GLOBAL ELECTRONICS

Issue No. 83 March, 1988

WHO GIVES A DRAM?

The market for computers of all sizes is booming again, and U.S. companies that produce computers are flourishing too. However, the shortage of dynamic random-access memory (DRAM) chips has created a major bottleneck in the computer production process. Just-in-time production schemes, introduced to promote efficiency, are in disarray, and many makers of systems, peripherals, and add-on boards have had to hold back shipments or pay premium prices to obtain the chips, which constitute the working memory of computers of all sizes.

There are three major reasons. First, the DRAM market is sharply cyclical, switching from shortage to oversupply and back every few years. DRAM's are commodity chips. Different companies use competing designs, but the circuits they produce are compatible. When there is a shortage, most suppliers increase capacity. As new fabrication factories come on line, a surplus develops. Where there is a surplus, no one invests in new plants. Not long ago, even the most efficient Japanese companies were losing money in DRAM's. So now there is a shortage.

Second, many producers are shifting from 256-kilobit (256K) RAM's to chips with four times as much memory, known as one-megabit (1M) RAM's. Some have encountered production glitches that have reduced the rate and/or yield of production. Few are functioning at full speed.

Third, in the wake of the 1986 semiconductor trade agreement between the U.S. and Japan, the Japanese government instituted supply controls to prevent the dumping of Japanese chips in third countries. In effect, the U.S. required Japan to form a cartel, and it appears this benefited Japanese DRAM suppliers to the detriment of their customers in the U.S. and Europe. In fact, the European Community challenged the agreement before a panel of GATT, the General Agreement on Tariffs and Trade, and thus far the international body has ruled against the agreement.

Some computer makers have made a lot of noise, offering to sign long-term purchase agreements with chipmakers investing in new capacity or even to invest directly in DRAM production, but those two approaches, already practiced by many large computer firms, are not likely to spread. The computer market is unstable. The demand for chips may evaporate by the time a new plant is built. Most systems houses cannot afford to risk so much capital.

Meanwhile, major merchant semiconductor firms in the U.S. are doing little to restart DRAM production. Motorola plans to fabricate its own RAM's (see **Global Electronics**, January, 1988), but now it is just assembling and marketing chips fabricated by Toshiba. Intel made a big splash by establishing an alliance with Idaho's Micron Technology, the only U.S.-owned merchant DRAM-maker that does most of its fabrication in the U.S. Though Intel may invest in Micron's future plants, the deal for now is for Intel to market Micron's DRAM's as its own, a relationsip similar to Intel's current agreement with Korea-based Samsung. National Semiconductor will probaly announce its own alliance, but it is unlikely to expand overall capacity for DRAM components.

Before leaders of U.S. industry and government reach a consensus on how to respond to the chip shortage, the bottleneck may disappear. As long as prices are high, Japanese and Korean-owned firms will increase their output. Given the increased activism of U.S.-owned customers, it is unlikely that the U.S. government will add to the problem again by demanding again that Japan control its supply.

SEMATECH DELAYS

Sematech, which appeared to be moving in a big hurry when demanding subsidies from the state and federal governments, has lost much of its momentum. The consortium of U.S.-owned chipmakers, formed to develop new manufacturing technologies for member firms, has not yet announced a chief executive, prompting questions about the willingness of member firms to share their top talent.

Secondly, Sematech's civilian leaders and military overseers are reportedly having difficulties.

(continued on page 2)

The Sematech executive committee has missed at least two deadlines for submitting a business plan to the Defense Advanced Research Projects Agency, which is responsible for dispensing $100 million in Federal funds this year. The **San Francisco Chronicle** (April 29, 1988) quotes Dataquest's Mike Boss, who says "There really do seem to be some basic philosophical differences."

The Pentagon apparently does not like the organization's planned focus on memory chips, and it would like to see a more detailed approach to flexible manufacturing.

RACE & GENDER IN HIGH TECH

High-tech industry has always been characterized by a clear hierarchy of race and gender. Positions with the greatest pay, status, and power are held predominantly by white men. Jobs at the bottom of the ladder are usually held by non-whites and women—indeed non-white women.

Most scientists and engineers associated with the electronics industry are white men, but a disproportionately large number are Asians. Here we present data on actual employment in the two occupations most associated with high-tech industry: computer specialists (such as programming professionals) and electrical and electronic engineers. Coincidentally, these two occupations represent the largest categories in the National Science Foundation's statistics on science and engineering professional employment.

