
GLOBAL ELECTRONICS

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TOP TENS

Integrated Circuit Engineering (ICE), a major semiconductor industry consulting firm, has released its version of the top ten merchant semiconductor producers in the world. Leading captive producers, such as IBM, Western Electric, and GM-Delco, are excluded. The list is based upon production of discrete semiconductors as well as chips, so it shows Motorola surpassing Texas Instruments for the first time and Nippon Electric and Hitachi in the top five. (ICE Newsletter, December, 1982)

1982 Semiconductor Production (US\$ millions)

Motorola	1,310
Texas Instruments	1,227
Nippon Electric (NEC)	1,100
Hitachi	800
National Semiconductor	690
Toshiba	680
Intel	610
Philips	500
Fujitsu	440
Fairchild	410
Worldwide total	17,675

ICE also ranks the top 10 U.S.-based merchant producers of integrated circuits. Comparison of production figures between the two tables shows that Motorola is the only top U.S. chip producer that does a significant portion of its business in discrete semiconductors (transistors and diodes).

Top U.S. IC Producers (US\$ millions)

Texas Instruments	1,052
Motorola	820
National Semiconductor	664
Intel	610
Signetics (Philips)	360
Fairchild (Schlumberger)3	~50
Advance Micro Devices	315
Mostek (United Technologies)	235
RCA	196
General Instruments	190

OOPS!

We mistakenly identified our last issue, November, 1982, as Issue No. 25. It was really No. 26. Sorry.

INTEL-IBM

To judge by the commentary it generated, IBM's purchase of 12% of Intel's stock is an earthshaking event. In December, IBM and Intel announced an agreement whereby IBM will pay Intel \$250 million for 6.25 million newly issued shares of Intel common stock. Though IBM gets a new seat on the Intel board of directors, it has pledged not to interfere with Intel's operations. In addition, IBM has promised not to sell any stock for two years or buy more than 30% of Intel's stock, at least through 1991.

IBM, with 354,000 employees, is the world's largest manufacturer of computers. It is also the world's largest manufacturer of integrated circuits, with an estimated 35,000 employees producing about \$2 billion in chips annually. None of its chips, however, are sold on the open market. All are assembled into IBM machines.

Intel, with about 20,000 employees, is generally considered the most innovative semiconductor company. It pioneered the design of semiconductor memory chips. It invented the first microprocessor. And in 1982 it announced the micro-mainframe, a set of three chips with the computing power of a large computer. IBM buys from Intel both memory chip technology and the chips around which its popular personal computer is based. Reportedly, IBM accounted for 13% of Intel's 1981 revenues.

As major multinational corporations purchased or bought blocks of stock in Silicon Valley semiconductor firms, Intel, along with National Semiconductor, was a notable hold-out. The growing demand for capital, however, pushed Intel into the IBM agreement. It is likely that IBM will do nothing, in the near future, to alter the creative, hard-working industrial environment known as Intelculture. Unlike Schlumberger, which bought 100% of Fairchild and rapidly re-organized the whole company, IBM will not challenge the leadership of Intel's engineer-entrepreneurs. However, should Intel's founding troika of Robert Noyce, Gordon Moore, and Andrew Grove leave, or

should their management practices stumble, IBM's management - dominated by sales executives rather than engineers - is well situated to move in and take over. It is in IBM's interest to keep Intel in the competitive marketplace, to promote technological advancement and cost-cutting.

Many analysts portray IBM's action as benevolent, designed to ensure that a major supplier could compete effectively with the Japanese. More likely, IBM's top management was concerned that its own chip operation, which does not compete on the open market, might be left behind in the technological race. After all, IBM almost missed out on the personal computer boom, with its late entry successful only because it went to Intel for its microprocessor and to other outsiders for software.

More generally, the link between IBM and Intel marks one more step on the road of high-tech convergence. A decade ago computer, communications equipment, communications services, and semiconductor industries were somewhat distinct. Today those fields have merged into one industry, in which participants have merged or established cooperative arrangements with other companies. As high-tech industries mature and converge, there will be a shake out. The IBM-Intel team, likely to merge formally in the 1990's, will likely be among the most formidable survivors.

