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# GLOBAL ELECTRONICS

# INFORMATION NEWSLETTER

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## SILICON SUPPLY

**Forbes** (November 10, 1980) recently evaluated the future supply of high grade polysilicon, the basic material of nearly all integrated circuits. Though the purpose of the article is to weigh claims of possible shortages, several interesting facts are mentioned: First, only ten companies worldwide manufacture polysilicon. German-based Wacker Siltronic is the largest supplier, followed by Dow Corning. Only two U.S.-based firms sell polysilicon, Dow Corning and Great Western Silicon (see issue No. 6). Others, such as Texas Instruments, Motorola, and Monsanto, are captive producers.

Second, Union Carbide supplies 40% of the U.S. market for trichlorosilane, a "key ingredient" of polysilicon. Texas Instruments, however, has its own captive production. And third, the silicon used in photovoltaic cells is of a much lower grade than semiconductor quality silicon.

## RECRUITERS

Add Connecticut and New Mexico to the areas that have sent industrial recruiting missions to Silicon Valley recently. (**Northern California Electronics News**, December 22, 1980 and **Peninsula Times Tribune**, February 9, 1981)

## RECESSION

Long cushioned from the national recession by huge order backlogs and rapidly diversifying markets, the semiconductor industry has joined the rest of the economy. Intel, one of the most profitable semiconductor companies, reported a sharp drop in earnings, and others are expected to follow. Several semiconductor companies, such as Intersil and RCA, as well as semiconductor-equipment-maker Applied Materials, have announced lay-offs. Many companies, however, will avoid lay-offs, hanging on to key professional and skilled personnel. And they will continue to expand capacity. They hope to avoid a recurrence of the late 1970's industry pattern, during which American producers of semiconductor memories were caught with their capacity down while the Japanese were prepared to expand rapidly.

As backlogs are eliminated, however, one can expect retrenchment at offshore assembly facilities, particularly those using older technologies and less capital equipment. Subcontractors at all stages of production will be hurt. Silicon Valley support industries, including office furniture suppliers and graphics specialists, are already hurting. Reluctant to lay off permanent employees, companies are doing jobs in house that they formerly sent out.

## CUSTOM CIRCUITS

At first glance, it appears that the semiconductor industry has returned to its innovative heyday. The past few years have been characterized by consolidation, largely the acquisition of semiconductor houses by multinational electronics firms and conglomerates. But in the last year several new ventures have started up.

In general, the new firms are specializing in segments of the custom chip market. Custom chips are generally logic chips, similar to microprocessors, but they are designed to perform specific functions. When mass produced, they are not only more compact, but less costly than microprocessors. Circuits may be fully customized – that is, with a unique design – but most are semi-customized, such as gate arrays. Gate arrays are circuits containing standard arrays of logic gates. They are customized through the introduction of specially designed networks of connections (the solid-state equivalent of wires).

While many major semiconductor houses, such as Motorola, American Microsystems (AMI), and Signetics, are major forces in the custom chip market, the new companies expect to find niches as well. Most, such as LSI Logic and Silicon Systems (SSI), plan to contract out for wafer fabrication, while at least one newcomer, VLSI Technology (VTI), plans to function as a “Silicon Foundry,” providing manufacturing capability to firms specializing in design. (See *Fortune*, March 9, 1981, for an overview of the custom business.)

It is unlikely, however, that the new custom houses will reverse the trend toward industry consolidation. Many of the founders of these firms are industry veterans who made a lot of money when their old companies sold out to Schlumberger, Honeywell, etc. To “succeed” again, they need only create new firms that can be sold to larger non-semiconductor interests seeking a window on semiconductor technology. Major corporations looking for captive sources of silicon technology and components

will not insist that new acquisitions be viable competitors in the merchant (open market) segment of the industry.

## SEEQ START-UP

As the pace of semiconductor start-ups increases, it is not surprising that the kind of litigation that characterized the industry's formative era is starting up again. Intel, for instance, is suing four former managers who left this January to form Seeq. Seeq plans to market EPROM (erasable programmable read-only memory) devices. (*Peninsula Times Tribune*, February 9, 1981)

## SUPERCHIPS

In February, the Hewlett-Packard company stunned the semiconductor world by announcing that it had created a prototype 32-bit microprocessor containing 450,000 “transistors” on a single chip. Bell Labs, the AT&T research arm that invented the transistor, announced a similar chip, incorporating 100,000 transistors, but requiring much less power. Intel, traditionally a leader in semiconductor technology, announced a “micromainframe” 32-bit microprocessor, three chips containing 200,000 transistors, with the same computing power as a large computer system. Intel's entry, however, will go into production soon.

