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RADIO APPARATUS TRADE

One might not know it from the lack of coverage in the business and electronics trade press, but the production of radio apparatus in the U.S. is big business and growing rapidly. U.S. producers' shipments rose from \$4,720 million in 1982 to \$6,051 million in 1984, while apparent consumption, in the wake of the AT&T break-up, jumped from \$5,061 million to \$6,955 over the same period. The number of U.S. producers rose from 600 to 650 over the same period, while employment crept up from 100 to 105,000.

The International Trade Commission reports, "The U.S. radio apparatus industry is a high-technology, capital-intensive industry in which product design and performance change rapidly. Almost all low-technology, labor-intensive products, particularly consumer radio apparatus, are produced overseas and imported." Often the foreign supplier is the subsidiary of an American firm.

Radio apparatus covers three major categories: Receivers include not only consumer radios, but radio pagers and military receivers; Transceivers include land mobile systems; Other Equipment refers to cordless phones, cellular telephones, microwave equipment and radio components. As new communications services have emerged, both domestic and foreign production have expanded. Over the last five years, U.S. shipments, U.S. consumption, exports, and imports of all three categories of radio apparatus have grown, except that transceiver exports fell from 1982 to 1984.

U.S. Radio Trade—1984 (US\$ thousands)

	Shipments	Imports	Exports	Consumption
Receivers	1,714.8	144.7	995.4	2,565.5
Transceivers	1,343.3	237.1	262.3	1,368.4
Other	2,992.6	900.4	929.0	3,021.2
Total	6,050.6	1,282.3	2,186.7	6,955.0

Note: Shipments and Consumption figures are ITC estimates.

As one might expect, the seven nations supplying the U.S. with more than \$100 million each in radio apparatus in 1984 included Japan and the "four little tigers" of East Asia. The other two are Canada and Mexico. Nearly all of Mexico's exports (92%) to the U.S. were brought in under item 807.00 of the tariff

code, which exempts from duties components and assemblies of U.S. origin.

U.S. Radio Imports—1984 (US\$ thousands)

	Reimports	Total Imports
Japan	.5	725.0
Hong Kong	6.6	332.2
Taiwan	2.3	208.2
Mexico	165.2	179.0
Canada	81.0	154.7
Singapore	70.9	134.7
South Korea	.2	127.7

Note: Reimports are the total value, dutiable as well as duty-free, brought into the U.S. under items 806.30 and 807.00 of the tariff code. In this case, nearly all qualified for 807.00 treatment.

Source: "Radio Apparatus," Summary of Trade and Tariff Information, United States International Trade Commission, December, 1985 (USITC Publication 841, Control No. 6-5-12, second supplement)

BORDER WAGES

Fortune's latest ode to the benefits of Mexico's Border Industrialization Program (August 18, 1986) reports that employment in *maquiladoras* has risen from 150,000 in 1982 to a quarter of million today, and it suggests that they could employ a million workers by the turn of the century. Fortune quotes Bill Ingram, operator of a Tijuana-based assembly subcontractor, who says that Far Eastern countries like Singapore and Taiwan have a variety of suppliers and subcontractors to help meet the demands of buyers who require custom work: "According to Ingram, *maquiladoras* are best-suited for assembling mature products whose labor content is at least 30% of their manufactured cost." Supplies are imported.

Still, devaluation and social control have made Mexican labor internationally "competitive" again. Fortune reports, "The average wage rate for unskilled Mexican labor is now one-sixth that of Japan and a little more than half that of Asia's 'four little dragons,' Singapore, South Korea, Hong Kong, and Taiwan."

HEALTH HAZARDS HANDBOOK

The Asia Monitor Resource Center, publisher of the *Asia Labour Monitor*, has published a handbook designed to inform electronics workers, on both sides of the Pacific, about health hazards on the job. **Health Hazards in Electronics: A Handbook**, by Thomas Gassert (Hong Kong, December, 1985) contains a wealth of technical information about chemical and other hazards found in electronics manufacturing.

Written from an Asian point of view, the handbook does not focus exclusively upon semiconductor wafer fabrication. It covers the other four major electronics production processes: semiconductor assembly, printed circuit board fabrication, printed circuit board assembly, and final product assembly.

The 400-page handbook contains a 90-page list (with index and notes) of chemicals used in electronics production. It describes chemically induced industrial illnesses, such as allergies, reproductive problems, and cancer, but it also covers radiation hazards, noise, stress, and conditions that impair vision.

