

NEWS IN PERSPECTIVE

What has brought on Don's sudden infatuation with multiple personality computers? The renowned engineer C. Gordon Bell, designer of DEC's VAX line, got it in one: standardization.

"Standards," as Bell says, "are seeping through every segment of the industry, prompted primarily by IBM's move to an open architecture with its PC. Today, "we have standard chips, buses, and operating systems to provide a ready base for peripherals and generic software to be transported from one brand of computer to another."

Sighs Lewine, "Today's hardware is beginning to look alike, and the scene is switching to the hunt for programs. One might ask in passing where this leaves companies like Data General, which are noted primarily for their hardware engineering skills and for supplying proprietary software which in the coming environment could be as dead as a dodo bird."

One approach Lewine and Data General could try is to go it alone and find ways to compensate for the lack of generic software. Wang's personal computer, for example, is faster than IBM's generic PC. Others, like NEC's, have better graphics than the IBM version. Texas Instruments' slant is to add voice recognition and synthesis. Hewlett-Packard has added a touch screen.

But when it comes to adding new software, this go-it-alone approach can lead to long delays. As IBM has shown, the availability of a huge library of software programs is the only thing that really counts. Lewine and company could also revert to the standby from the good old days: raw power. DG has shown an inclination to drive upmarket into the supermini class. But as it has done so, it has been followed relentlessly by the semiconductor companies, who, with only hardware to sell, are all trying to

"Neither going it alone nor moving to raw power alone will do the trick," says Data General's Don Lewine.

differentiate themselves from one another in a search for more MIPS per chip. Much has been made of DEC's efforts over the past six years to replace the top end of its VAX minicomputer line with a super VAX—a leap of from 1 to 4 MIPS. National Semiconductor, the current semiconductor chip king at 1 MIP per chip, will likely be succeeded by AT&T, with a 5 MIPS per chip WE-32 processor next year.

Or, to look at these figures in another light, as British vendor ICL has done, the minicomputer and mainframe concerns can only expect to be bruised by the semiconductor leaders in the war for low-cost MIPS. According to ICL internal estimates, gleaned from industry sources, three times as many

MIPS were sold on micros last year as on minis and mainframes combined. In the coming year, the ratio will be 10:1. It will grow exponentially thereafter as 32-bit micros replace their less powerful predecessors.

"Thus, neither going it alone nor moving to raw power alone will do the trick," says Lewine. "These must be combined with a generic solution to gain access to all the software libraries."

According to Lewine, "Generics will appear at both the top and bottom ends of Data General's line, with the company utilizing a different approach to each. The best solution at the desktop end is to combine a suite of chips, each dedicated to a particular environment or best-selling software package. But the top of the line is important, too. It's frustrating to users when the only hardware that will run the Lotus 1-2-3 or VisiCalc is a micro—and you've got a mainframe. Mainframers must find ways to host the best-selling microcomputer packages, because new software simply is not being written for the large machines anymore.

Lewine believes the mainframe and minicomputer companies will adopt a similar approach by optimizing the various operating system environments in reprogrammable microcode on their machines. "You can, for example, study the Unix operating system and see where the bulk of its instructions lie. You then optimize these instructions in microcode and make the whole operating system run much faster. CPM and MS/DOS can be afforded similar treatment," he added.

"The drawback here," as Gordon Bell points out, "is that AT&T and IBM will optimize future releases of their operating systems around their own hardware, making it difficult for the others to upgrade their microcode."

Unlike the 16-bit field, the generic engine for the 32-bit virtual machine generation is not yet set in concrete. Lewine believes that DG engineers have time to maneuver a mixture of all these approaches in their search for the Porsche of generic processors. If hardware evolution had suddenly stopped dead at the IBM PC—as it sometimes appears, with its many clones and imitators—we could all go home. There'd be no competition for IBM as the low-cost commodity producer.

But software developers such as Lotus Development Corp., searching for the right blend of user-friendly and AI-based software, are pushing the PC's 640K memory limit, and the 32-bit virtual machine workstation standard is up for grabs. Eventually, even this 32-bit hardware will be so cheap that it will be given away by manufacturers to sell their software.

