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QUANTUM RUNS HOME

Quantum Corporation, a Silicon Valley manufacturer of hard disk drives for small computers, announced in November that it planned to close its production facility in Ponce, Puerto Rico. Over the next year, the company is phasing out the devices produced in Ponce.

Going against the dominant geographic trend in the computer peripherals industry, Quantum is consolidating its manufacturing at its home base in Milpitas, in Silicon Valley. Company president James Patterson said, "Our new semiautomated manufacturing line in Milpitas was designed concurrently with our advanced Q200 Series intelligent disk drives. This state-of-the-art facility has nearly twice the capacity of the process used for our older products, and requires just half the floor space and one-third the manpower. It also gives us the flexibility to expand to multiple shifts per day to accommodate increased demand and new generation products.

"In addition, it is more cost effective for us to maintain our manufacturing facility close to our engineering and technical support operations, which are located at our corporate headquarters in Milpitas." (Quantum news release, November 24, 1986)

JAPANESE TO ASSEMBLE IN U.S.

In December, two of Japan's leading high-tech companies, Toshiba and Hitachi, announced plans to assemble state-of-the-art memory chips (1 megabit dynamic random-access memories) in the U.S. Toshiba will do the work in Sunnyvale, in Silicon Valley, while Hitachi will carry it out in Irving, Texas.

Since both companies will continue to fabricate wafers in Japan, both will be subject to the U.S.-Japan semiconductor trade agreement. The agreement sets minimum prices for several categories of memory circuits. With substantial overcapacity in Japan, no major Japanese chipmaker is likely to invest in U.S. wafer fabrication in the near future. (San Jose Mercury News, December 24, 1986)

Spokesmen for U.S.-based chipmakers have downplayed the significance of the Japanese announcement, but it does raise an important question. How can Japanese firms make money assembling high-volume semiconductor products in the U.S. when most U.S.-based firms find it necessary to do most of their assembly overseas?

MOTOROLA-TOSHIBA

In November, Motorola and Toshiba agreed to build jointly a semiconductor wafer fabrication complex in Izumi City (near Sendai), Japan. In addition, Motorola will exchange its microprocessor design technology—licensing its 32-bit 68020 to Toshiba for the Japanese firm's expertise in the manufacture of memory chips. (Electronics, December 18, 1986)

As more and more high-tech firms implement such "strategic alliances," competition within the electronics industry will be less between the U.S. and Japan and more between trans-Pacific corporate alliances, each containing one or more American and Japanese firms. But don't expect to hear much about it from the U.S.-based semiconductor industry. The specter of Japan carries too much weight in Washington, DC, for companies to publicly discuss their cooperation with the "enemy."

PHILIPPINE LAWSUIT

The new Philippine government of Corazon Aquino is attempting to recoup more than US\$5 million from Vicente Chuidian, the Philippine businessman who had founded assembly subcontractor Dynetics and its U.S. affiliates. In November, 1985—the waning days of the Marcos regime—Chuidian reached a settlement with in which Philguarantee, the Philippine Export and Foreign Loan Guarantee Corporation, agreed to pay him \$5.3 million. (See Global Electronics, February, 1986.)

Attorney James Kleinberg, representing the new leadership of Philguarantee, charges, "the settlement was obtained through fraud and duress." The agency insists that Marcos forced it to pay the funds to Chuidian to win his silence on the Marcos family's controversial overseas investments, a subject about which Chuidian was apparently well informed.

Back in May, 1985, Philguarantee sued Chuidian, who lives in Hillsborough, between Silicon Valley and San Francisco, in the U.S. courts. The agency charged that he had diverted funds from the Philippines to his U.S. venture. When the Philippine government took over his Philippine companies, he countersued.

At present, Chuidian is attempting to block the suit by invoking the Act of State doctrine, which says that the U.S. judiciary should not be in the position of judging the motivation of foreign rulers. (San Jose Mercury News, January 8, 1987)

TOXIC CHEMICAL UPDATE

1. For years, labor organizers and health and safety activists have been warning that on-the-job exposure to toxic chemicals used in semiconductor production is hazardous to workers' health. Industry, however, has not only ignored the warnings, but it has impugned the motives of its critics.

It came as a pleasant surprise in December, therefore, when officials at numerous companies actually publicized the results of a study, conducted by a team from the University of Massachusetts, evaluating employee health of workers in wafer fabrication at the Hudson, Massachusetts plant of the Digital Equipment Corporation (DEC).

