Winning and Losing at Texas Instruments
By PETER J. SCHUYTEN
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How Competitors Move in on the Electronics Giant

By PETER J. SCHUYTEN

DALLAS — Like its neighbors, the Dallas Cowboys, Texas Instruments is well-drilled and tightly controlled. It has excellent recruiting, depth at every position, and its offense runs like the proverbial clock. But the Cowboys don't always win, nor does Texas Instruments.

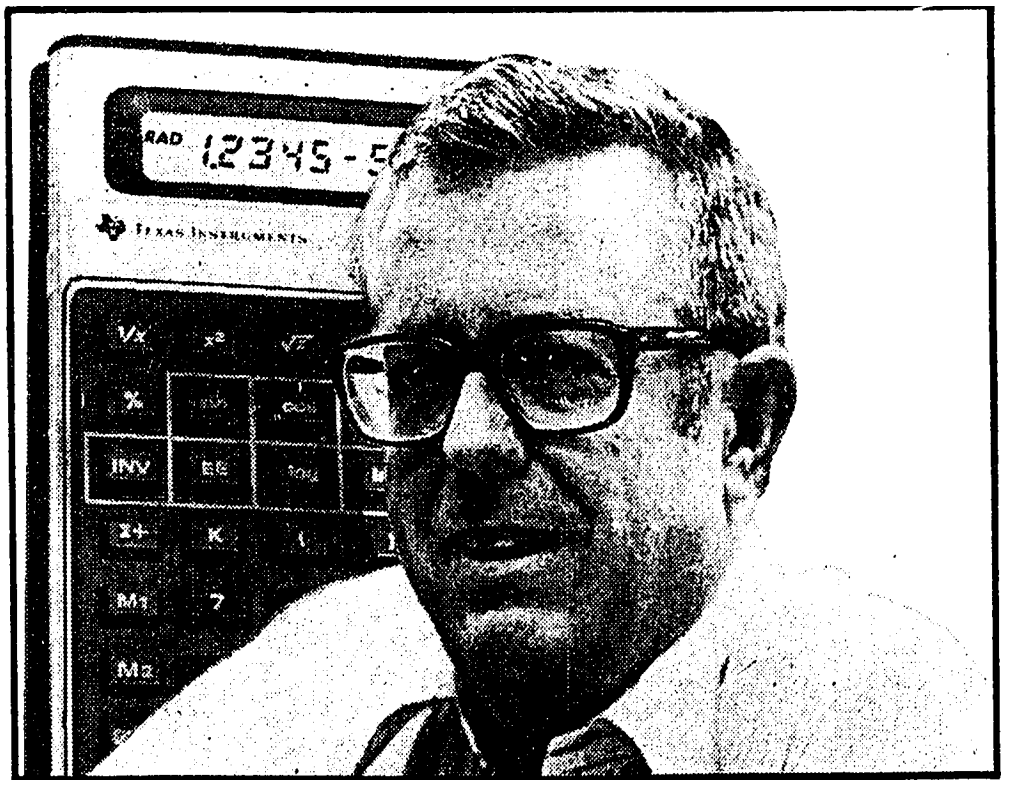
For all its apparent domination of the electronics industry, the $2.5 billion leader of the worldwide semiconductor industry has been badly outplayed in a number of key technologies that are themselves developing into markets worth hundreds of millions of dollars.

"T.I. is like a beautiful woman who is past her prime," says a competitor, W.J. Sanders 3d, chairman of Advanced Micro Devices Inc. And Thomas H. Mack, an analyst who follows the semiconductor industry for Paine Webber, Mitchell, Hutchins says: "Texas Instruments is a structured, systematic organization, but it often lacks the insight to react to fast-changing market conditions. They run well in a straight line, but they are not so good on the curves."

T.I, understandably, sees things differently. "We do stub our toe occasionally," says chief executive J. Fred Bucy, "But we are quick to recover."

That may be, but in the bustling market for the types of semiconductors that are used as computer memories, for example, T.I. fumbled away an early chance for leadership; then, too, its strategy for the minicomputer market went awry, and in microprocessors, that burgeoning technology where a host of computer functions are incorporated onto a single, microscopic chip of silicon, Texas Instruments isn't even considered a contender.

