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# GLOBAL ELECTRONICS

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## U.S.-JAPAN CHIP PACT

At the end of July negotiators representing both chipmakers and governments from Japan and the United States reached a landmark agreement designed to bolster the competitiveness of U.S.-based firms. The agreement calls upon Japanese manufacturers to sell commodity chips—particularly memory devices—at higher prices in the U.S., and it established procedures to increase the market share of U.S.-based companies in Japan.

Though the merchant semiconductor companies of the Semiconductor Industry Association (SIA) expressed satisfaction with the agreement, it is doubtful that it will do much for the American economy. Perhaps the most interesting question is how did this rather small industry, with little apparent political clout, develop the leverage for protection at a time when larger and more practiced forces, such as those representing the textile industry, were losing their battles for protection in Washington.

The pact's announcement had no immediate impact upon the flow of bad news from Silicon Valley, where semiconductor layoffs continued and companies continued to report staggering losses. The Japanese promise to charge higher prices for dynamic random access memory chips (DRAM's) will benefit Micron Technology (of Boise, Idaho), which makes the chips in the U.S., and Texas Instruments, which supplies most of its DRAM's from its Japanese factories, but Japanese-owned firms will profit as well. Just as Japanese auto firms took advantage of U.S. vehicle quotas to increase their margins, Japanese electronics firms are expected to do the same. South Korean electronics companies, which found DRAM production unprofitable during recent price wars, may be the chief benefactors.

It is possible that U.S.-based manufacturers, such as National Semiconductor, Motorola, and Intel, will enter the market for commodity DRAM circuits again, but they are likely to wait for a while to see how the agreement works.

Meanwhile, U.S. makers of EPROM's (erasable programmable read-only memory chips)—particularly Intel—should benefit handsomely from the Japanese guarantee of higher prices on those items. Japanese firms entered that market only recently, so American competitors are still in the game.

Even if the agreement propels U.S.-run firms into a new era of profitability, however, few new domestic production jobs will result. Wafer fabrication is highly automated, and SIA companies still overwhelmingly carry out assembly overseas.

The Japanese were negotiating from a position of

weakness because the U.S. International Trade Commission had found Japanese firms guilty of dumping 64-K DRAM's, 256-K DRAM's, and EPROM's. As part of the agreement, the ITC dropped its penalties, which would have effectively raised prices and made Japanese chips less competitive. Now the Japanese must still charge higher prices, but they get to pocket the difference.

The key finding which led to the ITC's three decisions was made by the Commerce Department. Investigators at Commerce's International Trade Administration concluded that Japanese companies were marketing circuits in the U.S. at less than their fair value—that is, at a price less than their *constructed* cost. To construct cost levels for each firm, Commerce collected confidential data from each charged company. When it was dissatisfied with the data, it took information from other sources, such as the American firms that filed the ITC complaints.

It appears that Commerce insisted that Japanese prices, to be fair, should at all times in a product life cycle include pro-rated fixed costs, such as research and development and capital investment, as well as variable costs such as materials and labor. Mark Giudici, an analyst for Dataquest, contends, "In a free market, fluctuating use of manufacturing capacity can temporarily force cost to exceed prices. Constructed cost pricing always sets prices above costs, regardless of whether a company is producing to capacity or has invested in a large plant that is producing little. In this way, constructed cost sets prices higher than in an unregulated market." (San Jose Mercury News, August 10, 1986)

Japanese producers typically maintain a higher ratio of fixed to variable costs than their American counterparts. Since Japanese companies finance most of their expansion through debt, loan repayment is a high fixed cost. Since Japanese electronics manufacturers promise many of their employees lifetime employment, even a portion of their labor costs could be considered a fixed cost.

Consequently, it makes sense (from their point of view) for them to charge less during a slow market. That is, any price which brings in revenue above the variable cost of an integrated circuit helps them pay off their considerable fixed costs, even if that margin does not appear to be high enough in the long run.

If U.S. firms behaved similarly—and if they could

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match Japanese technology and quality—they would still have to charge higher prices to cover their higher variable costs. Thus, the structure of the U.S. industry puts American firms at a disadvantage during a period of overcapacity. During a shortage, however, they can taken advantage of their low fixed costs to boost their margins considerably.

Could it be that the Department of Commerce's conclusions, on their own, gave the SIA and its allies in government bargaining power that other industries could not achieve? Or were policy-makers swayed by the argument that chip-making technology is of strategic importance to both the economy and national security? Somehow, the Reagan team backed the SIA, but at this time, there is insufficient evidence to figure out why.

Working in the SIA's favor, groups representing companies that buy chips—to build computers, communications equipment, and other products—did not lobby against the prospect of higher prices. (Few consumers buy chips as components.) There is good reason for this: Powerful corporations such as IBM, AT&T, DEC, Hewlett-Packard, and GM build a large portion of their chips in-house. IBM and AT&T, in fact, make state-of-the-art DRAM's. Any policy that drives up the open-market price of components raises the production costs of their smaller competitors.