The full results have not yet been published, but researchers found a significant increase in miscarriages among women who worked in wafer fab areas. They also found increased reports of headaches, nausea, and dizziness, but they did *not* find evidence of unusual concentrations of other disorders, such as birth defects and male infertility.

Two factors appear to explain industry's response: First, the warning flag was raised by a medical research team working *with* DEC management. Second, Fairchild Semiconductor recently paid a large settlement to neighbors of a plant that leaked toxic chemicals into the south San Jose water supply. Executives may now be convinced that a bit of prevention is worth a megabyte of lawsuit payments.

Several chipmakers have encouraged women who are pregnant or who plan to become pregnant to discuss their job duties with physicians and/or supervisors, to limit exposure to hazardous materials. A few, such as DEC, have guaranteed women workers the right to transfer to positions with less exposure. And in January, 1987, AT&T decided to exclude all pregnant women from production areas at its wafer fabrication plants.

AT&T's response, unfortunately, appears to blame the worker, not the company. Health and safety activists have long pointed out that it makes more sense to clean up the plant, for all workers, than to discriminate against women who are pregnant.

2. In December in Silicon Valley, six people were treated following a phosphine gas leak at LSI Logic, while one person was treated for exposure to gallium arsenide gas at General Instruments' optoelectronics division. Officials were critical of General Instruments, which took more than two-and-a-half hours to report the leak. (*Peninsula Times-Tribune*, December 16, 1986).

3. Also in December, California officials shut down the only major hazardous waste dump in northern California, International Technology Corporation's Panoche facility in Benecia. Now Silicon Valley firms must have their hazardous wastes trucked to sites in Kings County (halfway to Los Angeles) or Santa Barbara County.

4. The semiconductor industry is becoming increasingly aware of the dangers associated with the use

and storage of gases. *Semiconductor International* (August, 1986) describes how test engineers from Hazards Research Corp. triggered a silane gas explosion to illustrate the unpredictable volatility of the compound. It quotes Patrick Taylor, a manager at a Union Carbide unit that supplies gases to the electronics industry: "Prior to the study, it was believed that when you exposed silane to the air, it would burn, not explode. Those results really shook up the electronics industry."

As a result, chipmakers are isolating silane storage facilities and even building concrete bunkers for it. Jeff Harriman, an engineer at AT&T Technologies' plant in Lee's Summit, Missouri, told *Semiconductor International*, "We are trying to get silane out of the main building. As of now, we are doing it with cylinders having greater than 5% silane. We have also housed all of our toxic, corrosive and even our non-toxic gases in a gas cylinder building outside of our main building. The silane bunker is remote—even from the gas cylinder building. The result is we now have all of our gases out of the clean room areas."

SUBCONTRACT CHIP ASSEMBLY

We've just received the June, 1986 issue of *Semiconductor International*, which surveyed the state of Asia's chip assembly industry. Though most U.S.-based merchant semiconductor firms operate wholly owned subsidiaries in Asia to conduct the bulk of their circuit bonding and packaging, locally owned businesses have emerged as major subcontractors both for merchant manufacturers and captive houses as well.

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Typically, the subcontractor has an affiliate in the U.S., but the exact relationship varies from firm to firm. Of the U.S. affiliates, only Amkor, in Valley Forge, Pennsylvania (representing South Korea's Anam Industrial) is based outside Silicon Valley.

At the time of the Semiconductor International report, the Philippine semiconductor industry was in disarray. Stanford Microsystems, the largest Philippine subcontractor, had closed down, and number two Dynetics had laid off nearly three quarters of its workforce.

Subcontractor (Location)	Employees (Jan., 1986)
Anam Industrial (Seoul, South Korea)	n/a
Hyundai Electronics (Kyoungki-Do, So. Korea)	4,040
Semiconductor Devices (Manila, Philippines)	2,700
Integrated Microelectronics (Manila, Philippines)	1,760
Dynetics (Manila, Philippines)	1,700
Filipinas Micro-Circuits (Manila, Philippines)	1,300
Rectron (Taipei Hsian, Taiwan)	1,200
Semiconductor Devices (Aberdeen, Hong Kong)	900
Fine Products Microelectronics (Hsinchu, Taiwan)	550
Lingsen Precision Industries (Taiching, Taiwan)	550
Hana Semiconductor (Bangkok, Thailand)	483
Chinteik Electronic Industries (Pathumthani, Thai.)	450
Chino-Excel Technology Corp. (Taipei, Taiwan)	400
Labtech Manufacturing Indust. (Quezon City, Phil.)	321
Asionics Philippines (Manila, Philippines)	200
Swire Technologies (Tsuen Wan, Hong Kong)	200
Farsonics Solid State (Taoyuan, Taiwan)	190
Cirtek Electronics (Manila, Philippines)	180
Talent Electronics (Hsinchu, Taiwan)	150
U-JIN Electronics (Seoul, South Korea)	60
Advanced Semi. Engineering (Kaohsiung, Taiwan)	n/a
Advanced Devices Technology (Hsinchu, Taiwan)	n/a
Photronics (Keelung, Taiwan)	n/a
TEAM Semiconductors (Singapore)	n/a

