With the latest generation of computers. . .

The pen is mightier
— than the keyboard

by Gregory Jordahl

As technology rapidly transforms the business landscape, you may be among those who long for the days when the pen in your pocket was the only tool you needed to make it through a day at the office. If that's the case, you'll be interested to know that the pen is making a comeback.

Unlike the standard ballpoint or fountain pen, however, this latest model won't stain expensive suits or run out of ink just when a client is about to sign on the dotted line. It won't even need paper. Instead, the pen of the future will write on a portable computer screen and, according to many industry analysts, will make using a personal computer (PC) so easy that previously diffident computer users will quickly become active players in the office automation arena.

Early versions of this powerful new writing tool already exist as part of a recently introduced computer technology that recognizes characters printed directly on a digitized liquid crystal display and converts them into computer-readable text or numerals. In fact, the latest model, a pocket-size model dubbed "Newton," was announced in late May at the Consumer Electronics Show in Chicago, Illinois, U.S.A., by John Sculley, president of Apple Computer Company. This "personal digital assistant" combines electronic calendar, card index, note-taking, and telecommunications functions in a compact shape. It will be manufactured for Apple by Sharp Electronics in Japan, and uses a microprocessor developed by companies in California, U.S.A., and England.

Instead of entering information with a keyboard, the user of this new device prints the information on the appropriate part of the unit's screen.
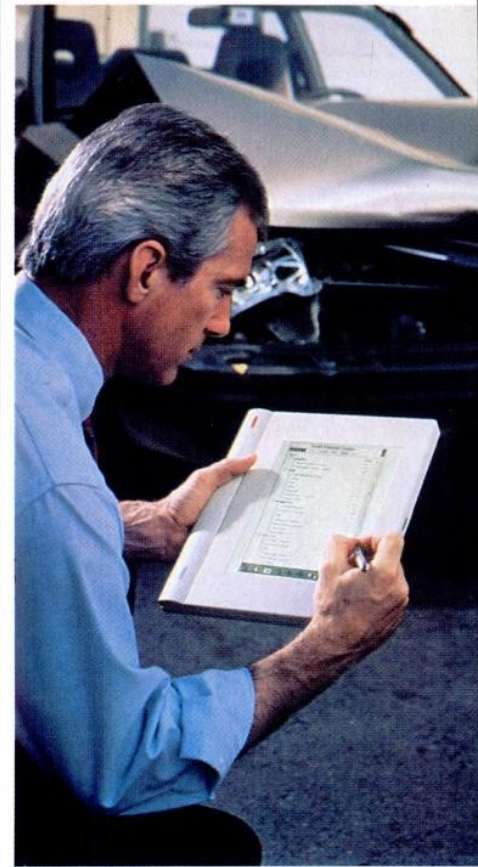
Although carefully printed characters are required for computer-readable input, users can jot down annotations such as notes and sketches in any style they choose. In addition, the pen can be used for selecting options from program menus and for entering special handwriting symbols that represent text-editing commands.

Since pen-based computers eliminate the need for a keyboard and provide what proponents call a more intuitive means of interaction, the technology is expected to appeal to a broad segment of the business and professional population who have heretofore been reluctant to make computers a part of their jobs. This includes executives who view keyboard-based PCs primarily as clerical tools and the millions of office and field sales employees who have long been intimidated by traditional computer technology.

The first vendor to enter the pen-computing arena was GRiD Systems Corporation of Fremont, California, U.S.A., which introduced a product called the GRiD PalmPAD about two years ago. GRiD's current models are the GRiDPad-HD, which has a 20-megabyte hard disk (list price: U.S. $3,570), and the GRiDPad-RC, which provides two megabytes of storage (list price: $2,870).

GRiD Systems officials say the device is being used to streamline paperwork tasks in a variety of settings. An example is Detroit Edison, an electric power company that serves 1.9 million customers in southeastern Michigan. Detroit Edison recently purchased 350 GRiDPads for line clearance crew foremen to use when filling out the forms required for clearing a power line of tree branches.

According to John Caretti, project manager for the program, the computer "enables Detroit Edison foremen to reduce their paperwork time from 30 minutes to five minutes per job." As a result, crews can trim more trees. Company officials predict the resulting productivity gains will save Detroit Edison as much as $750,000 per year.