In fact, somewhere around a third of the integrated circuits sold in the U.S. are made and consumed by such captive suppliers. If the U.S.-Japan pact leads to higher prices in the long-run, the in-house chipmakers will do better and may grab an even larger share of the "market." The nation's high profile merchant semiconductor producers may meet their demise, not at the hands of their highly publicized and widely vilified Japanese competitors, but at the hands of other U.S.-based electronics companies. One consultant, Robert Neeley of McKinsey and Company, wrote, in an admitted overstatement, "the merchant industry, after all, is just surge capacity for IBM." (*Electronic Business*, March 1, 1986)

Would the apparent decline of U.S.-run merchant semiconductor manufacturers lead to the decline of Silicon Valley? Not necessarily. While the major merchant firms that run the SIA have been having trouble, a number of small new Valley circuit-makers are prospering. The Valley still has the world's greatest concentration of chip design talent. Now, an increasing share of wafer fabrication is going to Asia, but frequently under the auspices of strategic alliances linking U.S. to Korean or Japanese companies.

Furthermore, Silicon Valley is home to more than the leading chipmakers. Most high-tech employment in the Valley is at firms that use semiconductor technology to build computers and other equipment. Historically, the growth of the semiconductor industry has made it easy for such firms to start or locate in the Valley, but as long as top-notch engineers remain in the area, the electronics industry will continue to cluster here.

Though the major U.S.-owned merchant chip houses are a major source of that talent, designers,

programmers, and other high-tech professionals are found at other firms—semiconductor equipment builders, niche chip makers, chip buyers, captive chip houses, and subsidiaries of Asian companies. That is, even if the depressed computer market and Japanese competition turn transform firms such as Intel, Advanced Micro Devices, and National Semiconductor from technological leaders into also rans, Silicon Valley is likely to remain the world's preeminent center for the development of advanced electronics technology.

## DECLINING COST OF CLONES

Now that there is an open market for "ROM/BIOS" chips containing the equivalent of IBM's operating system microcode, the business of cloning IBM personal computers has taken off. Start-ups firms, Asian suppliers, and giant multinational corporations have all joined the game.

Personal computer retailers, with established marketing and service outlets, are well positioned to move upstream. Two of the biggest have recently announced plans to contract for the offshore manufacture of IBM clones. Businessland will market computers compatible with the IBM PC-AT, and it has arranged for San Jose-based Wyse Technology to build them in Taiwan. Computerland will sell XT and AT clones manufactured by Trigem in South Korea. (*Electronics*, June 16, 1986)

*Business Week* (July 28, 1986) reports that clone-builders can produce a machine for as little as \$400. The following chart represents a typical PC with

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floppy disk drives. Large companies can buy components for even less.

<u>Part</u>	<u>Source/Location</u>	<u>Cost</u>
Main Circuit Board	Taiwan	\$100 to \$150
Black & White Screen	Taiwan	\$75 to \$100
Controller Cards		\$65
Floppy Disk Drives	Japan	\$60
Chassis & Cover		\$35 to \$85
Power Supply	Hong Kong or Taiwan	\$30 to \$100
Keyboard	U.S., Thailand, or Taiwan	\$20 to \$50
ROM/BIOS Chip	U.S. design	\$10 to \$15
Assembly		less than \$10

### VALLEY NOTES

In mid-June, Siemens, the German-based electronics multinational announced plans to hire nearly 300 people in Silicon Valley, over an 18-month period, for its new Semiconductor Group. It intends to transfer in a mere handful from Broomfield, Colorado, where it is phasing out operations. Siemens will begin operations in a Santa Clara plant closed by Korean chipmaker Hyundai last year. (San Jose Mercury News, June 19, 1986)

Later in June, Rolm, which began its corporate life in a old Valley prune-drying shed, announced plans to shift two manufacturing units out of Silicon Valley. Now owned by IBM, Rolm will transfer more than 600 jobs over the next 18 to 24 months to its digital telephone factory in Austin, Texas and its computerized branch exchange facility in Colorado Springs. Rolm, like its parent, has a policy against lay-offs, so it will offer workers new jobs or relocation. (San Jose Business Journal, June 30, 1986). That is, the letters in "ROLM" no longer stand for the company founders but for "I've Been Moved."

Advanced Micro Devices, a Silicon Valley company that just abandoned its policy of avoiding lay-offs, announced at the beginning of August that it was combining two Silicon Valley plants and eliminating 150 jobs. Thirty workers will be offered new positions within the company locally, while 120 are being told that they have to move to Austin or San Antonio, Texas, to keep their jobs. In March, AMD gave about 125 white collar workers the same choice. (Peninsula Times Tribune, August 9, 1986)

### OFFSHORE TRENDS

The government of Singapore, hoping to retain the city-state's export competitiveness, is actively recruiting electronics workers abroad. To hold wages flat, it is actively seeking production workers in adjacent Malaysia, and it has launched a campaign in Britain to attract engineers. Singapore places its near-term need for foreign electronics workers at 4,000. (Far Eastern

Economic Review, June 12, 1986)

Business Week (June 30, 1986) reports that the Dutch electronics giant, Philips, has agreed to invest \$40 million in a new \$207 million chip-making plant in Hsinchu, Taiwan. The Taipei government will provide \$70 million, while local banks (\$62 million) and investors (\$35 million) are expected to make up the difference.