Gassert does not see industrial health as a mere technical problem. Rather, he writes, "The causes of work-related and environmental health problems are deeply rooted in the fabric of every society." The handbook therefore analyzes the structure of high-tech industry, and it concludes, "Perhaps the most significant obstacle facing successful resolution of health problems is the innate need of most electronics companies to accumulate capital as rapidly as possible. The financial needs of electronics manufacturing in a highly competitive market economy directly conflict with the social needs of workers and local residents for safe and healthy industry."

Unlike other book-length treatments of electronics health hazards, this handbook is written for electronics workers. It contains sections on organizing a health committee and monitoring working conditions. It is written in non-technical language, and it defines many technical terms.

However, it is in English, and it requires a level of literacy beyond the education of many Asian electronics workers. It appears, therefore, that the book is aimed at organizers and support personnel—that is people who work directly with workers. Given that orientation, many of the handbook's cartoon illustrations seem out of place.

The handbook begins with a section, summarizing the electronics industry, to which *Global Electronics* editor Lenny Siegel contributed. Since events happen fast in the industry, and trends shift constantly, it is no surprise that portions of that summary are slightly out of date.

Health Hazards in Electronics may be ordered from the Asia Monitor Resource Center, 444 Nathan Road, #8B, Kowloon, Hong Kong. The retail price is US\$10 plus US\$2.50 for surface postage or US\$12 for air postage.

INDUSTRY'S TOXICS STANCE

The Semiconductor Industry Association appears now to be taking a more conciliatory stance toward the development of a model ordinance for the handling of hazardous gases (see *Global Electronics* No. 67), but the electronics industry as a whole is lining up to oppose Proposition 65, the "Safe Drinking Water and Toxic Enforcement Act of 1986," on the ballot in California this November. If passed, Proposition 65 would strengthen the ability of citizens to seek damages from companies that pollute the groundwater in the state, and it increases requirements for warning the public about the presence of toxic chemicals.

John Young, the president of Hewlett-Packard, and Jerry Sanders, head of Advanced Micro Devices, signed a letter directed to the chief executives of more than 400 California electronics firms. Young signed another, more broadly circulated letter. The purpose of the letter is to raise \$600,000 of the \$5.7 million that Californians Against the Toxics Initiative plans to spend in its campaign against Proposition 65. (*San Jose Mercury News*, September 8, 1986)

RECYCLING FAB ACID

Meanwhile, Fairchild Semiconductor, the Schlumberger subsidiary hurt significantly by the cost of cleaning up its toxic spills and reimbursing victims (see *Global Electronics* No. 66), has taken at least one positive step to reduce the production of toxic wastes in integrated circuit manufacturing. Fairchild plans to install

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a Piranha-Piranha acid reprocessor at its Puyallup, Washington plant. The reprocessor is designed to distill sulfuric acid used in wafer fabrication. If it works, Fairchild will install the reprocessor at its other five fab lines. Other chipmakers are looking at the device as well.

Athens Corp., producer of the Piranha-Piranha, says that the \$350,000 piece of equipment is expected to reduce the consumption of acid, at an average fab plant, from a range of 1,400 to 1,800 gallons per month to 100 to 125 gallons. Sulfuric acid costs manufacturers about \$10 per gallon. It should also reduce chemical handling and disposal costs from \$22,000 per month to about \$9,000. Athenas claims that a reprocessor can pay for itself in just 10 months—of course, that assumes that fab lines are operating somewhere near capacity. (*San Jose Business Journal*, August 11, 1986)

Practically, the reprocessor is only a small step in the cleaning up of high-tech production, but structurally it is a breakthrough. The reprocessor is the product of a joint development project of Athens and Fairchild. The design of environmental sound chipmaking processes has been held up by the fact that major process innovations generally come from the manufacturers of semiconductor capital equipment, not from the operators of wafer fabrication lines. Since chipmakers, not equipment producers, have been caught fouling the groundwater, little has been done to clean up the production process at its source. Chip producers have focused, instead, upon clean-up and improved storage.

SEAGATE'S ASIAN TRAINEES

Seagate Technology, the Scott's Valley (near Silicon Valley) producer of microcomputer disk drives, has run into trouble with the Immigration and Naturalization Service (INS). Seagate imported about 140 workers from its plants in Thailand and Singapore for training, but those workers have been doing production work, in possible violation of their immigration status. Consequently, the INS has asked Seagate to send one hundred of the workers home, and the company plans to comply.

The workers are in the U.S. for three to six months. They are paid their low Asian wages (a minimum of \$176 per month) plus a U.S. living allowance. The company also tries to help the Asians get around in the car-dependent Santa Cruz area. Some of the workers are reportedly unhappy because Seagate insisted that they stay longer than the three months for which they originally volunteered.

These workers are not authorized by the INS to do manufacturing, but Seagate claims that they need to do some production as part of their training. Still, the *San Jose Mercury News* (August 31, 1986) cites a Seagate employee who says that Asian "trainees" now do 80% of the production in his department.

