Portable Computers

THE FUTURE OF NOTEBOOK COMPU

Hot new features vie with low prices as key selling points

BY BRIAN GILLOOLY

features sell notebook computers. But an asthma detector? ◆ That winner was dreamed up by Ted Selker, a consummate tinkerer at IBM and inventor of the company's wildly successful TrackPoint cursor-control device for the ThinkPad line. One day last year, Selker walked into the office of Bruce Claflin, general manager of the IBM PC Co., carrying an odd-looking computer. Poking up from the middle of the computer's keyboard—the same spot where the familiar TrackPoint red-rubber tip normally sits—was a small rod protruding from a triangular piece of plastic. ◆ "If you blow on it," Selker explained to his boss, "a 16-bit analog-to-digital sensor in the keyboard detects the force of your breath and can determine if you have asthma. It can also be used to measure wind speed, seismic activity, acceleration and deceleration, that

sort of thing." Though Selker and his 20-person staff had created some of the most lucrative innovations in notebook computing, this one made Claflin laugh. "Get that out of here!" he cried.

as more notebook makers adopt the belief that the way to information systems managers' hearts is through cutting-edge innovation, such setbacks are becoming common in this extremely competitive business. Suppliers point to the success of IBM's TrackPoint and "Butterfly" retractable keyboard, and to Digital Equipment's detachable multimedia bay. Many of the top notebook makers are pushing their labs harder than ever to come up with the Next Big Thing. "Some of the technologies you think will be here in six months take 10 years to develop, and some of the most unusual technologies seem to develop overnight," says Paul Hoedeman, chief information officer of the aerospace division of AlliedSignal in Torrance, Calif., which uses many notebooks. "Who knows, maybe 10 years from now, we'll still be describing voice recognition as 'pretty good technology that isn't quite there.'"

For technology managers, the emphasis on innovation makes choosing a notebook that much harder. "The portable is not a plaything," says Joseph Farrelly, executive VP and CIO at Nabisco in Parsippany, N.J. "It's designed to get the job done better." Adds Sharon Francia, senior business manager for Compaq Computer in Houston: "New technology is really exciting, but the objective will be to introduce technology that's applicable."
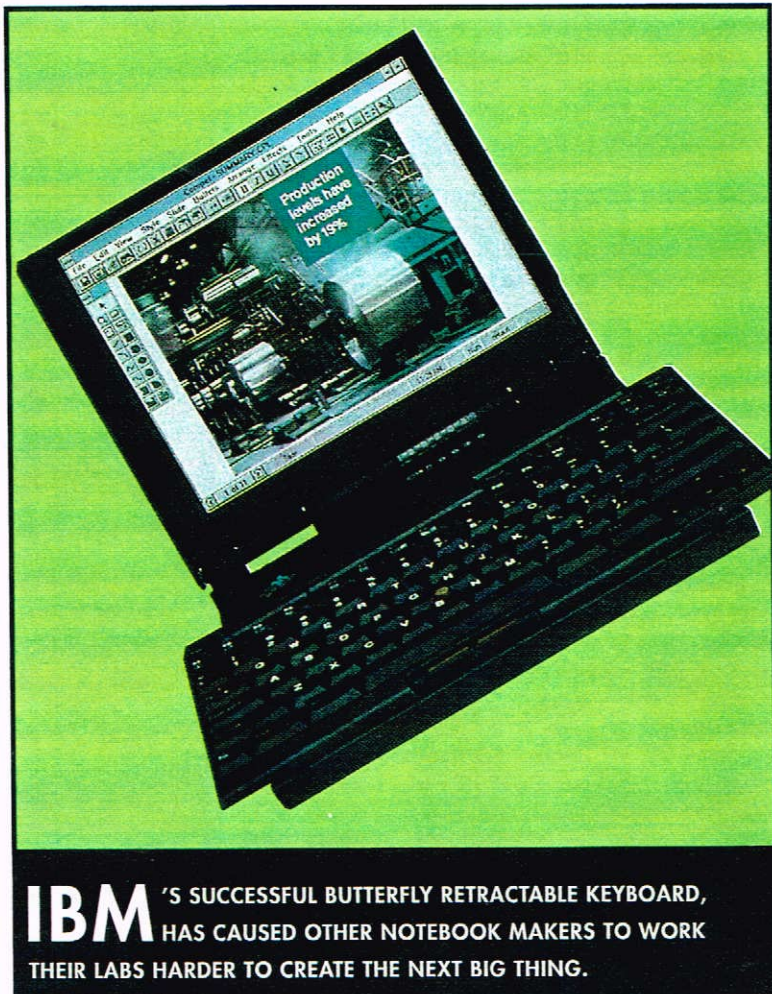
At the same time, most notebook vendors still compete the old way—on price. Technology managers must determine how much they're willing to budget for premium notebook technologies. "It's nice to have a Butterfly keyboard, but you have to determine if new things like that are worth the cost," says Nabisco's Farrelly. For some Nabisco users, it is: 1,500 of the company's 7,000 PC users have IBM ThinkPads; many of those are the 701C model with the Butterfly keyboard.

