 desktop computer, using a new software package, compares information from the analysis with data on thousands of samples to identify the bacterial strain. At the heart of the system lies a software library of known strains of bacteria, developed by a team of university scientists. The new system will find applications in sterility-control laboratories for pharmaceuticals, foods and cosmetics, and in laboratories involved in human and agricultural pathology, where speed, safety, and reliability are important.

New Products continued

Build a "custom" CAD system with modular HP 9000 Series 300 computer

The HP 9000 Series 300's modular design lets engineers tailor system performance and components for measurement, analysis, test, and control applications.

Introducing the HP 9000 Series 300 — the flexible computer for computer-aided design (CAD). The Series 300 is more than just a single machine. It is a system of computer components that changes when the needs of your organization change. Because it is modular, you have choices in computational power, color, screen resolution, peripherals, and accessories — and the components work together in a variety of configurations. The HP Series 300 is low-cost: built on standard design and advanced very-large-scale-integration (VLSI) technology. And powerful: using powerful operating systems like UNIX™ and high-speed 16/32- and 32-bit processors.

The HP Series 300 runs the MC68010 and MC68020 microprocessors from Motorola. The MC68000 series has proven itself for years as the industry standard in 16/32-bit computing: reliable, inexpensive, and universal. These microprocessors represent the leading edge of computer technology today — hundreds of thousands of transistors on a fingernail-size chip.

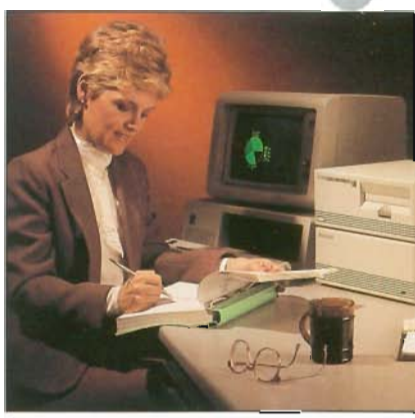
High-capacity information storage for your personal computer

New personal information storage products offer low cost, high reliability, performance, and capacity to owners of HP 150 Touchscreen, IBM PC, and Compaq computers.

The HP 9142A tape backup system provides an easy, low-cost way to back up information stored on personal computer hard disc drives. Simple function keys free users from complicated commands and a special error detection and correction system ensures accuracy. If a hard disc fails, the tape backup emulates the disc until it is repaired.

New Winchester discs provide large-capacity information storage for a variety of uses. The entry level 10 Mbyte disc (HP 9154A) is perfect for word processing, graphics and spreadsheet applications. The 20 Mbyte disc (HP 9134H) is best for general accounting, databases, or small local area networking.

A disc/tape interface card (HP 88500A) is available to connect these products with an IBM or Compaq personal computer. The interface comes with software for diagnostics, backup, installation, and a data manager that can help users organize files in the disc drive for easy retrieval.



HP's new information storage products expand personal computer storage capacity.

To find out more about Hewlett-Packard or its products and services, please call your local Hewlett-Packard sales or service office. Note: Not all HP computer products are sold and supported in all countries.