These are the first known uses of VLSI (very large scale integration) technology in microprocessors, and some industry observers, reports *Business Week* (March 2, 1981), believe that they could initiate a new “revolution” in microprocessor applications. A whole new sub-industry may emerge to program the VLSI microprocessors and integrate them into office machinery, industrial equipment, military systems, and oilfield devices.

## NATIONAL SEMI SURVEY

Management-oriented sources occasionally publish surveys of wages in different countries. The Global Electronic Information Project would like to carry out its own survey. If you are in contact with assemblers or other semi-skilled production workers at any of National Semiconductors' many plants, please help us out.

We would like to know, in either dollars or local currency (preferably both), the average hourly pay, including bonuses, overtime, and allowances, of National's employees. Please indicate the number of hours worked per week, as well as any other relevant data.

If enough correspondents answer this request, we will publish the results in the newsletter and carry out future surveys.

## NATIONAL IN TUCSON

National Semiconductor, which currently employs 275 people in a temporary 20,000-sq.-ft. plant in Tucson, Arizona, will move and expand those operations. In July, 1981, it will begin construction on an 86,000-sq.-ft., \$15 million facility, to be occupied in January, 1981. Eventually, the company expects to employ about 2,000. National assembles high-reliability, military "spec," semiconductors in Tucson.

National, a frequent critic of Japanese government cooperation with business, will receive a \$750,000 loan from the city of Tucson, which has received a Federal Urban Development grant for that purpose. In addition, National will finance construction with \$10 million in tax-exempt bonds. In return for the assistance, National has promised to hire half of its employees from a 12-sq.-mile poverty pocket in southwest Tucson. (Electronic News, February 16, 1981; Tucson Citizen, February 10, 1981; Arizona Daily Star, February 11, 1981; Arizona Republic, February 11, 1981)

## CYANIDE

Silicon Valley electronics firms are sophisticated enough to send their toxic chemical wastes to specialized recycling firms for treatment and eventual disposal at certified dumpsites. One of those firms, Santa Clara Metal Refining, was caught pouring sodium cyanide into the gutter in front of its plant. For dumping the lethal chemical, the company was fined \$1,300 and one of its owners received a suspended jail sentence.

## WESTERN ELECTRIC IN KOREA

Western Electric, the manufacturing subsidiary of AT&T, has linked up with the Gold Star Semiconductor Co., part of South Korea's Lucky industrial group. Western Electric has purchased a 44% share in Gold Star, and it will supply both semiconductor and electronic switching systems technologies. (Asia Monitor, fourth quarter, 1980)

## NEW PLANTS

Tektronix, the Beaverton, Oregon instrument manufacturer, has begun wafer fabrication at its new microelectronics facility, but the entire 500,000-sq.-ft. plant will not be completed until summer. The cost, originally announced at \$59 million, should approach \$80 million. (Electronics News, December 29, 1980).

Harris Microwave Semiconductor, a new 80% subsidiary of Harris specializing in gallium arsenide technology, is building a \$4 million, 36,000-sq.-ft. plant in Milpitas, at the eastern edge of Silicon Valley. When the plant is open in September, the firm will employ 60 people. It has reserved enough land, however, for an eventual workforce of 600.

Sperry Univac is constructing a 235,000-sq.-ft. semiconductor plant in Eagan, Minnesota. When completed, it will employ 800, primarily managerial, technical, and support staff. (Semiconductor International)

## PHILIPPINES

**Semiconductor International** (February, 1981) presents a feature on semiconductor assembly in the Philippines. Contributing editor Ron Iscoff calls the Philippines "the largest concentration of American semiconductor companies outside the United States" and lists 23 companies, including those owned by Filipinos and European corporations.

Iscoff reports that recent arrivals, such as Fairchild and Texas Instruments, have suffered from the poor infrastructure at their remote sites at export processing zones in Baguio and Cebu. He mentions that only one U.S.-owned firm, Intel Philippines, is managed by a Filipino.

Iscoff notes the absence of Japanese companies, but he points out that Filipino-owned subcontractors do substantial work for the Japanese. Half of Stanford Microsystems output is for Japanese firms, and one of its plants "is becoming captive to Japan's OKI Semiconductor."

The absence of high grade chemical supplies has helped keep wafer fabrication out of the Philippines, but several companies have moved certain final testing operations there. Even in the Manila metropolitan area, power outages are frequent.

Iscoff cites a Dynetics' spokesman, who reports that assemblers' wages rose from US\$80 per month in September, 1979, to \$104 per month a year later. Stanford Microsystems reports paying \$115 per month, well above average.

## BATAAN E.P.Z.

Though the Bataan Export Processing Zone at Mariveles, the Philippines, does not contain semiconductor assembly plants, its workers face similar problems. For more information, see **AMPO**, No. 5, 1980. **AMPO** is published by the Pacific Area Resource Center, Box 5250, Tokyo International, Japan.



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