Though the new data (1986) shows that women and most non-white groups are poorly represented in high-tech occupations, it does show both absolute and relative growth among women. The decline in the proportion of Hispanics, in both occupations, and of black EE's is a bad sign, however. Without conscious public policies, non-Asian racial minorities may be locked out of the benefits of high-tech professional work.

Women, blacks, and Hispanics who are employed in science and engineering also are paid significantly less, on average, than their white male counterparts, regardless of education and work experience. The gap varies depending upon the field of work. For women computer specialists and EE's, women's pay approaches that of men, probably because the fields are rapidly growing. Women in those occupations receive an average of 86% and 87% of male pay, respectively.

(**Women and Minorities in Science and Engineering**, National Science Foundation, January, 1988, NSF 88-301.)

COMPUTER SPECIALISTS
(thousands/percent)

	1876	1984	1986
Female (all races)	**20.6**	**114.1**	**162.5**
	17.3%	26.1%	28.9%
Asian	**4.0**	**24.6**	**36.1**
	3.4%	5.6%	6.4%
Black	**1.6**	**12.1**	**18.9**
	1.3%	2.8%	3.4%
Hispanic	**NA**	**8.2**	**9.3**
	NA	1.9%	1.7%
Native American	**NA**	**1.8**	**2.2**
	NA	.4%	.4%
TOTAL	**119.0**	**436.8**	**562.6**
	100.0%	100.0%	100.0%

ELECT. ENGINEERS
(thousands/percent)

	1876	1984	1986
Female (all races)	**1.6**	**12.2**	**18.9**
	.6%	2.4%	3.3%
Asian	**13.8**	**31.1**	**37.9**
	4.9	6.2	6.6
Black	**2.9**	**11.4**	**11.9**
	1.0%	2.3%	2.1%
Hispanic	**NA**	**11.3**	**12.2**
	NA	2.3%	2.1%
Native American	**NA**	**3.9**	**3.3**
	NA	.8%	.6%
TOTAL	**283.0**	**500.7**	**574.5**
	100.0%	100.0%	100.0%

GLOBAL ELECTRONICS
edited by Lenny Siegel
Issue No. 83
published monthly by the Pacific Studies Center
222B View Street
Mountain View, CA
94041 - USA 415/969-1545
US ISSN 0739-0416
subscription rates (12 issues)
United States: $12.00
Canada and Mexico: US$14.00
Overseas: US$17.00
all back issues are available

CORDATA, THAT'S WHO

We've long argued that transnational corporate organizations, joint ventures, and other strategic alliances have blurred the national identity of high-tech firms. However, in the case of Cordata, a producer of PC clones, cultural differences exacerbated an escalating conflict between company founder Robert Harp and executives of Daewoo, its Korean-based owner.

In 1986 Daewoo bought a seventy percent stake in the ailing southern California firm. Daewoo wanted a U.S. subsidiary to market its computers, while Harp was looking for a cheap way to build more sophisticated machines.

The conflict in goals between old and new owners was matched by a conlict in style. When Harp ran the company, Cordata was loose and informal, to encourage innovation. Daewoo, on the other hand, was formal and autocratic, and many company old-timers were unhappy. Soon the conflict assumed racial overtones. Harp's close allies at Cordata started quietly calling the Daewoo team the "gooks from Hazzard."

In early 1987, Cordata's new chief executive, Daewoo's Hyo-Bin Im, told Harp that the company would delay production of the 80386 (microprocessor)-based machine that Harp had been developing. At a lunch meeting, Im also criticized Harp's management style.

When the two men returned to company headquarters, Harp physically attacked his new boss. In his own words, he "beat the shit out of Im."

Harp resigned, and Cordata, which was not doing too well in the first place, has been unable to introduce some of its planned products.

("The Real Gung Ho," **California Business**, February, 1986)

STANFORD'S OFFICE PARK

The Stanford Research Park, 655 acres of university-owned land just south of the Stanford campus in the city of Palo Alto, is the core around which Silicon Valley was built. It is also the original high-tech industrial park, used as a model not only in the U.S., but around the world.

Stanford first leased land to two high-tech companies, Varian Associates and Hewlett-Packard in the early 1950's. Today the two Stanford spin-offs are Fortune 500 companies, and the industrial park is home to 60 companies employing about 27,000 workers.