PHONE RATES AND ACCESS

The transformation of the national telephone system into the integrated services digital network (ISDN) is bringing a steady increase in phone rates, but thus far the average American's access to residential telephone service remains virtually unchanged. That is, certain segments of the population are not served, but their numbers are not rising.

Local phone rates have risen significantly over the past six or seven years. The General Accounting Office

(GAO) modified figures from the Bureau of Labor Statistics to show the yearly increase (December to December) in charges for U.S. average flat-rate local telephone service:

1980	7.1 %
1981	15.6 %
1982	9.0 %
1983	0.2 %
1984	10.4 %
1985	11. %

The GAO, unlike other agencies, figures in the impact of the Federal Communications Commission's residential subscriber line charge, or access charge, which is a fee paid by phone subscribers for access to long distance carriers. In 1985, without the access charge, the increase would have been 3.8 %.

In 1986, the FCC's subscriber line charge rose from \$1 per month to \$2 for all customers. The GAO calculated that this single action raised local rates by as much as 7 percent.

The GAO points out that the access charge hike was accompanied by a decline in long distance rates, but not all residential phone subscribers are in a position to enjoy that benefit.

Despite the rate increases, the percentage of U.S. households with telephones has remained stable, hovering around 92% over the past few years. Either the average American can afford phone service or cannot afford to be without it.

Still, Census Bureau data shows a strong correlation between phone access and both race and income:

Percentage Telephone Penetration by Race and Income
March, 1986

Household Income	All Races	White	Black	Hispanic
Total	92.2	93.6	82.0	81.5
Under \$5,000	71.1	74.0	63.8	56.7
\$5,000-\$7,499	82.7	85.1	72.0	68.7
\$7,500-\$9,999	87.6	88.8	82.1	72.1
\$10,000-\$12,499	89.5	90.6	82.1	78.5
\$12,499-\$14,999	91.3	92.0	87.6	84.6
\$15,000-\$17,499	92.9	93.6	88.0	84.9
\$17,499-\$19,999	94.6	95.2	90.1	86.1
\$20,000-\$24,999	96.3	96.7	93.6	92.3
\$25,000 or more	Penetration levels for all groups approximate or exceed the March 1986 national average of 92.2%.			

("Telephone Communications: The FCC's Monitoring of Residential Telephone Service," GAO/RCED-86-146, June, 1986)

CONSTITUENT EXPRESS

A new progressive organization, Compupax, is inaugurating a computer system designed to serve groups working for social and political change. Beginning March 1, Compupax will offer an electronic message and direct lobbying service. Subscribing groups will be able to send messages, prepared by individuals, to every member of Congress or to subsets of Congress, such as members of a specific committee or even swing votes on an issue. Messages will be transmitted to a Compupax computer in Washington, DC, where they will be sorted, printed, and hand delivered on Capitol Hill.

Compupax plans to activate a similar service in the State of California in the summer, and it is working on services serving other states, such as Illinois and New York. It also plans to extend the Washington operation to cover embassies and federal agencies

For more information, write Compupax, 408 13th Street, Suite 283, Oakland, CA, 94612, or call 415/836-2389.

SENSORS

Semiconductor sensors, which convert physical measurements into electronic signals, are less known than logic and memory chips, but they are becoming increasingly important. Market research firm Frost &

Sullivan ("Semiconductor Sensor Market in the U.S.") reports that the U.S. market for semiconductor sensors rose from \$288 million in 1985 to \$340 million in 1986. Frost & Sullivan anticipates that the total will reach \$534 million (in 1985 dollars) by 1990. Several major types of semiconductor sensors hold a significant market share:

Pressure	\$125 million
Chemical	\$52 million
Temperature	\$42 million
Proximity	\$35 million
Optical	\$19 million
Humidity/Moisture	\$10 million
Other	\$57 million

NEW RATES

Effective January 1, 1987, the basic yearly (12 issues) subscription rate for Global Electronics is US\$12.00. The rate to Canada and Mexico remains US\$2.00 higher, rising to US\$14.00, and the overseas rate climbs to US\$17.00.

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