There's a lot at stake. The worldwide notebook market grew by 28% in the first quarter of this year, with more than 2 million units shipped, says Randy Giusto, manager of mobile computing research at International Data Corp., a market research firm in Framingham, Mass. Portable machines will account for more than one-third of all PC sales by the end of the decade, predicts BIS Strategic Decisions Inc., up from an estimated one-quarter of all PC sales today (see chart, p. 44).

Also, vendors have proven that premium features attract customers. Hoedeman of AlliedSignal says the retractable keyboard design in the ThinkPad 701C was enough to get IBM added to his company's approved vendor list for portables. Vendors know this, too, says Dale Fuller, VP of portable computer systems for NEC Technologies in Mountain View, Calif.: "We're trying to spend a lot more time with customers to determine their latest needs. In the past, the manufacturers made large amounts of money and threw technology out there to see what stuck."

All this innovation is changing the ranking of suppliers. For years, Toshiba was the king of the hill, the one all the other notebook vendors tried to match, feature for feature and price for price. But in 1992, IBM, then a virtual unknown in the portable business, upset the cart by unveiling its ThinkPad line. The business hasn't been the same since.

The ThinkPad boasted such premium features as a 10.4-inch active-matrix screen, unusually capacious hard disks, and that famous TrackPoint pointing device. Corporate America went nuts, gobbling up whatever precious models it could find. Seemingly overnight, IBM became the note-

IBM'S SUCCESSFUL BUTTERFLY RETRACTABLE KEYBOARD, HAS CAUSED OTHER NOTEBOOK MAKERS TO WORK THEIR LABS HARDER TO CREATE THE NEXT BIG THING.

book vendor to watch. Big Blue also opened the market for any manufacturer skilled enough—or lucky enough—to develop the next hot notebook feature.

Unfortunately for IBM, supply problems kept it from capitalizing completely on the innovations. Toshiba is still No. 1 with 15% of worldwide unit shipments in the first quarter of 1995, according to IDC. NEC ranks second, followed by Compaq and IBM (see chart, p. 44). Toshiba's lead in the market, coupled with its no-frills Satellite line and recent aggressiveness with notebook pricing, suggest that price is still a key determinant for technology buyers. "It flies in the face of companies like IBM saying they'll lead and differentiate by technology, but life's a bitch," says Kimball Brown, VP of portable research at market researcher Dataquest Inc. in San Jose, Calif.

Toshiba, a pioneer in the portable business and once

known for being first to market with cutting-edge technology and premium-priced systems, is now a low-price leader. "We won't come out with gee-whiz technology unless we see a mainstream use that will appeal to everyone," says Michael Wagner, Toshiba's product marketing director. True to its word, Toshiba lagged IBM by six months in bringing out a notebook with a built-in CD-ROM drive while it tried to cut the price. "We were able to bring

TOSHIBA STILL LEADS THE MARKET WITH 15% OF WORLDWIDE SHIPMENTS FOR ITS NO-FRILLS SATELLITE LINE AND AGGRESSIVE NOTEBOOK PRICING.

it in under the $3,500 price point," says Wagner. "The days of the $6,000 notebook are dead."

