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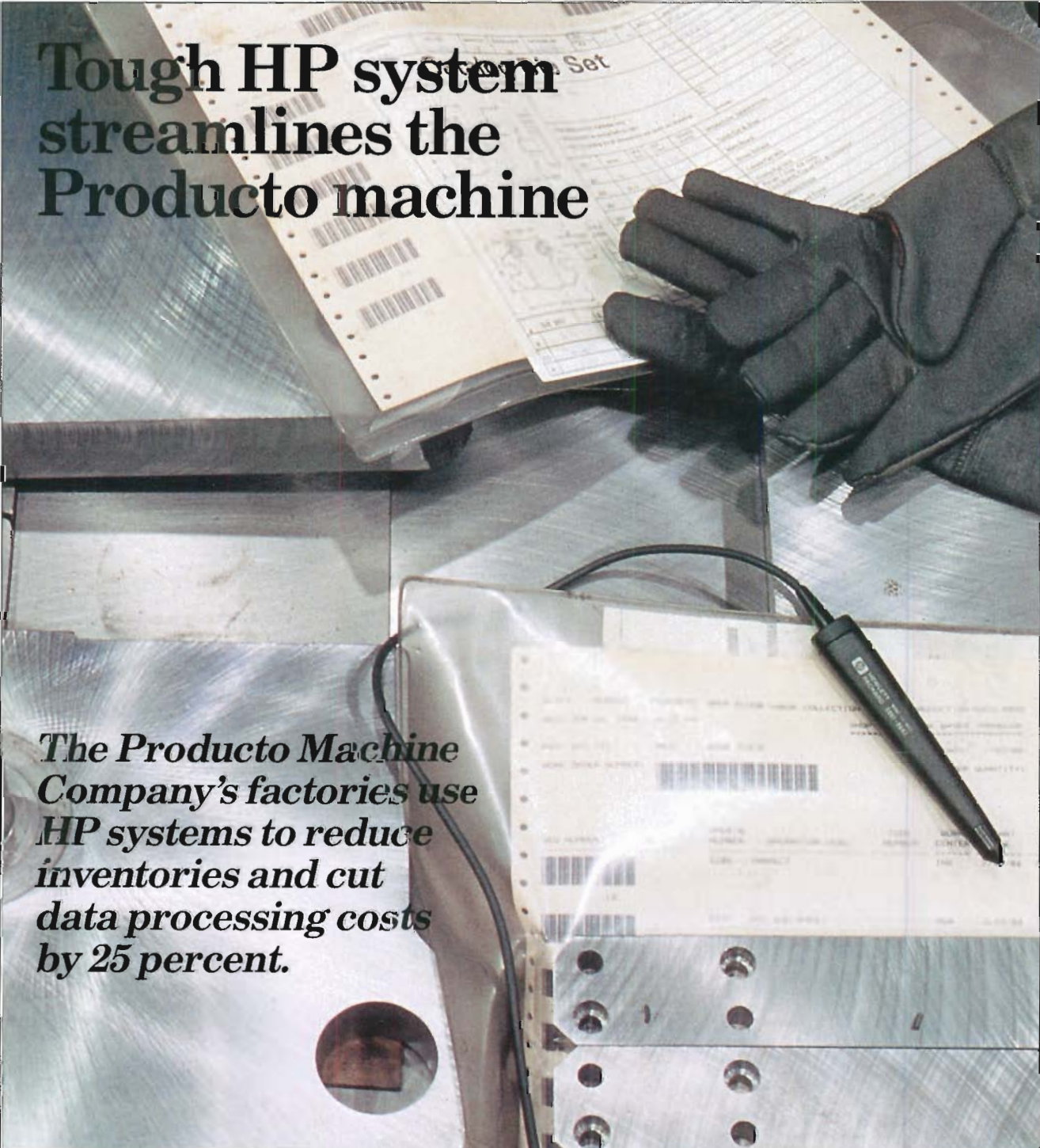
Winter Issue 1987

Tough HP system streamlines the Producto machine

The Producto Machine Company's factories use HP systems to reduce inventories and cut data processing costs by 25 percent.

Bar coding: a productivity tool that works

By Hal Edmondson

Manufacturing and process automation have made great strides in increasing quality and efficiency throughout the industrialized world. But wider adoption has been stymied by what might be called an "input" gap. Getting information into any system has always depended largely upon slow, error-prone handwriting or typing.

