BUSINESS TECHNOLOGY; Computers Without Keyboards

By EBEN SHAPIRO

A number of computer makers are betting that the pen is mightier than the keyboard.

Development teams at the International Business Machines Corporation and the NCR Corporation are trying to design sophisticated versions of portable computers that are operated with a pen-like device rather than a keyboard or mouse controller. The new versions would be able to read cursive handwriting; the first machines, now reaching the market, can read only carefully printed letters and numbers.

Apple Computer Inc. and the Microsoft Corporation have also expressed interest in the technology, although they will not discuss their work on it. And several start-up companies, including the Go Corporation, the Momenta Corporation and the Slate Corporation, are focusing on pen-based systems.

The new machines, known as pen-based computers, work this way: A user writes on the computer's screen; the computer reads the letters or numbers and redisplays them as computer-generated characters for confirmation. It then accepts them as commands to operate the computer, or stores them as text or data to be transmitted to central computers. Because such systems would be easier for first-time users to operate, some industry experts think they represent the next great wave of computing.

Several companies have already introduced pen-based products. Attracting the most attention is the Tandy Corporation, whose Grid Systems Corporation subsidiary introduced its 4.5-pound pen-based machine earlier this year. Grid has aimed its computers at workers in jobs away from the office -- a market largely ignored by the computer industry -- and workers whose jobs require filling out the same forms repeatedly.

So far, Grid has sold more than 5,000 units for such uses as providing an electronic accident report form for a California police force and a high-tech survey device for a California pollster.

Scenario Inc., based in Boston, has sold prototypes of its Dynawriter to brokerage firms and insurance companies. The company expects to begin selling its pen-based systems, which range in price from $1,995 to $5,750, in volume early next year.

In Japan, the Sony Corporation and Canon Inc. are selling pen-based computers that are used primarily as electronic calendars or note pads. Light in Weight

Pen-based machines could give vast amounts of computing power to people unable or unwilling to use a keyboard. Also, because they are lightweight -- NCR is planning a

machine that weighs just two pounds -- the clipboard-size machines can be used by people standing up, making them available to armies of mobile workers currently untapped by computer makers.

Scott Kirkpatrick, the I.B.M. researcher heading development efforts on what is referred to within the company as the Tablet, said that with the advent of pen-based systems, the personal computer market might "take off by another factor of three or so" in terms of unit sales. An estimated 11.6 million personal computers will be sold this year in the United States.

But significant technical obstacles must still be solved. Much of the current research is centered on developing sotware that will allow the machines to read cursive handwriting. The main problem is that everyone writes differently. Currently, the best machines can read only carefully printed block letters. Millions of Customers

Still, normally staid computer industry executives begin sounding a bit like deodorant salesmen contemplating the two billion armpits in China when discussing the sales potential of pen-based systems. Executives taking notes, salespeople filling orders -- anybody who uses a pen and paper is a potential customer.

"All major corporations have large sales forces and they all have executives," said Alok Mohan, the NCR vice president directing development of pen-based computing. He said the NCR machine would be available next year for $4,000 to $5,000. $3 Billion Potential

E. Gray Glass, a consultant, estimates that sales of pen-based systems could reach $3 billion by the year 2000. Infocorp, a research firm in Santa Clara, Calif., estimates that two million units will be sold by 1995.

And at a time when many professional investors have soured on the personal computer industry, promising start-ups in pen-based computers seem to be having little problem attracting venture capital.

Kleiner Perkins Caufield & Byers, a California venture capital firm, has invested in Go, based in Foster City, Calif., and Slate, in Scottsdale, Ariz. John Doerr of Kleiner Perkins said his reaction to pen-based computing "reminds me a lot of the kind of goose bumps I felt when I first saw Lotus 1-2-3."

"It has become a focal point for venture capital," said Bruce Stephen, an analyst with the International Data Corporation, a market research firm in Framingham, Mass. "This is certainly one of the hot development areas." Forming Alliances

I.B.M. has formed an alliance with Go, which is trying to become the Microsoft of the pen-based market by developing a proprietary operating system for pen-based computers.

Developers are debating the type of operating system the new computers should incorporate. Using a standard system, such as MS-DOS, would make it easier to adapt existing software applications to pen-based computers and make the machines

compatible with other computers. But a new operating system tailored for pen-based computers, while reducing compatibility, could make them far more effective.

"It is a race," said Mr. Kirkpatrick, the I.B.M. researcher. I.B.M. is backing Go's new system, but Mr. Kirkpatrick said the company's researchers were exploring all possible choices. Tandy's Grid system is MS-DOS compatible; NCR will not disclose its plans.

I.B.M. will not say when it will have a pen-based system ready for market or disclose the number of people working on the project.

A well-received pen-based product may determine whether a computer company is successful in this decade, said Timothy P. Bajarin of Creative Strategies International, a consulting and market research firm in Santa Clara, Calif. "Whoever gets the lion's share of that market will be the dominant player in the latter part of the 90's," he said. Having an Impact

Already, pen-based computers are having an impact. The Grid Pad is being used by the field sales force of the Kellogg Company and other large consumer-goods concerns to keep track of product sales in stores. Field salespeople, equipped with the pads, visit grocery stores and tabulate inventory levels.

One Grid user has found the machine offers surprising benefits. Richard H. Hertz, a pollster in California who has bought six of the computers, said that people appeared more receptive to being approached by someone with a computer than someone with a clipboard. "It gives you a bit more legitimacy," he said. "White-collar types, when they see someone with a clipboard and a stack of questionnaires, they sort of head in the other direction."

The Grid Pads, which use the I.B.M.-compatible MS-DOS operating systems and must be programmed by the buyers, sell for an average of $3,000.

Not all computer companies are rushing to develop pen-based computers, however. Compaq said it was waiting for the technology to be refined.