Caretti adds that the pen-based computers will also help the company save another $900,000 per year by speeding the processing of work orders and invoices so that the private contractor line-clearance crews are paid sooner. Because the GRiDPads can download work orders and timecards on a daily basis—eliminating the need for them to be re-keyed into Detroit Edison's computers—the utility is reducing the payment turnaround from 30-45 days to 10 days or less. Because the contractors are paid faster and are therefore not required to keep floating loans at banks to meet payroll, they are discounting each invoice by up to four percent.

In addition to GRiD products, other pen-computer products include the

NCR CORPORATION

A repair shop manager tallies up the cost of a collision using the NCR System 3125 computer and Go PenPoint software.

System 3125 from NCR Corporation of Dayton, Ohio. The 3125, which NCR began shipping in August 1991, weighs 1.6 kilograms (3.9 pounds) with an optional 20-megabyte hard drive, and is about the size of a thick magazine.

The $4,795 machine is based on an Intel 386SL microprocessor, which provides approximately the same computing power as today's high-end desktop PCs. The basic system includes four megabytes of random access memory (RAM) and a VGA screen that can display up to 16 gray scales. The unit will run up to six hours on built-in batteries and can also be used with AC power.

IBM's ThinkPad, which was released in limited quantities for testing purposes in April, includes a 386SX microprocessor and four megabytes of RAM. Instead of a hard disk, the ThinkPad uses 20 megabytes of flash RAM, which is designed to provide the same high-capacity storage as a hard disk but with faster access times. The ThinkPad is thicker than the NCR 3125 and weighs about 2.7 kilos (six pounds). IBM has not yet announced ThinkPad pricing information. However, industry analysts predict the unit

will retail for approximately $5,000.

Apple says its Newton, slated to be on the market in Japan and the U.S. by the end of the year, will be priced at less than $1,000.

Some companies are taking a hybrid approach to pen computing. Momenta Corporation of Mountain View, California, for example, recently introduced what it calls a "pentop" computer. The unit can be used as a pen computer or, by attaching an accompanying keyboard, as a laptop computer. The Momenta, which includes a 40-megabyte hard drive and a built-in fax and data modem, retails for $4,995.

Another device designed with an emphasis on versatility is the TelePad SL from TelePad Corporation of Reston, Virginia, a clipboard size model weighing approximately 2.3 kilos (five pounds). This device can perform basic data collection functions or be upgraded into a multi-purpose computer and communications tool by adding optional equipment such as keyboard, printer, CD-ROM player, and a cellular or packet radio communications interface. Company officials say the TelePad, which will be introduced by October, will cost between $3,000 and $3,500.

Revolutionary though it is, the pen-based computer requires the appropriate software if it is to satisfy its users. To that end, a number of major

software companies have announced programs designed for pen computing applications. Industry analysts expect the initial products, many of which should be available by the end of the year, to focus on applications such as contact management, data collections, and form filling.

Pen software will be designed to run on one or two operating systems that have emerged as leaders in the pen computing marketplace. The first of these is PenPoint, from Go Corporation of Foster City, California, which uses a notebook as its user interface metaphor. Rather than making the user think in terms of programs and files, PenPoint groups information into "notebooks," each with its own table of contents that serves as a director of all relevant files, or "documents." A page number is associated with each document.

The system can maintain several notebooks, each with different documents or with copies of the same documents organized differently. Tabs can be attached to any document. To go from the table of contents to a document, the user touches the appropriate page number, the tab, or the document's corresponding icon.

The other pen-based operating system is Pen Windows, an extension of the Windows operating system manufactured for desktop PCs by Microsoft Corporation of Redmond, Washington. A major advantage of Pen Windows is that existing Windows programs can easily be modified to run on a pen computer.

With Pen Windows, the pen replaces the mouse as a pointing and selecting device. In addition, Pen Windows allows the use of written gestures for editing and handwriting recognition to enter text to existing Windows programs.

Since pen computing is so new, it's difficult to predict how popular it will become. However, for people who are turned off by typing on a computer keyboard, the attraction of simply picking up a pen and putting a computer through its paces will probably be hard to resist. ⊛

A bottling plant worker uses a compact GRiD PalmPAD pen computer for time-in-motion studies and quality control procedures.

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