
GLOBAL ELECTRONICS

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watchdogging "High Tech"

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P.S.C. LIVES—NEEDS VOLUNTEERS

The response to the Pacific Studies Center's recent fund-raising drive was very positive, so we'll be keeping the doors of our resource center open, at the same location, for at least another year. We still need to raise some money this year, and we need to find a more stable source of revenue for future years, but we are extremely pleased.

Unfortunately, there is not enough money to support a paid staff to process the clippings and reports that make up the bulk of PSC's library, so we are seeking long-term, part-time volunteers. Call 415/969-1545 if you are interested.

ALLIANCES

It is difficult to assess long-term structural changes in the semiconductor industry because outright corporate acquisitions are relatively rare. Rather, most companies have chosen to share technology with and farm out production to one or more allies. The practice is so widespread that the semiconductor industry today exists as one, complex, interlocking web. Corporate interest groups that appear to compete on one level frequently cooperate on others.

Among alliances announced in the last few months, two merit particular attention. First, in May Hewlett-Packard announced plans to produce arithmetic chips for niche semiconductor firm, Weitek. Second, in June, Samsung agreed to supply Intel with memory chips.

■ Hewlett-Packard has manufactured chips for its own use for years, but it sells few components on the open market. It has never acted as a silicon foundry for another company. Weitek makes number-crunching floating-point chip sets.

H-P engineers wanted to incorporate a Weitek chip set into a new workstation they were designing, but the chip was not quite fast enough. Weitek was fabricating wafers for the chips at a facility that could "etch" onto silicon features only as small as 1.5 microns.

H-P, on the other hand, operates a 1.2 micron fab facility in Corvallis, Oregon. Chips made there, from the same design, would be faster. It agreed to manufacture chips designed by Weitek in exchange for a share of the output. The three-year deal gives Weitek the right to order at least \$20 million of its own chips from Hewlett-Packard in addition to the \$10 million worth that it is selling directly to H-P. (San Jose Business Journal, May 18, 1987)

■ Intel, the company which, in the early 1970's, was the first to successfully market memory chips, is getting back into the business of selling DRAM (dynamic random access memory) chips. Two years ago, Intel had stopped making RAM's in the face of cutthroat pricing by Japanese semiconductor firms.

Intel will not be making its own RAM's, however. Instead, the South Korean firm Samsung has contracted to supply Intel with 64K, 256K, and 1-megabit chips. For now, all production will be done in South Korea.

Intel, a leader in microprocessor technology and read-only memory circuits, does not plan to become again a major player in commodity RAM chips. Rather, an Intel spokeswoman told the San Jose Mercury News, June 25, 1987, "We did it so we could offer our customers a one-stop solution."

Since Korean firms are not bound by the U.S.-Japan semiconductor agreement, Intel is free to charge prices below mandated Japanese floor prices. Given Intel's long commitment to global sourcing of its products, it is not surprising that the company is taking advantage of Washington's new, aggressive stance on Japanese semiconductor trade while creating jobs in South Korea.

ROBOTIC FAB

A new facility for making radiation-hardened integrated circuits, at Sandia National Laboratories in New Mexico, will be "the first U.S. integrated circuit research and prototype plant usings robots throughout the wafer fabrication process. Sandia is installing an automated guided vehicle that will

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follow tape tracks in the floor of a three-hundred foot clean-room (particle-free) aisle.

The vehicle will transport cassettes containing up to twenty-five wafers to and from twenty-two separate processing stations. The robot, controlled in part by computer integrated manufacturing software, is designed to minimize human contact and intervention in production.

By the end of 1989, the Sandia fab lab will be capable of manufacturing 200 six-inch wafers per month. (*Defense Electronics*, June, 1987)

MILITARY ELECTRONICS

The Pentagon's seemingly insatiable appetite for high-tech electronics appears to be growing a little more slowly. *Electronics* (June 11, 1987) cites market researcher Henderson Ventures, which says "Military electronics production will grow by only 4.4% this year and by only 3.6% in 1988."

The proposed 1988 Pentagon procurement budget, which is about 35% electronics, is actually shrinking, but research, development, test, and evaluation, which is 49% electronics, is scheduled to rise 19%. (Remember, the Strategic Defense Initiative is still officially in its R & D stage.)

Another market research outfit, Integrated Circuit Engineering, has estimated the 1986 military integrated circuit sales of top Pentagon suppliers. (Reported in *San Jose Business Journal*, June 15, 1987.) Note that transistors and other discrete components are not included.

<u>Company</u>	<u>Sales (\$ millions)</u>
Texas Instruments	160
Harris	150
Fairchild	148
Advanced Micro Devices	139
National Semiconductor	118
Motorola	100
Intel	75
LSI Logic	70
RCA	70
Signetics	60
Monolithic Memories	40
All Others	260
TOTAL	1,390

SILICON VALLEY WEAPONS EMPLOYMENT

In last month's *Global Electronics*, we presented data showing the long-term decline of military contracts relative to all manufacturing shipments in Silicon Valley. Not surprisingly, the relative decline in military business has been accompanied by a similar drop in the share of employment in the weapons sector.

Official statistics do not distinguish military electronics from civilian electronics, so the percentages shown below are valuable only for year-to-year comparison. We estimate that actual weapons-related employment in the Valley is normally twice the employment in missiles and tank manufacture.

Missile and tank jobs in the Valley are concentrated at four employers, Lockheed Missiles and Space, FMC's ordnance division, Westinghouse Marine, and United Technologies.