Now, a 40-year-old technique, bar coding, is helping to close that gap and showing impressive results. Hewlett-Packard first began to use bar codes in 1979. Today, bar codes are surfacing in virtually every HP division—and in much of the rest of the manufacturing and industrial process community around the world. In fact, the Department of Defense, the Department of Energy, and the automotive industry now require bar codes on products they buy.

Significant productivity improvements. It's not hard to see why. Bar coding is the fastest way to enter, track, and update factory information, whether on products or processes. It can be 10 times faster than keying data into a system

and perhaps 1,000 times more accurate. Compared to other automatic information gathering schemes, it offers the broadest applicability. But it is not just a contributor to efficiency, it is a key ingredient in an automation system—the one that can make an application possible or even worth doing.

As the leading vendor of bar code hardware outside the retail sector, Hewlett-Packard has a major stake in the business. And as a company in which virtually every manufacturing division uses bar codes, HP has gained a deep understanding of their profitable applications. Bar code techniques help increase quality, and we at HP have found that increased quality almost automatically leads to reduced costs.

One HP division, for instance, needed to collect data about the quality of its manufacturing process, including the identity of each printed circuit board, cycle time, problem symptoms, diagnoses, and repairs made. A manual system got worthwhile results, but took a great deal of time. The information often wasn't entered accurately, and wasn't timely enough to help in day-to-day

decision making. The addition of a bar code system has increased productivity by a factor of six.

Another division went from batch production of its 123 different printed circuit boards (with 10 to 15 versions in production at any time) to just-in-time manufacturing. Bar coding proved to be the most logical and effective human/machine interface for the system. Turnaround time has become significantly shorter, and, more importantly, the division now carries 50 percent less inventory. Bar coding was only part of the solution, but the critical one.

In some cases bar code readers help machines talk to machines, thus reducing human errors and speeding up production processes. For example, one of our divisions uses an automatic printed circuit

board loading machine. The machine identifies which board is coming next so it can call up the proper insertion program from the computer. It does this by simply scanning a bar code on the board.

Getting the most value from automated systems. The list of applications at HP goes on and on. We have found that bar coding, while not the whole solution, is the finishing touch on any system that requires efficient, accurate gathering of information rapidly enough that its analysis can have an impact on daily operations. Compared to other techniques, its cost is quite small.

Bar coding is another way to help wring the utmost value from automated systems, whether totally automated factories or small islands of automation. HP, with its pre-eminence in the bar code market, its own experience, and its historical concern for quality, is well equipped to coach firms through their first profitable exposure to bar coding. **(hp)**
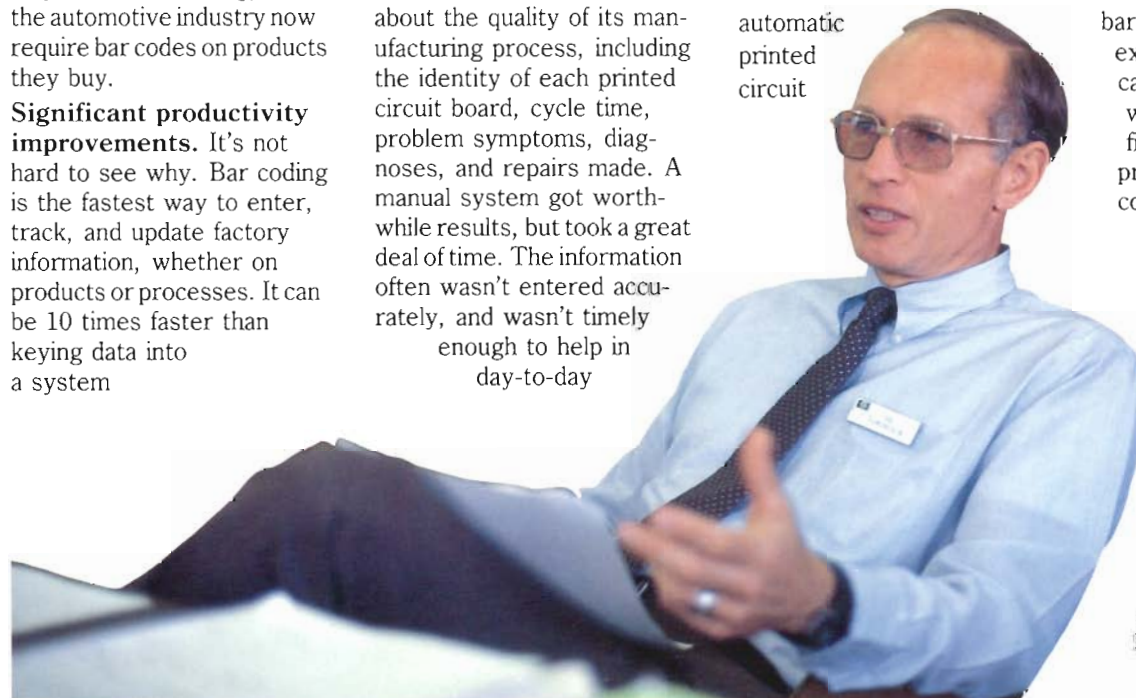
Hal Edmondson
Vice President and Director
Corporate Manufacturing
Hewlett-Packard Company