WEEKLY SEMINAR

Beginning Friday, February 11, PSC will hold weekly seminars on the social and economic implications of high technology electronics. The seminars will not only focus on the global division of labor in electronics production, the emphasis of this newsletter, but on the consequences of the introduction of microelectronics and computers into the workplace, the home, the school, etc. Each seminar will begin at 3:30 p.m. and continue for approximately two hours at PSC's library/office in Mountain View. For more information call PSC at 415/969-1545.

SEMI TRADE STATS

In July, 1982 the U.S. International Trade Commission released its "Summary of Trade and Tariff Information: Semiconductors," (Publication 841; Control No. 6-5-22), providing detailed data on U.S. imports and exports of chips and other semiconductors. The ITC reported that 112 firms, operating about 545 establishments, produced semiconductors in the U.S. in 1981, compared to 49 firms at 325 sites in 1972. 61 firms manufactured discrete semiconductors (diodes and transistors). 108 companies made integrated circuits (IC's).

Nationwide semiconductor employment - this does not include employees producing other products at semiconductor manufacturing companies - reached 204,000 in 1981, compared to 114,000 in 1977 and 97,600 in 1972. Production workers accounted for 53% in 1981, 56% in 1977, and 60% in 1972.

In 1981, the U.S. imported \$3,582,026,000 worth of semiconductors. 78.3% were imported under items 806.30 and 807.00 of the tariff code (see Newsletter No. 25). That 78.3% broke down into a 52.7% share imported duty-free because components or materials originated in the U.S. and 25.6%, representing foreign value added, upon which duties were charged. Of the remaining 21.7% in genuine imports (goods originating outside the U.S.), 11.1% came from Japan.

1981 Semiconductor Trade (US\$ millions)

	Shipments	Exports	Imports	Apparent Consumption
All semis	9,672	3,584	3,582	9,670
Discretes	1,838	806	484	1,516
IC's	7,833	2778	3,081	8,137

1981 Imports by Country (US\$ millions)

Source	All Semis	Discretes	IC's
Malaysia	880	75	805
Singapore	593	29	564
Philippines	471	23	448
Japan	398	68	321
So. Korea	238	32	204
Canada	159	10	150
Mexico	149	84	65
Taiwan	131	26	105
Thailand	n.a.	n.a.	108
Hong Kong	n.a.	53	n.a.
W. Germany	n.a.	22	n.a.
Worldwide	3,582	484	3,081

1981 Exports by Country (US\$ millions)

Market	All Semis	Discretes	IC's
Malaysia	726	152	574
Singapore	432	87	345
Philippines	386	79	307
Canada	238	53	186
So. Korea	227	54	174
Mexico	220	79	141
Thailand	185	33	152
W. Germany	181	37	145
Japan	n.a.	n.a.	144
Hong Kong	n.a.	39	n.a.
Worldwide	3,584	806	2778

Notes: "n.a." means that the figures are not included in this particular ITC report; in the report, the import figures for Japan for IC's and discretes do not add up to the total, but there is no explanation; these country figures obviously include, as both imports and exports, U.S.-origin goods that are assembled or processed abroad and re-imported into the U.S. under items 806.30 and 807 of the tariff code.

ASIAN ZONES

CETRI, the Belgium-based Tricontinental Centre, has prepared a report, "Free Trade Zones and Transnational Corporations in Malaysia, the Philippines, and Sri Lanka." The report discusses the political background and economic consequences of export manufacturing in each country. The section on Sri Lanka is particularly useful, since so little has been written on the South Asian island nation's policies, at least in the Western press. The report is available from CETRI, Avenue Sainte-Gertrude 5, B-1348 Ottignies, Louvain-la-Neuve, Belgium, for 200 Belgian Francs plus 30 BF shipping. CETRI asks that 120 BF added if payment is by check.

TANDY IN KOREA

Tandy-Radio Shack, manufacturer of the TRS-80 home computer, is joining Atari (see the November, 1982 Newsletter) in manufacturing home computers in the Far East. Tandy has begun final assembly of home computers at the company's Masan plant, which has been making other products for ten years. Like Atari, Tandy will not be producing for the U.S. market. The Korean version is specially designed (in power requirements and video standards) for the European market. By shifting production for Europe to Korea, Tandy is freeing space at its domestic plants to increase production for the U.S. market.

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Pacific Studies Center



222B View Street, Mountain View
California 94041 USA
415/969-1545

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