Notes: All data are from the State of California Employment Development Department, and cover Santa Clara County only. The 1950-1971 figures for missiles (and space vehicles) and tanks (armored personnel carriers) were categorized "ordnance."

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Cost

<u>Year</u>	<u>Missiles & Tanks</u> (thousands)	<u>All Manufacturing</u> (thousands)	<u>Share</u>
1950	0	22.1	0.0%
1951	.2	26.7	0.7%
1952	.7	27.6	2.5%
1953	.8	28.9	2.8%
1954	1.1	29.4	3.7%
1955	1.3	34.0	3.8%
1956	1.6	39.3	4.1%
1957	4.2	46.8	9.1%
1958	9.6	52.1	18.4%
1959	14.8	62.2	28.4%
1960	18.0	70.3	25.6%
1961	22.0	76.3	28.8%
1962	26.0	85.4	30.4%
1963	26.8	88.3	30.4%
1964	24.3	87.9	27.6%
1965	22.0	89.8	24.5%
1966	24.3	105.8	23.0%
1967	28.7	119.7	24.0%
1968	28.7	127.0	22.6%
1969	24.2	128.6	18.8%
1970	20.7	123.5	16.8%
1971	19.0	117.4	16.2%
1972	19.4	130.9	14.9%
1973	19.5	151.3	12.9%
1974	20.2	167.2	12.1%
1975	21.9	157.7	13.9%
1976	21.1	170.1	13.4%
1977	19.6	180.4	10.9%
1978	20.5	203.4	10.1%
1979	22.1	232.1	9.5%
1980	24.2	250.0	9.7%
1981	25.2	254.7	9.9%
1982	27.0	268.0	10.1%
1983	27.6	270.9	10.2%
1984	29.3	293.3	10.0%
1985	32.2	291.0	11.1%

MORE ON SEMATECH

Details about plans for Sematech, the Semiconductor Industry Association's (SIA) version of the proposed chip manufacturing consortium (see **Global Electronics**, March, 1987) are slowly diffusing into the public domain. Sematech is moving ahead, but not without difficulty.

Larry Sumney, head of the Semiconductor Research Corp. (SRC), another SIA joint activity, has been selected as acting managing director. He retains his SRC position.

The venture has leased temporary office space in Santa Clara, and cities and states are preparing for a bidding war to attract Sematech's permanent facility. Sematech hopes to eventually employ 700 to 800 people with an annual budget of \$250 million.

In California, state officials may offer as much as \$25 million to entice Sematech. At least three major California cities—San Jose, Sacramento, and San Diego—are expected to submit proposals.

At this point it appears that Sematech will build a high-volume production line for state-of-the-art SRAM (static random access memory) chips, most of which will be destroyed, not marketed. Static RAM's are faster than dynamic RAM's (DRAM's), which consume more power and lose their information when power is turned off. However, since SRAM's require more gates—that is, transistor equivalents—per bit of information, at any given memory capacity, they are more expensive to make than DRAM's.

U.S. chipmakers may hope to outgun their Japanese competitors, not by outproducing DRAM's, the currently top-volume commodity chips, but by establishing another product, SRAM's, as the semiconductor commodity of the future.

Sematech has carefully defined U.S. nationality to suit the interests of its primary backers. **Electronics** (May 28, 1987) reports, "Membership will be restricted to chip-making firms primarily owned by U.S. citizens and having a domestic manufacturing base. This provision will bar subsidiaries of foreign-based firms—such as Fairchild, Inmos, Mostek, and Signetics, and several Japanese-owned operations—as well as the wave of startups and niche silicon houses dependent on offshore foundries..."

The Semiconductor Equipment and Materials Institute (SEMI), which includes most major

suppliers—globally—of chip production equipment, is now backing Sematech. U.S. members of SEMI will form a chapter of Sematech, financed by member companies, not SEMI at large. Sematech will award contracts to chapter members when it determines that new equipment needs to be developed.

SEMI endorses the idea of federal funding for Sematech, as long as the government does not restrict the commercial use of its products or technologies. (SEMI press release, May 26, 1987).

Though Sematech has never involved environmental or health and safety activists in its planning, it stated, in its May 12, 1987 press statement, "SEMATECH will emphasize environmental, health and safety concerns in the development of new processes and equipment." (Reprinted in the **Congressional Record**, May 19, 1987, p. S6700.)

Adequate funding for Sematech is by no means assured. Despite the Semiconductor Industry Association's apparent unity behind Sematech, potential participants are reluctant to sign up. The **San Jose Mercury News** (June 14, 1987) reports, "Only 14 of the hoped-for 30 to 40 semiconductor firms have agreed to commit money

and personnel..."

Though Sematech's backers want Pentagon money and the Pentagon wants to back something like Sematech, large-scale funding may be difficult to arrange. Chipmakers don't want the Pentagon telling them what to do. The military not only wants strings attached, but it may insist that the consortium produce circuits directly for insertion into weapons systems.

The influential American Electronics Association, which represents equipment-makers as well as components manufacturers, has not endorsed Sematech. Many AEA stalwarts, like a number of Reagan administration officials, are ideologically opposed to government involvement in private industry.

Finally, even if Sematech gets off the ground, getting companies to share valuable production technology may be difficult. **Electronics** (May 28, 1987), in an editorial expressing doubts about the consortium, quotes a semiconductor exec, "I don't know if I'll send my best production engineers. I also don't know if I'll share with it the proprietary advances in manufacturing we've achieved at our company."

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