IBM disagrees. It says that while cheap prices attract buyers at the low end of the market, there's still room for high-end machines that deliver innovation. "In the high end," says Joseph Formichelli, VP of portables for IBM, "we look for technologies that get people to say 'Wow.' The trick is to make sure prospective buyers aren't looking at the price tag when they say that."

Impressive machines are expensive. Today's R&D costs can push high-end notebook prices into the $7,000-to-$8,000 range. That's where IBM's new Pentium-based ThinkPad 760CD resides, for example.

Who's willing to pay this top dollar? Vita Cassesse, for one. She's VP of systems and market research at Pfizer Co., the pharmaceuticals giant in New York. "I'll pay a premium for lighter weight, larger storage, and the ability to do real multimedia," she says. In fact, Cassesse stunned IBM executives a couple of years ago when she told them

not to worry about the cost of the machines and to focus on cutting-edge features instead. "You should have seen their eyes widen," she recalls. "They don't often hear that from customers."

Some naysayers believe the market will forever belong to the bargains. Dataquest's Brown, for one, believes the market's sweet spot will drop to $1,200 later this year for what he calls an "E-mail machine." Such a system would contain a 66-MHz 486DX2 processor, passive-matrix color screen, and full-size keyboard. By the second half of 1996, Brown predicts, the same $1,200 will buy a 100-MHz DX4 model, and by 1997, a 90-MHz or 100-MHz Pentium. "Premium lines have been taking over the last two to three quarters," he says. "[Companies] don't pay for industrial design, because end users in a big company don't buy their own notebooks. Executives love it, but IS says no."

In fact, it's at the top levels of many large companies that premium technologies are catching on. "Executives want a subnotebook that's really a notebook," says Harry Meyer, project manager for strategic planning administration at Rockwell Information Systems in Seal Beach, Calif. "They want a 1-Gigabyte disk, 100-MHz Pentium, 16 Megabytes of memory, and the best communications."

To fill the need, IBM, NEC, Apple, Compaq, and others continue to push the envelope. IBM's ThinkPad 755, introduced in May 1994, quickly became the top-selling model and was followed quickly by IBM's own 701C Butterfly. Apple can't keep its PowerBook 5300CE, with a 117-MHz PowerPC processor and built-in infrared, in stock. NEC's Versa V was an immediate hit, and Compaq is expecting high demand in corporate markets for its recently introduced Elite LTE-5000 modular notebook. "If we all stopped [innovating] tomorrow," says Formichelli of IBM, "we'd be selling nothing but $200 word processors."

Then there's the Paris-Dubuque phenomenon. Just as the latest clothing fashions from Paris eventually make their way down to the local Kmart, innovations that appear in today's top-end machines eventually—and sometimes very quickly—show up in cheaper models.

Take the 12.1-inch active-matrix screens just arriving on the market in $7,000-plus notebooks. PC makers expect to start adding the screens to the low end of premium lines by next spring, and to $4,000 machines by next summer. How about MPEG motion video technology, a premium feature now? Expect to see it slide into $2,500 machines in the next six to eight months. Want a 1-Gbyte hard disk in a low-end system? Wait until next summer, say industry sources. And infrared connectivity, a hot feature at the high end now, will be common on cheaper systems by mid-'96.

But don't expect radical changes in the format of the notebook computer. Wagner of Toshiba believes the footprint of the portable won't change much over the next 18 months, with the length and width remaining at about 9 inches by 12 inches. He does expect one improvement,

though: "It will continue to get thinner and lighter," he says.

How viable is wireless communication for the notebook market? Toshiba's Wagner says early adopters already use it. "Wireless is absolutely a technology that innovative companies can use today," he says. "The adoption will take place over the next 18 months." But one thing holds it back: the lack of a nationwide wireless infrastructure. Over the next year, cellular digital packet data will anchor wide area data communications, says Wagner.

