

# Final Market Share Estimates

These market share estimates provide our final estimates of 1988. The tables cover history for the period 1981 to 1988 for the major categories of semiconductors.

## **BACKGROUND**

An integral part of Dataquest's Semiconductor Industry Service data base is analyzing the semiconductor markets by estimating each manufacturer's market share. These analyses provide insights into semiconductor markets and reinforce estimates of consumption, production, and company revenue that were made using other data. Table 1 gives market share estimates for the total worldwide merchant semiconductor market. Tables 2, 18, and 23 further segment the semiconductor market into integrated circuits, discrete devices, and optoelectronic devices. The first two of these categories are divided into a number of subgroups, and some subgroups are further segmented. In general, these product divisions are self-explanatory. Since 1979, the bipolar digital and MOS segments have been divided both by function and by technology. Special discrete semiconductor devices that are neither transistors, diodes, nor thyristors are categorized as "Other" and shown in Table 22. An index of all tables is included for easy reference. Information on further product detail may be requested through the client inquiry privilege.

The semiconductor market is divided among U.S. companies, European companies, Japanese companies, and Rest of World (ROW) companies, based on the location of their main offices. All of the major U.S., European, and Japanese companies are included.

The totals given for U.S. companies reflect worldwide production. For example, even though Texas Instruments manufactures semiconductors in many parts of the world, its entire production is included under the U.S. companies market share section. In contrast, some, but not all foreign-owned subsidiaries, are included in the U.S. totals and not in the total of the parent company location. For example, Exar, a subsidiary of the Japanese company Rohm is included as a U.S. company. On the other hand, revenue for Signetics is included under Philips, a European company. The total for U.S. companies, therefore, is not the same as for U.S. semiconductor consumption.

## **MERCHANT VS. CAPTIVE CONSUMPTION**

Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. The data excludes totally captive suppliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

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## Hybrid Circuits

Hybrid integrated circuits, while primarily a special packaging arrangement, are included in Table 17, under Analog ICs. Only those hybrids are included that are made in the division or other organization whose primary product is semiconductors. Several major manufacturers also manufacture hybrids in other divisions; where we have identified these manufacturers, they are excluded. For 1987 and 1988, a split between monolithics and hybrid analog circuits is available through the client inquiry service.

## Exchange Rate Conventions

Estimates of Japanese consumption or factory shipments use the exchange rate (dollar/yen) for the given year. Refer to Table 0 for the exchange rates used. In viewing the year-to-year Japanese market growth rate, one must consider the different exchange rates in effect during the year. For the European market, the value of shipments is estimated directly in dollars.

## Notes

Notes to the tables appear at the end of this study.

## DATA SOURCES

In both the United States and Europe, there is no official body—government organization, industry association, or trade publication—that maintains complete or even near-complete statistics on the semiconductor industry. In Japan, some statistics are kept by MITI. We believe that the estimates presented here are the most accurate and meaningful generally available today. The sources of the data presented in the tables are as follows:

- Revenue published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data such as those from WSTS, MITI, and EIA
- Published product literature and price lists

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- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant projected world economic data

### **NEED FOR CAREFUL INTERPRETATION**

Construction of the tables involves combining data from many countries, each of which has different and changing exchange rates. Dataquest uses average exchange rates for each year and, as far as possible, the estimates are prepared in terms of local currencies before conversion to U.S. dollars or yen.

Despite the care taken in gathering and analyzing the available data and in attempting to categorize those data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in these tables. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between these data and those provided by others.

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# Final Market Share Estimates

Table 0

## Yen per U.S. Dollar Exchange Rates

<u>Year</u>	<u>Exchange Rate</u>
1981	221
1982	248
1983	235
1984	237
1985	238
1986	167
1987	144
1988	130

Source: International Monetary Fund  
Far Eastern Economic Review  
Dataquest  
July 1989