The *Mercury News* reports, "The entire training program is part of a Seagate strategy to develop manufacturing techniques and do early production for

new products in Scotts Valley, [company founder and chairman Alan] Shugart said. The entire production process then is shipped to the overseas plants, he said. The work the Asian women are doing is eventually headed for the Far East, he said."

That is, Shugart is justifying practices questionable under U.S. immigration law because they are necessary to operate his runaway shops.

LAY-OFF POLICIES

In the wake of the Atari lay-off settlement (see *Global Electronics* no. 66), the Silicon Valley press has been paying increased attention to the lay-off policies of high-tech companies. The *San Jose Mercury News* (June 16, 1986) listed eleven companies that had axed workers with no notice whatsoever in the first half of 1986: Personal CAD Systems, Fortune Systems, Applied Materials, Molecular Computer, Ridge Computer, Pyramid Technology, Altos Computer Systems, Daisy Systems, Seagate Technology, Sytek, and Elxsi (Trilogy).

UC Berkeley researcher Phil Shapira reports that only 45% of California laid-off high-tech workers, from 1979 to 1984, were given notice. In other industries, 55% were warned ahead of time..

When start-up Molecular Computer filed for Chapter 11 (bankruptcy) protection, "77 workers found themselves out of work without severance pay despite a written policy promising two weeks' pay." Though the firm has since re-opened, "Terminated workers must line up with unsecured creditors . . ."

Many larger, ongoing concerns have shown similar disregard for the interests of its employees, but others have chosen to assist them. Apple Computer, for example, provided laid off workers with emotional counseling and provided advice on seeking new jobs, as well as "some time off with pay to look for a new job."

At the most reputable end of the spectrum are a handful of companies, which receive the greatest coverage in the press, that strive to avoid lay-offs. In most cases, of course, there are loopholes. These firms often shed surplus workers by canceling the contracts of temporary workers or insisting upon transfers that the workers are unlikely to accept.

Mired in the semiconductor slump, chipmaker Advanced Micro Devices finally dropped its promise of job security this summer. AMD had been given a little too much credit in the press, but it had made more of an effort than its major competitors to hang on to employees—production workers and office workers as well as professionals.

IBM, the country's largest high-tech employer with 242,000 U.S. employees, avoids cutbacks by slashing overtime, asking workers to use leftover vacation, hiring fewer students, ending contracts with temporary employees, and subcontracting less. Only "regular" IBM employees are protected, and they often must accept changes in responsibility or geographic transfers.

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The company channels significant resources into retraining and relocation assistance. In 1985 IBM spent \$550 million training 10,000 of its workers. It spent about \$60,000 each transferring 7,300 employees. (Business Week, July 7, 1986)

In June, Silicon Valley's largest homegrown employer, Hewlett-Packard, sought to reduce its permanent U.S. workforce by 1,500 employees. (H-P has about 56,000 workers in the U.S.) It offered an early retirement program—including a bonus equalling a half month's salary for each year of service (up to one-year's pay maximum) to workers over 55 years of age with 15 years at H-P. The firm offered a similar voluntary severance package to younger workers at H-P's manufacturing plants, limiting the numbers at each location. The San Jose Mercury News (September 4, 1986) reports that 1,515 workers accepted.

Such programs not only help those who leave, but they maintain the morale of those who remain. However, since these are non-union employers with no guarantee of job security or seniority protection, authority to displace (fire, lay off, or transfer) workers in entirety in the hands of management.

PHONE ACCESS

Despite concerns that many low-income American households would discontinue their phone service as local rates increased, the Census Bureau reports that

92.2% of American households now have phones, compared to 91.4% just a few years ago. There appear to be several reasons. In many areas, regulators have held down increases to manageable proportions. In addition, many people consider phone service a necessity, and they are willing to cut back first in other home budget items. And some states have "lifeline" plans, which provide a minimal level of service at a low rate.

Lifeline is good public policy, but it is unlikely to make it possible for poor Americans to plug into the "on-line" digital information services increasingly being utilized by their affluent neighbors. (New York Times, June 16, 1986)

VALLEY INFO CENTER

The San Jose City Library has opened its Silicon Valley Information Center, which features an on-line data base (with remote access), newspaper clippings, and other resources on high-technology. The Center claims to be the "first large-scale concentration of services and materials anywhere to chronicle the birth and development of Silicon Valley." While this is not true, the financial support available to the library indicates that the Center will become a valuable source of materials about high-tech industry.

The Silicon Valley Information Center has received \$900,000 from government, corporate, and other sources, including a \$345,000 federal grant and \$145,000 in San Jose city funds.

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