Tandon Corp. closed its Silicon Valley disk-drive subsidiary, Microtek Storage, at the beginning of August and laid off 225 workers. The company announced that it was shifting production to Singapore, where it already has a plant. Now all of Tandon's disk-drive work is done in India and Singapore. It still operates a personal computer plant in Southern California, but it has furloughed 270 workers there (San Jose Mercury News, August 2, 1986).

Intel is reducing its presence in the Caribbean. It is permanently closing its Barbados assembly plant, laying off 900 workers, and retrenching 420 of its 870 employees in Puerto Rico. The company is reportedly providing severance benefits above those required by law. (San Jose Mercury News, August 6, 1986).

Workers in Penang, Malaysia, have continued their protests against lay-offs. One hundred members of the Electrical Industry Workers Union (EIWU) have staged demonstrations demanding better retrenchment benefits from two subsidiaries of Atlas. (Asia Labour Monitor, May, 1986)

And in Hong Kong, employees of Digital Equipment have protested the transfer of their factory from Kwai Chung, Kowloon to Shatin, New Territories. Asia Labour Monitor, May, 1986, reports, "The mostly women workers, many of whom are housewives, said that the move would force them out of a job since the new location was too far for them to travel."

### TOXIC GASES

The Santa Clara County (Silicon Valley) Fire Chiefs' Association has released a 41-page first draft of a model ordinance designed to regulate the storage and handling of toxic gases by industry. Once the ordinance is finalized, each of the industrial cities in the County is expected to enact such an ordinance.

The Fire Chiefs' effort has been supported by a grant from the State of California, and it has relied upon the expertise of two consulting firms, Practicon of Santa Clara and Microsafe of Santa Clara.

The proposed law regulates toxic gases such as chlorine, nitrogen dioxide, and arsine. Among its many provisions, it requires companies to determine the impact of a worst case gas leak. If such a leak could lead to concentrations above legal thresholds at the property line, companies are required to notify their neighbors of the risk and provide a public warning system.

The legislation could prove costly, particularly to companies engaged in semiconductor wafer fabrication. And the proposed notification of neighbors could wor-

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sen the public image of an industry already beleaguered by the impact of its chemical leaks into Silicon Valley groundwater.

Consequently, the Semiconductor Industry Association—which cooperated in the development of a similar ordinance designed to prevent future groundwater contamination—appears to be opposed to the proposal. Industry representatives point out that there has been no major catastrophe (yet) involving toxic gases in Silicon Valley. (The acid gas clouds which have occasionally forced evacuations in the area have resulted from liquid spills.) Industry experts appear to prefer Fire Code revisions over the passage of separate local ordinances.

### TELECOMMUTING

Telecommuting, the practice of having clerical employees do their work from computer terminals at home, is growing slowly. The experiences of two groups of Madison, Wisconsin workers show how it is not technology, but workplace power, that determines the impact of electronic homework. (White Collar Report, AFL-CIO, April 23, 1986)

In Madison, the employees union, AFSCME (the American Federation of State, County, and Municipal Employees) actually suggested a trial project of electronic homework to alleviate the heavy workload in the medical transcriptionist department at the University of Wisconsin Hospital. The union bargained for (and monitors) working conditions comparable to the unionized office,

and the homeworkers, as well as the new hires that moved into their office space, are all represented by the union. Productivity has risen and workers have been pleased by the experiment, though only a few workers have been involved.

On the other hand, the Wisconsin Physicians Service (WPS) Insurance Corporation, also in Madison, introduced a much larger homework program in 1979. It now involves about 150 workers. WPS homeworkers earn less than their office counterparts, receive no benefits, and must cover their own expenses. Homeworkers there are dissatisfied, and office workers feel that the telecommuting program undermines their bargaining power. The United Food and Commercial Workers union, which represents about 800 WPS office workers, has not been able to organize the home workers.

### TOXICS IN MALAYSIA

Most Asian countries—other than Japan—are not known for strict environmental regulation. And since there have historically been few semiconductor wafer fabrication plants in non-Japan Asia, the electronics industry there uses fewer chemical than in the U.S. Occasionally, however, there is a report of a leak or spill.

The Malaysian subsidiary of Italy's SGS-ATES has been found guilty of discharging cyanide into a canal near the Muar river. The company, which employs more than 1,000 workers in Malaysia, received only a token fine. (Asia Labour Monitor, May, 1986)

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