HP Computer Museum
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Automation moves sales at Allied Van Lines

How does the world's largest moving company improve sales force productivity and accuracy? Allied Van Lines uses the HP-41 Advanced Calculator to close sales faster.

An Allied moving counselor uses the HP-41-based ALLFAX system to provide a thorough room-by-room inventory.

I f you've ever hired a moving company to relocate your household possessions, the process of getting an estimate may have been something of a mystery. But Allied Van Lines, the country's leading moving company, now uses the HP-41 to eliminate the mystery and provide fast and accurate on-the-spot estimates to customers.

Productivity challenge. In 1984 Allied had a work force of 2,500 people out in the field whose job it was to give estimates on moving costs to potential customers. An Allied moving counselor would go to the customer's home or office and do a room-by-room inventory, recording the contents of each room on a checksheet. The cost of the move was then determined manually using a formula that converted the approximate cubic feet of an item into weight. Other factors contributing to the estimate included such things as the origin and destination of the move, insurance costs, packing methods, government regulations, and storage costs.

With so many variables to consider, the moving counselor was forced to keep customers waiting while wading through a complicated set of calculations. Allied needed an innovative solution that would produce quick estimates so that counselors could close sales on the spot.

The HP-41 is the solution. Allied now uses a bar code reading system built around the HP-41 to produce accurate estimates, make effective sales presentations, and quickly provide the customer with an itemized sales quotation.

The system, which Allied calls ALLFAX™, combines the HP-41 with a bar code wand and HP ThinkJet printer. It makes short work of the formerly time-consuming process of estimating the cubic feet and weight of household items. A directory contains codes that correspond to typical household or office items. By passing the bar code wand over the appropriate codes, the ALLFAX system records the size and weight of each item. When the inventory is complete, the HP-41 calculates the total cubic feet and weight of the customer's possessions and develops the cost to move them. Competitive pricing is also determined through pre-programmed rate files for every selling situation. An itemized sales quotation is then printed out on the HP ThinkJet printer and the quotation is in the hands of the customer in about 12 minutes. Comparative prices can be rapidly calculated for the number of items being moved, insurance, packing, and other options.

After the sale is closed, all this information can be transferred electronically to a mainframe computer at Allied headquarters where further tracking and analyses help streamline the moving process.

Everyone Benefits. Allied's use of the HP-41 produces benefits for everyone. Because all costs are known, including packing costs, costs of materials, and services, the ALLFAX system can give customers choices about the level of service they need. With varied "what if" analyses, moving counselors can tailor a move to fit a customer's exact budget requirements. And because the HP-41 system emulates the manual estimation process, moving counselors do not need extensive training to use it.

"The HP-41 has made our moving counselors more accurate, more professional, and more productive," says C.R. Greene, director of marketing services at Allied. "In fact, in 1986, sales people using ALLFAX closed sales 23% more often than those using manual estimating methods. Customers simply responded to the 'credibility of information' a system like this one allows us to offer."

In a competitive area like the moving business, pricing and service levels are important. The HP-41 system is helping the Allied agents stay ahead of the competition. *(hp)*

Tough HP system streamlines the Producto machine

Since installing a rugged HP 3000-based computer system, The Producto Machine Company has sped up quotes and deliveries, while reducing key inventories by 18 percent.