Vendors trying to break into premium technologies risk losing focus. Zenith Data Systems, for example, tried high-end designs but hit too small a niche and has since retreated to competing on price with mainstream technology. "Our reputation on premium has lapsed over the last 12 to 16 months," admits Brian Manser, director of product strategy for Zenith in Buffalo Grove, Ill.

Other suppliers try to dominate certain features. Digital Equipment, for example, will continue creating slim-chassis designs like its HiNote, say executives there. IBM hopes to lead in pointing devices and keyboard innovations. Dell will continue pursuing advancements in batteries.

What's next? Few vendors will discuss their hottest projects. But they say privately that advancements in screen technology are a clear priority. That includes boosting display size and resolution, as well as finding new ways to get large screens into a small form factor. IDC's Giusto says a lab technician from MIT has been making the rounds with an LCD screen that folds along hinges in the middle.

How about no screen at all? Kopin, a small company in Boston, is working on a 1-inch-square device that projects the computer's display onto a wall or other nearby flat surface. But Steve Offsey, Kopin's marketing manager, says the company is spending more time developing a head-mounted unit, 3/4-inch across, that plugs into a notebook's video port. It would allow, say, a maintenance worker to scan the pages of a manual while working inside a jet engine. Offsey says such technology is 18 to 24 months away, when it should cost about $1,000.

For many, the list of hot new features could be a lot more down to earth: "Longer battery life, bigger screen, larger hard disk," suggests Ed McDonald, a chief architect for Texaco in Houston.

Beyond that, who knows? "Maybe," says IBM's Formichelli, "there's a Ted Selker out there who can invent a rubber active-matrix screen." Anyone for asthma detectors?
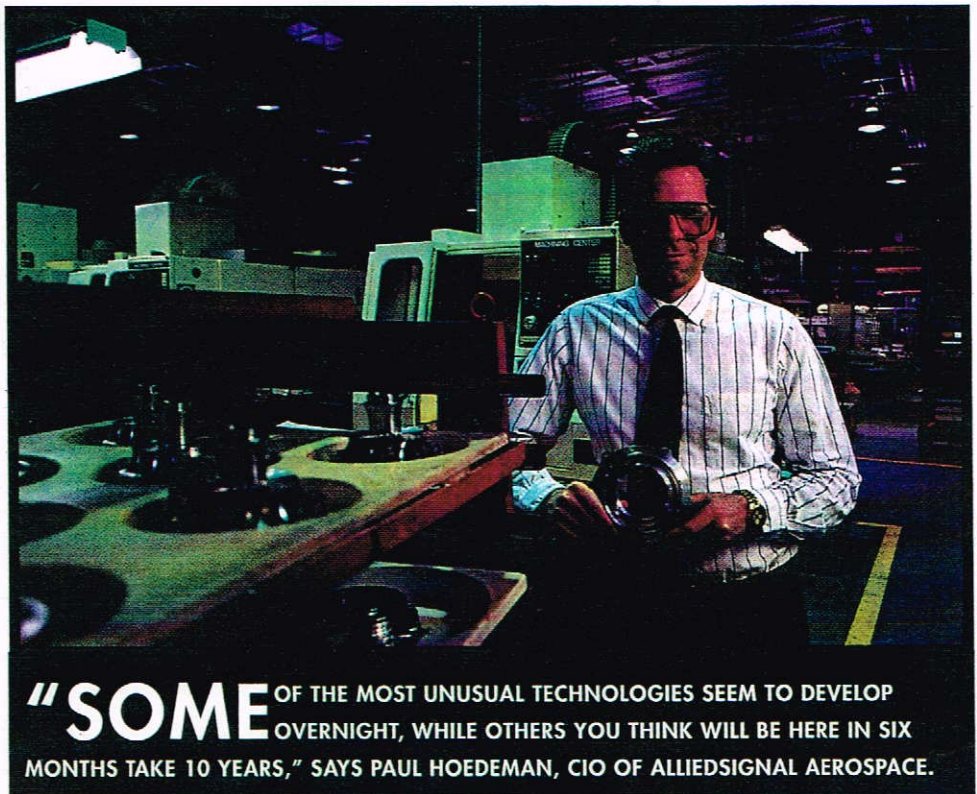
See related story on Ted Selker, p. 48.