"I don't look forward to that day," says Lewine. "I know how to build record players, not how to be Michael Jackson."

WHEN THE CHIPS ARE DOWN

A dire shortage of one Intel microprocessor is causing pain among systems manufacturers.

by Charles Bruno

Demand for Intel's next-generation microprocessor is far outstripping supply and forcing systems manufacturers to change product designs and limit production of their machinery.

The problem at Intel, which has affected such companies as Convergent Technologies, Tandy Corp., and Tektronix, apparently stems from the advanced design of the 80186 chip, which combines the circuitry of the popular 8086 microprocessor and that of several support chips that handle memory, I/O, and other functions. Intel's production lines for the 80186, have been slowed by the discovery of logic bugs in the 80186 and startup difficulties in the semiconductor fabrication process.

Some of the Santa Clara, Calif., company's customers have been forced to accept slower versions of the Intel chip, which make their systems run slower and perform less work. For instance, Convergent Technologies, another Santa Clara manufacturer, has had to ship its N-Gen workstation with a 6 megahertz 80186 chip as well as the originally expected 8 megahertz part.

"Many oems will be receiving a mixture of both versions," said Nate Teichholtz, marketing manager at Convergent. The company's customers for N-Gen include Burroughs Corp., Raytheon, and Automatic Data Processing, the former being heavily dependent on Convergent for its low-end office and workstation product lines.

Tandy Corp.'s flagship Model 2000, a personal computer designed to use much of the same software as IBM's PC, is not being produced as fast as the Fort Worth, Texas, company had planned because of the general shortage of 80186 chips.

"Let's just say our production facilities aren't nearly being used to their fullest," admits Yama Gata, director of merchandising for the 2000. Tandy has had high hopes for the new pc because it will bring the company into the IBM PC marketplace and give it an entree into corporate accounts. Tandy's Radio Shack TRS-80 line, once a leader in the pc marketplace, is based on 8-bit Z80 microprocessors.

NEWS IN PERSPECTIVE

Besides trying to boost production by generating slower versions of the chip, Intel has been making an effort to expand production of the 16-bit 80186 by off-loading production of the popular 8088 chip to other companies. In recent weeks, both IBM and Commodore International have sought licenses to build that chip, which forms the heart of the previous generation of personal computers. IBM has not yet introduced a machine based on the 80186 but is expected to do so sometime this year in the form of a machine code-named Popcorn.

Aggravating the supply problem are bugs that have appeared in some batches of the 80186. Intel tried to correct the problems in the initial version but a second version was also flawed, according to industry sources. Customers report being told by Intel that the third version will be bug-free.

One unintended result of the chip shortage has been the emergence of a black market in the 80186 part. One parts distributor says he can sell the chips for double their list price because demand is so strong.

Intel introduced the 80186 in June 1982, describing it as a supermicro that in a single package contains an improved 8086

A black market in the 80186 chip has been created by the dire shortages of the popular part.

processor and the various support circuitry. "The 80186-based machines run rings around the 8086 and 8088 products that are available today," says Convergent's Teichholtz.

To Intel's credit, the 80186, which now lists for \$93, has been an incredible success despite the maker's backlog. Intel estimates demand at 3 million to 4 million chips for 1984. But, the company says it can only supply about a fourth that amount, or fewer than 1 million chips. It is hoping for some assistance from Advanced Micro Devices, which Intel has licensed as a second source for the 80186. Unfortunately for Intel and its anxious customers, however, AMD says it will not deliver a single chip much before the end of this year.

While Intel is losing some potential business—it admits to being surprised by the demand for its chip—the biggest losers may be the many computer vendors that are committed to using the 80186 in their systems. Among them are Convergent Technologies, North Star Computers, Tandy, Durango Systems, Pronto Computer, Onyx, Altos Computer, Tektronix, Computer Automation, and MAD Computers.

In another category are vendors that are relying on Convergent to supply them, oem style, with its 80186-based N-Gen for their subsequent resale. This list includes Burroughs, Raytheon, and Mohawk Data Sciences.