Everyone buys from companies like General Motors and General Electric. These giants, in turn, buy from firms like The Producto Machine Company of Bridgeport, Connecticut. Producto's Machine Tool division builds precision equipment for Pratt & Whitney Aircraft, GE, Hughes Tool, and many other large manufacturers.

"We operate in narrow markets—but ones in which we can earn dominant positions," says Newman Marsilius III, president of the family-held company. Producto equipment helps build virtually all of the military and commercial aircraft engines in the U.S.

Producto's 400 employees staff two main plants—the Machine Tool Division in Bridgeport and The Tooling Division in Jamestown, New York, which produces tool, die, and precision components for OEMs (original-equipment manufacturers).

Since January, 1985, the company has used an HP 3000 computer, in combination with

ASK Computer Systems software, for such applications as manufacturing management, general ledger, and accounting. The on-line network includes HP bar code readers for gathering time-in-attendance and other data, using Striped Lightning by Peripheral Software.

Cutting through the bureaucracy. Before going with HP, Producto had grown through a series of other computer systems, finding each software conversion more cumbersome than the last. Meanwhile, corporate functions—such as accounting, data processing, and payroll—had grown out of proportion to Producto's business. Says Marsilius, "these departments had taken on lives of their own."

In HP and ASK, Producto found an appealing combination of straightforward practicality and ease of use. "They

Producto's heavy-duty machine environment puts HP products to the environmental test.

At Producto, an HP 3000 computer supports HP barcode readers that track work in process.

stripped away the complications," he says.

The ease of switching to HP and ASK helped Producto's management make a clean break with the bureaucracy that had started to grow within the company. "Our new system let us refocus our attention on manufacturing, where it belongs."

Increased competitiveness. "Though we're a small company, we have very divergent manufacturing requirements," says Marsilius. "Tooling produces large volumes of simple components, for customers numbering in the thousands. Machine Tool, by contrast, makes extremely complex machines for a very few customers." The HP system has boosted the competitiveness of both units.

Fast turnaround is the imperative at the Tooling division, whose OEM customers increasingly demand just-in-time (JIT) shipments. "Our buyers don't want a component delivered until they're ready to put it into the product they're making."

The computer system's quality, scheduling, and production controls "help us stay on top of JIT requirements, while keeping our own inventories low," says Marsilius.

The HP network aids the Machine Tool division by eliminating legwork—and guesswork—that used to hamper its complicated bidding process. "We can easily assemble the price sections on a bid in modular form, drawing on our experience from previous jobs," notes Marsilius. "And we have more accurate historical records from which to draw. We can quote more aggressively, working with tighter margins, because we have greater confidence in the numbers."

Access to information. What's more, Producto's managers can get access to the *right* numbers. With their previous computer system, an avalanche of data had been burying the important facts.

"We do 50 jobs a day, 20 work days a month," says Marsilius. "When we processed data in batch mode, we'd have 1,000 jobs' worth of information to sort through at once.

"With the daily summary reports we get now, we can spot problems and take action while it still makes a difference. All of our system users have gained access to information they never had before," he says. "We've been able to take a look at our business from a fresh point of view."

Tough machines. Giving employees access to the information means putting the machines where the action is. In Producto's case, that means placing computer terminals in a tough industrial environment amid all the usual heat, cold, humidity, noise, and dust.

The computer equipment has withstood the test. "We've had more problems with our phones than with our HP equipment," says Joe Brignola, Producto's manager of data processing. "We've been up and running 24 hours a day, six days a week, for the past two years—with only the most minor of interruptions."

Adds Marsilius, "I've seen some people bulletproof their computers. Aside from putting plastic wrap on the keyboards, we haven't had to worry about 'hardening' the HP machines.

"Producto's shops are no rougher than anyone else's," he emphasizes. "The point is that the computer fit into our environment, rather than forcing us to make the adjustments."

Fast payback. HP and ASK also fit the corporate budget, Marsilius notes. "There must be hundreds of systems from which we could have chosen—if we'd had a million dollars to spend." The system they chose, he says, was "relatively cheap," and paid for itself in less than 18 months.