No one seriously doubts that Texas Instruments, with 80,000 employees, 48 factories, and an record of healthy growth and profitability, is a strong company. It rules the semiconductor business much as General Motors rules the automobile market. And with pocket calculators and digital watches, it also dominates much of the consumer electronics market, a position that it is likely to extend to home computers when the company enters that business, probably next month.



T.I.'s J. Fred Bucy Jr.: "We do stub our toe occasionally, but we are quick to recover."

But there appear to be flaws in Texas Instruments' corporate psyche, and at this point, it is an open question as to whether the flaws are serious or whether they are the sort that a company can live with and still prosper and grow. Either way, though, T.I.'s competition is benefiting from its mistakes.

Much of the company's considerable success to date stems from unrelenting attention to productivity, using such devises as robot arms and computerized assembly systems to crank out its products at lower and lower cost. Its dedication to automation has enabled Texas Instruments to gain market share by driving down prices to levels its competitors cannot match.

All of this attention to productivity has resulted in earnings that have grown nearly fivefold in the last 10 years to $140 million, while sales have slightly more than tripled from the $800 million of a decade ago.

Throughout those years, T.I. managed to hold its traditional rivals in its wake, companies such as Fairchild Camera and Instrument, Motorola and National Semiconductor. But there are newer challengers — such fast-growing, nimble competitors as the Intel Corporation, the computer-manufacturer Data General, and the Mostek Corporation, itself a T.I. spinoff. They have moved into markets that T.I. might once have called its own.

Some observers of the industry say that the company has an almost blind faith in its own abilities. Others say the company seems to have insulated itself from what is going on in the rest of the business. Indeed, even company insiders proudly refer to something called the "T.I. culture."

A visitor to the company is likely to come away thinking he has spent a hitch aboard a spit-and-polish battleship. The desks are bare and the floors polished linoleum. From one low-slung glass-and-concrete facility to another, whether in Dallas, Lubbock, Austin, or Nice, France, T.I.'s buildings look the same. The workers, from Fred Bucy on down, usually wear conservative, white shirts, with security passes clipped to their pockets — a striking contrast to the informal, low-key world of the high technology companies that populate California's "Silicon Valley." Then, too, managers talk with evangelistic zeal about the company's O.S.T. (for objectives, strategy and tactics) system, T.I.'s version of management by objective.

Its management system dates to the mid-50's, when the company developed the semiconductor product that put it in the forefront of the industry: the silicon transistor. It was out in front again in the 1960's with integrated circuits, a generational leap in the technology that allowed the industry to pack the power of scores of transistors on a single piece of silicon that until then could hold only one. T.I. refined and refined the circuits, making them ever smaller and ever more complex. They performed the vital logic functions of computers, and as that industry boomed, so did T.I.

Today the company is a major supplier of most of the best-selling semiconductor prod-

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ucts, including transistors, computer logic and electronic displays — what might be called the high-volume, low-margin nuts and bolts products of the industry. But lately, it has failed to establish a position at the industry's leading edge in developing products that are among the likely big winners of the 80's.

"This is an embarrassing time for T.I. because they haven't lived up to the technological expectations of the industry," says the chief executive of a San Francisco Bay area semiconductor company.

Part of the problem, say analysts who watch the company closely, lies in a decision eight years ago to pursue the emerging consumer electronics market. It required an all-out effort that stretched the company's resources so thin that its traditional businesses suffered a loss of momentum.

Texas Instruments, for instance, had trouble developing the metal-oxide semiconductor, or M.O.S., circuits that today drive its calculators. The result was that company efforts to establish a presence in the M.O.S. end of the semiconductor business were, in the opinion of many, irreparably damaged. Today, M.O.S. circuitry is the fastest-growing portion of that business.

"It did slow our momentum," concedes Mr. Bucy, of the move into consumer electronics, "specifically in memories." But he disputes the notion of any long-term effect, saying this only lasted for two years, the period from roughly 1971 to 1973. From 1973 on, he maintains, T.I. had been equal to or better than the rest of the industry in developing memories. "We came back and closed the gap," he says.

Maybe, maybe not. On the one hand, Texas Instruments was the first of only a handful of companies to publicly announce a 64,000-bit random-access semiconductor memory. Memories are the devices in which computers store information that is processed by their logic devices, and while strong in logic circuitry, T.I. has lagged in memories. The new product could give the company an edge in supplying the computer makers' thirst for ever more sophisticated memories.

On the other hand, designing a good product is one thing, and succeeding in the marketplace is another. T.I. could run into snags in achieving volume production — a common dilemma in the business. And T.I., a number of industry executives note, has been beaten in this arena before.