Top Portable Vendors

Others 36%
Toshiba 15%
NEC 13%
Compaq 12%
IBM 10%
Apple 8%
AST 2%
Dell 2%
Epson 2%
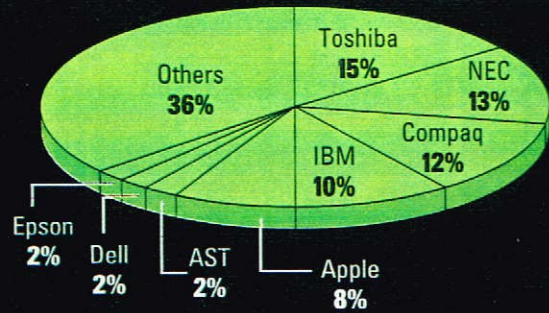
Units shipped 1Q '95: 2 million

Note: Suppliers in "others" category each have a market share of 2% or less
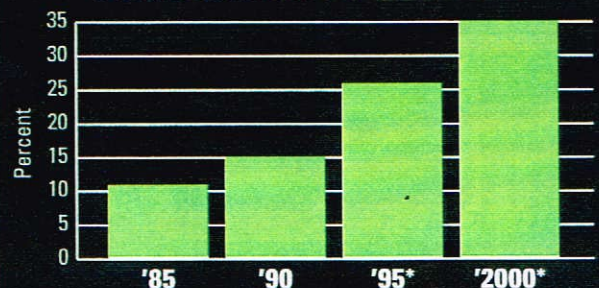DATA: INTERNATIONAL DATA CORP.

"**SOME** OF THE MOST UNUSUAL TECHNOLOGIES SEEM TO DEVELOP OVERNIGHT, WHILE OTHERS YOU THINK WILL BE HERE IN SIX MONTHS TAKE 10 YEARS," SAYS PAUL HOEDEMAN, CIO OF ALLIEDSIGNAL AEROSPACE.

PHOTO FOR INFORMATIONWEEK BY PAUL HARRIS

Small Is Bountiful
Portables as a share of total PC sales

'85 · '90 · '95* · '2000*

DATA: BIS STRATEGIC DECISIONS
*Estimate

IBM's Point(er) Man

Once technology managers give PC makers their wish lists of notebook features and functions, the tall task of bringing some of those technologies to market falls to the brains in the labs. This means people like Ted Selker, manager of IBM's User System Ergonomic Research (USER) group.

A description of a typical day in Selker's cluttered lab conjures up images of Christopher Lloyd's scatter-brained character in the movie *Back To The Future.* "I spend a lot of time in the machine shop creating my own prototypes," says Selker. "I'm usually working on three or four inventions at once."

Selker admits that to be a free thinker—a requirement for coming up with high-tech solutions to tough problems—he sometimes has to bend the rules. "I'm not very good at following directions," he says. "But I've been able to show my inventions are valuable."

That's for sure. Selker invented several iterations of IBM's TrackPoint cursor-control device, as well as a transformer for notebooks in the shape of a power cord to minimize space. To come up with the TrackPoint, Selker recalls, "I timed novice text editors and noticed that it took 1.75 seconds to go from the keyboard to the mouse and back. It takes one second less to use the TrackPoint."

Selker is the kind of guy who likes observing these things. He's now working on a pointing device that lets the user "feel" the graphical interface as the cursor moves over the terrain. "It's my job to make these things and then prove them," he says.

Selker is rarely without his briefcase, which contains some of his latest tinkerings. Some IBMers jokingly wonder how he gets it through airport security with all the wires and odd parts inside. Asked for a peek inside the briefcase, Selker says it contains a prototype of an LCD tablet that lets a user control several pieces of office equipment through a wall-based "viewboard" with icons representing various peripherals. "It would let users work with the office equipment in a shared-space environment," he says. How it would work is something only Selker knows for now.   —*B.G.*

FREE THINKER TED SELKER HAS A SIMPLE PHILOSOPHY FOR INNOVATION: IT'S OK TO BEND THE RULES.