

Transpacific and Transatlantic Alliances Emerge in Chip Industry

The American approach to competition in the semiconductor industry has taken some interesting turns in recent months. What would have been the largest cooperative effort of US semiconductor and computer companies to manufacture memory chips was laid to rest in January. Shortly thereafter, two companies that were to have participated in the venture announced that they had entered into chip-producing arrangements with Japanese and European partners.

What these and other recent events suggest is that the leading US computer and semiconductor companies are rethinking how best to maintain their own competitiveness. Despite the general perception of an industry-wide "us-versus-them" attitude, US firms are finding alliances with Japanese and European concerns much more palatable and even desirable these days, leaving the future of exclusively American ventures in question.

Death of a consortium

The now-defunct consortium, called US Memories, was intended to reduce American dependence on Japanese memory-chip suppliers. The idea to form an all-American consortium to make memory chips first arose in 1988, at a time when memory chips were scarce and prices were high. Most US semiconductor companies had dropped out of the memory-chip business in the mid-1980s. A joint task force was set up by the Semiconductor Industry Association and the American Electronics Association to explore the possibility. Last March, Sanford Kane, a vice president in IBM's general technology division, told several American chip makers that IBM would license its technology for making dynamic random access memory chips to a group of US companies to create another independent US source.

In June 1989 US Memories was announced with great enthusiasm by Kane, who had left IBM after 27 years to head the venture. The plan called for construction of four state-of-the-art plants to manufacture the latest-generation memory chips, 4-megabit DRAMs. The first of them would come off the line in 1991. Member companies, at first restricted to semiconductor and computer makers, were to invest a total of \$500 million, with an equal amount to be borrowed; in addition, members were to purchase an agreed-upon percentage of their chips from US Memories.

Seven companies initially agreed to back US Memories: IBM, Digital Equipment and Hewlett-Packard—the first-, second- and fourth-largest US computer companies, respectively—and semiconductor firms Intel, LSI Logic, Advanced Micro Devices and National Semiconductor. But the idea never spread further than that. Unable to attract enough investors, Kane declared the venture dead on 15 January.

What happened? For one thing, even before Kane went looking for partners, the memory-chip market had completely turned around—the price of a one-megabit DRAM had plummeted in the one year from June 1988 to June 1989 from \$40 to \$14. Some companies criticized the US Memories plan, which was devised by a 35-member team of managers—from the seven founding companies, Goldman, Sachs & Co and Price Waterhouse—for being too ambitious and constraining. Though the original plan was eventually scaled back and non-electronics companies were invited to join, some of the largest American computer companies—notably Apple Computer and Sun Microsystems—refused to join.

"The problem that companies had with US Memories was that they would have been committed to a certain source for their DRAMs, which may or may not have been the best quality or the cheapest," Herbert I. Fufeld told *PHYSICS TODAY*. Fufeld, who is director of the Center for Science and Technology Policy at Rensselaer Polytechnic Institute, added, "That's a very risky strategic move." He pointed out that there was talk of creating a common manufacturing facility when the semiconductor research consortium Sematech was first being put together. That idea was subsequently dropped. "Every company has its own objectives, its own strategy to maintain a profitable business, and there are lots of options. US Memories was just one of those options," Fufeld said.

Other options

On 22 January Intel Corp of Santa Clara, California, announced that it will join forces with NMB Semiconductor, a subsidiary of the Japanese conglomerate Minebea, to produce and sell memory chips. Two days later IBM said that it will cooperate with West German electronics giant Siemens AG to develop the 64-megabit DRAM. Both companies were quick to say that the new agreements

were independent of the US Memories failure and would have gone through even if it had succeeded. "The demise of US Memories was a disappointment to IBM," says Paul Bergevin, an IBM spokesperson. "But it was only one piece in an overall strategy. Other pieces are still in place."

On the same day as, but independent of, the IBM-Siemens deal, IBM's European group was invited to participate in JESSI, the European semiconductor consortium overseen by EUREKA (see page 70).

The Intel-NMBS arrangement calls for Intel to put its name on NMBS-produced chips, which Intel would then market worldwide. The venture is scheduled to be operating by the third quarter of this year. Intel will gain access to NMBS's state-of-the-art manufacturing technologies, but there will be no technology transfer by Intel, which stopped making DRAMs in 1985. NMBS currently has two chip-making plants operating in Japan, with another scheduled to open by mid-year. A fourth plant is to be built in the US, thereby creating another American source of memory chips.

The IBM-Siemens agreement provides for the two companies to jointly develop a memory chip capable of storing 64 million bits of information, with commercial production to begin as early as 1995. The cost of the development project, estimated to be in "the hundreds of millions of dollars range," is to be shared equally. The work itself will focus on chip design and processing techniques, but will not include work on x-ray lithography, on which IBM has spent a half billion dollars over the past decade (see *PHYSICS TODAY*, January, page 67).

Though Siemens entered the semiconductor business fairly late and is still the lesser of the two companies in terms of technological know-how, the agreement positions the West German firm to become a major player in the European chip market in the 1990s. The agreement is also the next logical step for both companies in heightening their already strong presences in the European computer market. At present IBM leads the field, accounting for \$20.2 billion of computer sales revenues in 1988; Siemens was second with \$5.4 billion. Siemens recently fortified its position by acquiring Nixdorf AG, a German pioneer in personal computers and workstations, which had been the sixth largest European computer maker.

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