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Table 1

## Worldwide Semiconductor Market Total Semiconductor Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	14,801	15,231	19,537	28,825	24,341	30,834	38,251	50,859
North American Companies	7,601	7,829	9,565	13,948	11,051	12,809	14,930	18,586
Acrian	2	17	18	21	18	13	15	21
Advanced Micro Devices	279	329	505	937	615	828	986	1,084
Altera					4	12	21	37
AMCC			7	18	21	19	27	28
Analog Devices	89	101	145	218	226	243	292	360
AT&T						983	802	859
BIT							2	6
Burr-Brown				71	78	113	120	144
California Micro Devices							24	28
Catalyst							2	5
Cherry Semiconductor	6	10	13	16	14	22	29	33
Chips & Technologies						41	112	160
Comodore	50	20						
Communications Transistor	10							
Cypress Semiconductor Corp.					18	50	76	135
Electronic Arrays								
Exar				38	32	41	44	47
EXEL				1	4			
Fairchild	462	410	455	665	492			
General Instrument	266	282	241	272	208	218	160	164
General Motors	13							
GE Solid State	121	102	115	136	118	521	520	555
Gould AMI Semiconductors	133	156	162	164	140	155	85	101
GTE Microcircuits	26	32	19	24	27	22	24	
Harris	165	156	171	256	247	267	275	329
Hewlett-Packard	92	102	130	182	206	218	243	270
Holt				10	12	12	9	9
Honeywell	18	20	24	64	88	137	187	182
Hughes	21	20	25	32	36	39	43	47
IMI				10	12	12	13	15
IMP			16	28	25	32	42	47
Integrated Device Technology		3	10	33	51	72	95	171
Intel	525	625	775	1,201	1,020	991	1,491	2,350
Interdesign			25	34	31			
International Rectifier	86	82	84	115	128	125	151	192
Intersil	75	71	80	89	79			
ITT	175	190	185	250	270	312	357	360
Lattice					3	10	13	22
Linear Technology			4	16	19	29	43	59
Litronix	22	23						
LSI Logic		6	32	84	140	197	262	375
Maxim							22	35
Microchip Technology							89	111
Micro Linear							12	24
Micron Technology		5	24	117	36	63	115	331
Micro Power Systems		14	19	26	28	32	23	26
Mitel				35	29	33	39	43
Monolithic Memories	68	70	131	200	172			
Monsanto								
Mosel							1	12
Mostek	210	220	315	467	110			
Motorola	1,190	1,219	1,647	2,319	1,830	2,025	2,434	3,035 <sup>3k</sup>
National Semiconductor	742	708	914	1,213	925	1,427	1,506	1,650
NCR		28	75	80	75	94	116	132
Powerex						94	106	115

(Continued)

# Final Market Share Estimates

Table 1 (Continued)

## Worldwide Semiconductor Market Total Semiconductor Market Share Estimates (Millions of Dollars)

Precision Monolithics	34	40	50	70	64	73	78	85
Quality Technologies								40
Raytheon	51	52	65	95	79	84	89	99
RCA	293	273	297	402	310			
Rockwell	70	80	57	57	44	124	172	174
Saratoga Semiconductor							4	10
SEEQ			9	53	33	32	50	60
Sierra Semiconductor						8	24	47
Siliconix	60	60	70	97	110	112	115	131
Silicon General							25	35
Silicon Systems	13	16	28	64	51	75	88	125
Solid State Scientific	34	33	33	40				
Solitron	29	29	33	37	38	42	47	46
Spectronics								
Sprague	40	46	55	84	115	122	109	120
Standard Microsystems	19	26	42	70	54	54	41	41
Supertex	8	9	10	13	13	17	19	21
Synertek	72	88	96	60				
Teledyne	19	21	22	23	16	25	33	35
Texas Instruments	1,295	1,305	1,638	2,484	1,742	1,781	2,127	2,741
TRW	114	116	118	147	125	105	117	61
Unitrode	70	73	81	106	89	82	69	113
Universal				7	9	10	8	10
VISIC					1			
Vitellic						4	10	40
VLSI Technology		21	36	69	78	112	172	221
VOSI	31	28	27	27	22	17	21	21
VTC					24	37	44	46
Waferscale						8	20	35
Weitek						17	21	35
Western Digital	27	30	47	68	56	53	70	100
Westinghouse	59	53	58	52	52			
Xicor		3	16	39	32	41	63	90
Xilinx						4	11	27
Zilog	39	44	70	88	59	64	75	90
Zymos			10	22	17	18	26	27
Others	378	362	231	228	231	186	151	151
Japanese Companies	5,252	5,375	7,583	11,456	10,144	14,160	18,450	25,942
Fuji Electric	111	102	124	175	157	205	252	346
Fujitsu	375	465	673	1,190	1,019	1,362	1,801	2,607
Hitachi	807	879	1,277	2,051	1,671	2,157	2,618	3,506
Matsushita	487	427	600	928	906	1,176	1,457	1,883
Mitsubishi	321	340	505	964	662	1,123	1,492	2,312
NEC	993	1,079	1,413	2,251	1,984	2,615	3,368	4,543
New JRC						92	130	169
HMB Semiconductor							104	199
OKI	98	129	229	362	307	428	651	947
Ricoh						55	65	85
Rohm	113	100	151	252	247	413	518	721
Sanken	99	90	103	162	156	224	294	383
Sanyo	226	241	351	455	457	615	851	1,083
Seiko Epson				115	93	165	245	311
Sharp	158	192	279	337	328	433	590	1,036
Sony			128	169	252	458	571	950
Toshiba	774	715	983	1,561	1,468	2,281	3,029	4,395
Yamaha							116	151
Others	690	615	767	484	438	358	298	315