At first, many of the firms in the Stanford Industrial Park—as it has been known for most of its history—conducted manufacturing, as well as research and administrative work, at Stanford-park facilities. But over the years, manufacturers have moved out of the park, or at least moved their factories elsewhere to take advantage of lower rents and to be near housing affordable to production workers.

The park is now undergoing its second metamorphosis. Today firms are moving research labs out, and new space in the park is increasingly being devoted to office uses. The **San Jose Mercury News** (April 28, 1988) reports, "of the 1.4 million in square feet of new buildings added to the park from 1980 to 1987, more than half was for office space. During the same time, 30 percent went to research and development space and 9 percent went to manufacturing." There appear to be three reasons:

First, rents there are among the highest in Silicon Valley, ranging from $1.65 to $2.25 per square foot. Since office use is more intensive than research, employers can keep the rent per employee down by moving research out to less expensive areas.

Second, park companies have contaminated a local creek, released acidic gas into an adjacent commercial district, and tainted groundwater at a dozen sites. Pressured by nearby residents, environmentally conscious Palo Alto has enacted strict rules for the handling of hazardous materials and tightened up its building review process.

And third, software development is taking up an increasing share of the work performed at most high-tech companies, included manufacturers of computers and chips, as well as firms dedicated solely to software. Since software coding and testing takes place in offices, not labs, much of the switch to office development merely reflects the changing nature of research, not a move away from it.

EXPLOSIVE SITUATION

Silane gas, used extensively in semiconductor production, is a particularly volatile compound, as we reported in **Global Electronics** (December, 1986). When contaminated with other substances, it is even more dangerous. In March, silane cylinders believed to have been contaminated with nitrous oxide exploded at the Berkeley Heights, New Jersey plant of Gollob Analytical Services.

(continued on page 4)

Suspecting contamination, Gollob had evacuated its plant. But the three workers who remained were killed in the explosion.

The silane supplier, Liquid Carbonics Specialty Gas Co., traced the silane to its plant in San Carlos, California, just north of Silicon Valley. Fire officials evacuated surrounding factories and businesses. In addition, two Valley chipmakers, Teledyne and AMD, closed plants and kept 800 workers home while preparing to dispose of cylinders from the same batch.

Late one night, more than a week after the New Jersey blast, 100 residents of San Carlos were evacuated from their homes, and the Bayshore Freeway was closed as a convoy transported the remaining cylinders to the salt flats of the San Francisco Bay, where they were detonated. (**San Jose Mercury News**, March 22, 24, and 25, 1988)

V.H.S.I.C. LOWERS GOALS

An extremely dense superchip, designed to be the "flagship" of Phase 2 of the Pentagon's Very *High Speed* Integrated Circuit (VHSIC) program, never made it off the drawing boards. TRW and Motorola had planned to build a device packing a whopping 28 million transistors onto a 1.4-inch square of silicon.

To achieve such a high density, designers were counting on an unproven electron-beam lithography machine under development at equipment-maker Perkin-Elmer, which was supposed to etch half-micron features onto the chip. The E-beam was delivered a year late, and reportedly never met its specifications.

Instead of the superchip, Motorola and TRW have developed a less complex chip using optical lithography. The chip, called the CPUAX, incorporates a design breakthrough, a form of self-correcting on-chip redundancy, planned for the original design. (**Electronics**, April 28, 1988)

KOREAN FLY-BY-NIGHT

While many transnational electronics firms maintain constant real-time contact with their affiliates in Asia, it takes months for reports on strikes and other actions by Asian workers to percolate to their sympathizers in the U.S. Last we heard, former employees of Max Tech, a locally owned computer producer in South Korea, were occupying the firm's property in Seoul.

When workers returned from their New Year's holiday, they found the plant gates locked, its machinery removed, and utilities shut off. Workers had formed a union in August, 1987. **Korea Bi-Weekly Report** (February 15, 1988) says, "In November, when the company saw that the labor union was getting too strong to control, [it] acquired a new plant… and utilizing the year-end holidays, closed [the] present plant and laid [off] all 255 workers."

Pacific Studies Center
222B View Street
Mountain View, CA
94041 USA

BULK RATE
NON-PROFIT ORGANIZATION
U. S. POSTAGE
PAID
PERMIT NO. 155
MOUNTAIN VIEW, CA.

Address Correction Requested