The semiconductor memory business can be thought of in a generational sense. The 1,000-bit memory chip was succeeded by a chip storing 2,000 binary digits of computer language, and so on up through the 64,000-bit memory.

In 1974, when the market began to standardize on Mostek's version of the 4,000-bit memory, the rest of the industry was quick to switch to that design. T.I., by contrast, took nearly three years to do so.

"They could've absolutely crushed us," says a leading memory competitor. "As it is now, we've all grown strong, and T.I. has to run hard just to keep in the ball game."

Allowing competitors to grow sleek and strong in one product, gave them the power to go after T.I. in others, notably in the microprocessors that are themselves tiny computers used singly for products needing limited computational power or as building blocks of big computers. Microprocessors, like computers, also require peripheral circuits for getting data into and out of the processor, as well as software, so there is far more to this market than competition among single chips.

In late 1973, Intel introduced its 8080 8-bit microprocessor — microprocessors are rated according to the length of a word, measured in bits, that they can handle, while memories are rated according to a hierarchy of storage complexity — which quickly became the industry standard.

Along with the 8080, Intel spent millions of dollars developing a highly successful family of peripheral devices to work with its processor chip and the software necessary to communicate with these miniature systems.

T.I., outmaneuvered in the 8-bit market, tried to move in front of Intel with a 16-bit memory that T.I. introduced in 1975. "We looked at the resources needed to overcome the 8-bit market, and decided to leapfrog it and come out with a 16-bit m.p.u.," says Mr. Bucy.

Unfortunately for T.I., the company underestimated the growth of the 8-bit microprocessor market, while being overly optimistic about the potential for its 16-bit device. As late as 1977, the company continued to forecast a rosy future for its microprocessors. Internal company documents, for example, reveal that management was predicting a $210 million market by 1980 for its 16-bit microprocessor, while contending that the market for 8-bit devices would grow to only $190 million.

But the predictions were wrong. Daniel L. Klesken of the Cupertino, Calif., market research firm, Dataquest Inc., says the market in 1980 for 8-bit microprocessors will have mushroomed to $375 million, while the 16-bit market will still be stalled at around $142 million.

"We were ahead of the market," says Mr. Bucy. But it was Intel that was ahead where it mattered. Intel has become the country's No.1 producer of microprocessors, just as Mostek has stolen the lead in computer memories.

Today, of course, as Intel along with Motorola and others begin introducing 16-bit microprocessors, T.I.'s experience with the product would appear to give it an edge. But that may not be the case. Attendees at a Morgan Stanley forum on semiconductors got a laugh recently when a panelist casually alluded to T.I.'s 16-bit device as the Edsel of the industry.

T.I. has also had problems with minicomputers. Looking at the booming business being done by companies like Digital Equipment, Data General and Hewlett-Packard a few years ago, T.I. brought out two general-purpose small business machines. The other companies relied on selling to the so-called original-equipment market, where the machines are then incorporated into other equipment. T.I. tried to go one better by selling finished computers.

The company presevered for four years, selling "complete solutions." But as Mr. Bucy admits, "we didn't sell many minis." It took the company another two years to turn this strategy around. Today, T.I. is generally conceded to rank fourth in minicomputers.

Texas Instruments Inc.

AT A GLANCE

Year ended Dec. 31	Net Sales (millions)	Net Income (millions)	Earnings per Share	Quarter ended	Net Sales (millions)	Net Income (millions)	Earnings per Share	Dividend
1978	$2,549.9	$140.3	$6.15	March 1979	$720.8	$38.2	$1.68	$0.50
1977	2,046.5	116.6	5.11	Dec. 1978	733.2	39.8	1.74	0.42
1976	1,658.6	97.4	4.25	Sept. 1978	644.5	35.5	1.56	0.42
1975	1,367.6	62.1	2.71	June 1978	614.6	34.3	1.50	0.42
1974	1,572.5	89.6	3.92	March 1978	557.6	30.7	1.35	0.42

Total assets, Dec. 31, 1978	$1,518,199,000	Stock price, May 11, 1979	
Current assets	915,497,000	N.Y.S.E. consolidated close	80¼
Current liabilities	637,161,000	Stock price, 52-week range	92½–72
Stockholders equity	845,390,000	Employees, Dec. 31, 1978	78,571