(Continued)

# Final Market Share Estimates

Table 1 (Continued)

**Worldwide Semiconductor Market  
Total Semiconductor Market Share Estimates  
(Millions of Dollars)**

European Companies	1,903	1,929	2,215	3,183	2,851	3,443	4,200	4,917
ASEA-Brown Boveri	10	13	14	22	28	64	103	113
Austria Mikro Systeme							32	44
Brown-Boveri	24	24	20	25	29			
Ericsson							41	52
ES2							7	13
Eurosil	15	15	15	20	21	32	25	29
Fagor								27
Ferranti	48	82	85	105	98	110		
Inmos	4	26	58	146	85	80	91	110
Matra-Harris	6	13	13	41	42	44	48	71
MEDL	19	21	25	31	35	39	47	51
Mietec							32	42
Philips	828	797	917	1,325	1,065	1,361	1,602	1,738
Piher	8	6	5	6	14	7		
Plessey	49	53	61	82	99	112	222	284
Rifa	7	7	7	11	12	14		
Semikron	29	34	36	40	48	72	79	91
SGS Thomson	160	175	230	335	300	696	859	1,087
Siemens	337	329	333	450	420	502	657	784
STC			34	40	17	18	12	22
TAG	21	21	17	20	18	18	21	23
Telefunken Electronic	138	143	134	161	170	219	273	289
Thomson	180	148	195	301	324			
Others	20	22	16	22	26	55	49	47
Rest of World Companies	45	98	174	238	295	422	671	1,414
Daewoo							1	7
Erso			25	32	26	20	30	
Gold Star				15	33	50	69	137
Hyundai						18	30	106
KEC		15	26	38	42	50	78	95
MIL								
Samsung		27	40	60	95	170	328	905
United Microelectronics		5	23	27	33	69	91	106
Others	45	51	60	66	66	45	44	58

Source: Dataquest  
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# Final Market Share Estimates