"We've cut our accounting and data processing costs by 25 percent, while improving the accuracy and timeliness of the reports we get from these groups. We've reduced some key inventory items by 18 percent, while speeding delivery time."

By installing an on-line system to which employees have wide access, "we've eliminated hundreds of 'homegrown' systems: people keeping information in an unsystematic way. Now we're not out on a limb if someone leaves—and it's easier to train new employees." [hp]

HP makes rugged products for harsh environments

Hewlett-Packard tackles the toughest automation jobs in harsh environments and delivers performance you can count on.

HP's rugged industrial computers and data acquisition and control systems stand up to the elements that can shut down your industrial operations—dirt, dust, heat, humidity, vibration, power spikes, and shock.

Depend on our broad range of rugged high-quality hardware products and powerful software tools to perform in the worst conditions typically found in the automobile, machine tool, petroleum, chemical, mining, pulp and paper, rubber and plastic, and other primary industries.

HP offers an expanding line of rugged, reliable automation products. Many have been customized especially for tough conditions. Others have been designed and built from the ground up to provide you with sturdiness along with HP's traditional high quality, reliability, and engineering excellence; these standard products offer workhorse capabilities, featuring environmental specifications found only in the most rugged systems.

The HP 9666A Operator Interface Unit—a rugged terminal that can work with HP 1000, HP 3000, and HP 9000 computers—is designed specifically to run on the factory floor. Contained in a compact dust and drip-protected enclosure, with a keyboard surrounded by a sealed membrane, the HP 9666A withstands dirty environments and temperatures ranging from 0 to 60 degrees Celsius.

When you choose HP's rugged hardware and software systems, you can be confident that you're getting products designed and tested for quality and reliability. From integrated circuits to complete systems, we subject all products to rigorous tests to guarantee that they meet the highest performance standards.

By testing and pushing our products to extremes, we go beyond standard test limits to ensure these products stand up to many environmental hazards. [hp]

The HP 3081A Industrial Workstation Terminal, a compact data collection device, guards itself against the factory environment with a sealed plastic casing. It is sturdy, dustproof, splashproof—resisting grime and many chemicals. The HP 3081A features a standard numeric keyboard, a single-line display, and a choice of bar code readers.

The HP 48000 Remote Terminal Unit operates reliably almost anywhere. It collects data from instruments located great distances from a plant site, often under erratic and challenging environmental conditions, such as those encountered in oil and gas production and pipeline operations.

New line of HP 3000 business computers delivers higher performance at lower cost

Two new HP systems, the HP MICRO 3000 and the HP MICRO 3000XE, offer higher performance and lower cost to HP's business computer line and are engineered to turn ordinary office electrical

menu-style operation. Up to 30 additional personal computer users can be tied into the system using any of HP's local area networks.

The HP MICRO 3000 is priced at 21 percent less than

The MICRO 3000 offers the power everyone in the office needs to become more productive. Advanced design means it outperforms comparably priced systems.

power into business computing power.

Power. The new MICRO 3000XE is the high-powered choice for departments and larger offices with many users that have the need for multiple network connections. It has the ability to serve 8 to 56 users and can function in both local and remote networks.

Economy. The new MICRO 3000 is the choice for smaller offices with 4 to 16 users because it is so economical. It reduces operating and training costs with its simple

the current HP 3000 Series 37 and outperforms both the Series 37 and 37XE. The MICRO 3000XE also provides performance comparable to the HP 3000 Series 42 at a 30 percent lower price.

All systems and applications software and peripherals for the MICRO 3000 systems are compatible with the entire HP 3000 product line. Additionally, HP 3000 Series 37 and 37XE systems can be upgraded to a MICRO 3000XE in about two hours.

Compact new disc drives offer increased capacity

A new line of disc drives for HP computers—the HP 7936/7937 and the HP 7957A/7958A—represent two new mass storage families that offer significant advantages to you.

For midrange to large systems. Two new high-performance disc drives, the HP 7936 and HP 7937, offer HP 3000, HP 1000, and HP 9000 owners increased on-line computer capacity, higher performance, better use of floorspace, and reliability at a lower price-per-megabyte.

Both the HP 7936 and 7937 disc drives can be vertically stacked in a cabinet. Not only do these drives require less space, they consume less power and require less air conditioning, thus reducing data-center overhead costs.

