Technology

Those Proliferating Microprocessors

By VICTOR K. McELHENY

Last year, a total of 8 million tiny computer chips called microprocessors —devices that were not even invented until 1971—were shipped to eager customers around the world.

The year before, only 2.4 million of the fingernail-sized microprocessors were shipped, according to a recent survey by Dataquest Inc., an analytical concern based in Menlo Park, Calif., near many of the leading microprocessor manufacturers.

Compared with the $21.5 billion in worldwide revenues from computers last year, the market for the little computer chips is tiny—about $175 million last year, including associated data-storing memory chips and input-output devices. A market of $300 million is expected this year.

• • •

But microprocessors, whose prices continue to fall while their computational power increases, draw disproportionate attention in the electronics industry. Many are convinced that microprocessors eventually will push their way into almost any device where a little bit of electronic intelligence seems necessary, convenient or just pleasing.

That is expected to diminish the use of so-called personal computers—also based on microprocessors—for controlling many devices around the home or office, such as doors, windows, lights, ovens or furnaces.

In this view, the proliferating personal computers, typically costing a few hundred to a few thousand dollars, will focus on a variety of business, scientific and entertainment tasks.

A multitude of difficulties with devising easily used programs of instructions for operating such computers still need to be overcome. But, assuming they can be, "perhaps the ordinary citizen will become algorithmically literate, just as today he reads and writes," as John Doerr of the Intel Corporation put it.

• • •

In a special issue on microprocessors published in the Proceedings of the Institute of Electrical and Electronics Engineers, a leading professional electronics journal, Mr. Doerr wrote:

"That is not to say that we each will be skilled programmers or computer scientists, any more than we are already Nobel laureates. But we are going to learn; we are going to have fun."

Microprocessors last year went into top-of-the-line Singer sewing machines to allow elaborate patterns to be sewn. They also went into gasoline pumps, supermarket scales, microwave ovens, private branch telephone exchanges, individual telephones, a myriad of "intelligent terminals" hooked up to computers and an increasing number of computers.

Engineers now are preparing microprocessors for a great leap for-

Continued on Page D17

Technology: Those Proliferating Microprocessors

Continued From Page D1

ward into the automobile, amid publicly expressed skepticism that there will be enough manufacturing capacity to meet the demand.

Starting in 1980, virtually all the nearly 10 million new cars produced each year in the United States are expected to be using microprocessors to increase the fuel economy of their engines as mandated by Federal law.

Many cars also will be using microprocessors to control displays in their dashboards of the sort now used in only a few luxury models. Still other microprocessors are expected to control the tuning of FM radios and televison sets.

• • •

This year, for the first time on a large scale, microprocessors from such companies as Texas Instruments and Intel (each claims to have invented the first microprocessor) will be handling data in chunks of 16 binary digits or bits, the figure that is typical of the proliferating minicomputers.

Many industry observers regard the move to 16-bit microprocessors as heralding the day when most computers' central data-processing units really will consist of committees of microprocessors.

This would transfer much of the responsibility for designing the heart of computer systems from such companies as the International Business Machines Corporation to a manufacturer of semiconductor components, including microprocessors, such as Intel.

At a conference in Orlando, Fla., last month, William H. Davidow, vice president and general manager of Intel's microcomputer systems division, said he used to believe that microprocessors would be a kind of Cinderella of the electronics world.

"It seemed as if microprocessors would be used within devices such as terminals, but that their personalities [that is, their architectures] would be hidden from the outside," he said. "They would be used only to do the dirty work that was carried on inside of peripherals, controllers, terminals and instruments."

But now, he said, the picture has changed. "Save for a few large systems, most future computers manufactured—even within computer manufacturing companies—will be implemented from standard, large-scale-integration building blocks supplied to these companies by component manufacturers."

Of the 8 million microprocessors shipped last year, more than one-third, or 2.8 million, were Texas Instruments TMS-1000's. Handling data in four-bit chunks, this chip is used in pocket calculators and other relatively simple applications. Industry observers estimate that this device now is selling for $1.25 to $1.50 in large lots.

The next largest selling category was the eight-bit device called the 8080, sold by Intel, Advanced Micro Devices Inc., the National Semiconductor Corporation, the Nippon Electric Company and Texas Instruments.

Intel, the originator of the 8080, accounted for an estimated 515,000 out of the 1.1 million 8080-type microprocessors shipped last year.

Selling earlier for between $5 and $10, such microprocessors now are said to be offered in large lots at between $4.25 and $5 each.