Intel's system-building customers are currently receiving one third to one quarter of the 80186s they have ordered. Some of the chips they have received are the 6MHz version, which runs about 25% slower than the 8MHz part. Considering that the 80186's main virtue is its speed, this has left some of Intel's customers unhappy. Some of them, including Convergent, have even been forced to redesign products to accommodate the slower chip, thus reducing their systems' overall performance.

Convergent Technologies' reliance on the 80186 as the heart of its N-Gen workstation has left it highly vulnerable to the dearth of 80186 components. Moreover, it has signed many oem customers for the workstation whose product plans are keyed around N-Gen. Burroughs, for instance, has been forced to delay the introduction of its B 25 product line, a series of small, N-Gen-based desktop machines that were originally slated for unveiling in the first quarter of this year. Computer Consoles Inc., Rochester, N.Y., has reportedly decided to hold back on introducing an N-Gen-based machine and is looking for a replacement.

Convergent itself has stated it will not sign any new N-Gen contracts during the first half of 1984 and may extend that decision through the rest of the year. The company has signed many oem contracts based on N-Gen, including those with Burroughs, Raytheon, Automatic Data, Gould, NCR, Prime, Microdata, A.B. Dick, and Four-Phase. The company also has a major product development effort under way with AT&T, which plans this year to enter the workstation and personal computer marketplace. According to industry reports, AT&T will receive little product from Convergent this year, even though the phone company had first expected to ship Convergent-built machines by midyear. It was unclear, however, if the AT&T situation is related to the 80186 allocation position.

Yet Convergent may be luckier than some of Intel's other 80186s customers. Smaller companies that are currently using

We've protected the companies that have shown good faith in our product," says an Intel manager.

the 80186 are concerned about Intel's allocation policy. The chip maker has decided to deliver many 80186's to its biggest customers first, according to Steven Kanzler, product manager for North Star's Dimension computer.

"Intel is going to meet its own needs and those of its largest customers before it is going to meet the needs of a great many smaller ones," Kanzler says, adding that at \$40 million a year, North Star is considered by Intel to be among the

"smallers." He notes that North Star expects to ship 40,000 workstations this year, most of which will use the 6MHz version of the 80186.

Intel's view of the situation is somewhat different than its customers'. "We've protected the companies that have shown good faith in our product," says Tony Barre, product marketing manager for the 80186. He adds that Intel is forecasting all customers' needs, and telling each one how many chips it will receive. "We learned back in 1977-'78, when we had our last parts shortage, that you have to control the customers," Barre says.

Regardless of who's getting chips when, earlier versions of the 80186, by In-

Early, faulty versions of the 80186 have found their way into the hands of unauthorized dealers.

tel's own admission, contained bugs that made end products fail. Specifically, the problems were found in the direct memory access section of the processor chip. DMA, as it is called, enables the transfer of data between peripheral devices and internal memory without going through the central processing unit. Intel corrected early versions of the 80186 with a software patch and produced a revised version of the chip. That, too, had flaws.

Intel is now promising a chip it calls the C-version that will be bug-free. In addition, Intel says, a number of computer vendors have built successful machines using the earlier-version 80186 by designing around the chip's flaws.

Somehow, the earlier-version chips have found their way to unauthorized dealers who are charging what the market will bear—in one case, up to \$250 per chip.

"Wow!" exclaimed Intel's Barre, "that's a lot of money. I'm not surprised that some of the chips are being resold, but that is a lot of money to pay for the chips."

One such dealer is Jericho Electronics, of Portland, Ore. The company has managed to obtain 8MHz versions of the 80186 and is selling them for as much as \$250 apiece. It says the chips are selling fast.

"I had never even heard of the 80186 until two of our overseas oems contacted us with an urgent need," said James Brooks, a Jericho salesman. "We did some checking and were lucky to run across the chips. We're mostly selling them to small oems doing R&D." Jericho Electronics, said Brooks, has been selling 50 to 400 of the 80186 chips a week.

Semiconductor shortages are not wholly unknown to the computer business. Several years ago a dire shortage of 64K RAM chips forced many U.S. system manufacturers to buy from Japanese vendors.*