For engineering workstations and small multiuser systems. The HP 7957A and HP 7958A, two new 5 1/4-inch

midrange disc drives, offer the high capacity and performance previously found only in the 14-inch disc products. These discs are the highest capacity 5 1/4-inch disc products offered by HP.

Before now, midrange HP disc drives had been based on 14-inch technology and, as a result, were much larger and more expensive. With the HP 7957A and 7958A, four drives can be rack-mounted and tucked away in HP's mini-rack cabinet.

The HP 7957A and 7958A provide the performance demanded by today's commercial and technical multiuser systems and engineering workstations. Their attractive entry-level pricing results in a substantial reduction in cost per megabyte over previous HP midrange disc drives.

Because of the compact size of the HP 7936 and 7937, two disc drives can be vertically stacked in a cabinet using one-fifth as much space as previous drives.

■ **Joint Research.** HP has joined the Microelectronic and Computer Corporation (MCC) as one of 21 companies that are shareholders in the cooperative research venture. Based at the University of Texas in Austin, Texas, MCC was created in 1983 to help maintain U.S. international competitiveness in microelectronics and computers. HP will actively participate in MCC's semiconductor packaging/interconnect program. Other long-range advanced technology projects are in advanced computer architecture, computer-aided design, and software technology.

■ **#1 in Performance.** For the fourth year in a row, Hewlett-Packard display terminals have come out on top in DataPro's Terminal Users' Survey. The 1986 survey gives all HP terminals a score of 3.5 out of a possible 4 for overall performance. The HP 2392A Display Terminal scored 3.6 in the same category for individual terminal models. DataPro's scoring includes customer ratings for ease of operation, display clarity, keyboard feel and usability, ergonomics, hardware reliability, and service/support.

■ **#1 in Support.** For the fourth year in a row, HP ranks number one in overall support satisfaction based on results compiled from the U.S. Datapro Survey. In five of the six support categories, customers rated HP either first or second. This top ranking across major support categories reaffirms HP's consistency in delivering high-quality support. Scores for Hewlett-Packard are even higher than 1985 results in five of six support categories. This improvement demonstrates HP's continuing commitment to customer satisfaction.

Vectra Publisher PC: a powerful all-in-one desktop package

The HP Vectra Publisher PC includes workstation hardware and software to give you a complete high-quality publishing solution in one product.

The heart of the system is the HP Vectra personal computer (an IBM PC AT-compatible personal computer), with the leading page composition software, PageMaker® from Aldus Corporation, and the windowing environment of Microsoft® Windows. The Vectra Publisher PC can communicate with most office PCs and larger office systems.

The HP Vectra Publisher PC gives you the tools you need to produce professional-looking "nearly-typeset-quality" copy for reproduction. When combined with the HP LaserJet family of printers, you can produce professional documents with merged text and graphics that are ready to print.

Now business communications can have that professionally published look without the time, expense, and complexities of conventional publishing methods.

Pagemaker* is a U.S. registered trademark of Aldus Corporation.
Microsoft® is a U.S. registered trademark of Microsoft Corporation.

The Vectra Publisher PC combines the best qualities of three outstanding products—the HP Vectra PC, Aldus PageMaker from HP, and Microsoft Windows from HP.

New scientific calculator offers algebraic, calculus, and equation-solving solutions

HP's newest handheld calculator, the HP-28C Scientific Professional Calculator, offers features not available on other calculators—such as an equation solver, symbolic math, and one-step matrix operations.

Now you can do algebra and calculus problems with just a few keystrokes. And you can enter and store equations using your own terms with the calculation equation-solver function. The HP-28C can then solve the equation for any unknown variable.

The HP-28C has separate alphabetic and numeric keyboards and a 4-line by 23-character liquid-crystal display. On-screen menus and soft keys provide high-level problem-solving capability without the need for programming.

Designed for scientists, engineers, students, and math and computer specialists, the HP-28C allows users to concentrate on the concepts of mathematics rather than on the mechanics. Professionals save time because problems can be formulated right on the calculator instead of using pencil and paper.

The HP-28C helps you formulate the problem, carry out the analysis, and understand the solution.

An optional compact printer is available to communicate with the HP-28C via an infrared beam. It allows users to record keystrokes, show stored data, or print the display contents for review.

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.