**Table 2**

**Worldwide Semiconductor Market  
Total Integrated Circuit Market Share Estimates  
(Millions of Dollars)**

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	10,023	10,857	14,700	22,618	18,550	23,618	29,887	41,068
North American Companies	5,601	5,973	7,700	11,681	8,999	10,493	12,496	15,990
Advanced Micro Devices	279	329	505	937	615	828	986	1,084
Altera					4	12	21	37
AMCC			7	18	21	19	27	28
Analog Devices	89	101	145	218	226	243	292	360
AT&T						730	595	688
BIT							2	6
Burr-Brown				71	78	113	120	144
California Micro Devices							24	28
Catalyst							2	5
Cherry Semiconductor	6	10	13	16	14	22	29	33
Chips & Technologies						41	112	160
Commodore	50	20						
Cypress Semiconductor Corp.				4	18	50	76	135
Electronic Arrays								
Exar				38	32	41	44	47
EXEL				1	4			
Fairchild	370	333	384	595	451			
General Instrument	152	172	113	91	70	69		
GE Solid State	3	2	3	4	6	350	358	389
Gould AMI Semiconductors	133	156	162	164	140	155	85	101
GTE Microcircuits	26	32	19	24	27	22	24	
Harris	165	156	171	256	247	267	275	329
Holt				10	12	12	9	9
Honeywell				37	57	102	147	142
Hughes	21	20	25	32	36	39	43	47
IMI				10	12	12	13	15
IMP			16	28	25	32	42	47
Integrated Device Technology		3	10	33	51	72	98	171
Intel	525	625	775	1,201	1,020	991	1,491	2,350
Interdesign			25	34	31			
Intersil	66	62	78	78	71			
ITT	78	90	90	125	140	168	197	214
Lattice					3	10	13	22
Linear Technology			4	16	19	29	43	59
Litronix								
LSI Logic		6	32	84	140	197	262	375
Maxim							22	35
Microchip Technology							89	111
Micro Linear							12	24
Micron Technology		5	24	117	36	63	115	331
Micro Power Systems		14	19	26	28	32	23	26
Mitel				35	29	33	39	43
Monolithic Memories	68	70	131	200	172			
Mosel							1	12
Mostek	210	220	315	467	110			
Motorola	730	791	1,150	1,693	1,281	1,403	1,758	2,259
National Semiconductor	686	655	864	1,153	882	1,363	1,431	1,575
NCR		28	75	80	75	94	116	132
Precision Monolithics	34	40	50	70	64	73	78	85
Raytheon	34	34	45	73	51	69	77	84

(Continued)

# Final Market Share Estimates

Table 2 (Continued)

**Worldwide Semiconductor Market  
Total Integrated Circuit Market Share Estimates  
(Millions of Dollars)**

RCA	192	185	211	303	225			
Rockwell	70	80	57	57	44	124	172	174
Saratoga Semiconductor							4	10
SEEQ			9	53	33	32	50	60
Sierra Semiconductor						8	24	47
Siliconix	35	35	40	54	63	67	70	70
Silicon General							25	35
Silicon Systems	13	16	28	64	51	75	88	125
Solid State Scientific	34	33	33	40				
Solitron	5	5	4	6	8	12	13	13
Sprague	35	37	40	57	102	108	92	102
Standard Microsystems	19	26	42	70	54	54	41	41
Supertex	5	6	6	10	8	9	10	11
Synertek	72	88	96	60				
Teledyne	15	17	19	20	16	25	33	35
Texas Instruments	1,075	1,155	1,535	2,375	1,653	1,689	2,024	2,637
TRW	20	31	43	54	43	24	25	25
Unitrode		2	4	9	8	16	23	51
Universal				7	9	10	8	10
VISIC					1			
Vitellic						4	10	40
VLSI Technology		21	36	69	78	112	172	221
VTC					24	37	44	46
Waferscale						8	20	35
Weitek						17	21	35
Western Digital	27	30	47	68	56	53	70	100
Xicor		3	16	39	32	41	63	90
Xilinx						4	11	27
Zilog	39	44	70	88	59	64	75	90
Zymos			10	22	17	18	26	27
Others	220	185	104	117	117	126	91	91
<b>Japanese Companies</b>	<b>3,307</b>	<b>3,674</b>	<b>5,411</b>	<b>8,500</b>	<b>7,409</b>	<b>10,510</b>	<b>13,981</b>	<b>20,375</b>
Fuji Electric	13	15	25	31	20	35	42	64
Fujitsu	335	427	606	1,098	940	1,247	1,660	2,420
Hitachi	502	609	912	1,569	1,236	1,639	1,946	2,729
Matsushita	277	250	367	592	595	795	994	1,328
Mitsubishi	212	244	384	766	504	873	1,239	1,975
NEC	681	794	1,093	1,838	1,603	2,144	2,795	3,884
New JRC						76	109	146
NEB Semiconductor							104	199
OKI	88	121	216	343	289	404	619	902
Ricoh						55	65	85
Rohm	39	40	58	111	104	186	248	325
Sanken	18	19	25	47	53	81	119	157
Sanyo	148	146	247	305	314	407	556	811
Seiko Epson				115	93	165	245	311
Sharp	96	115	164	221	201	236	367	751
Sony			103	122	155	281	361	621
Toshiba	394	429	613	1,035	1,004	1,616	2,194	3,316
Yamaha							116	151
Others	504	464	598	307	299	270	202	200

(Continued)

# Final Market Share Estimates

**Table 2 (Continued)**

**Worldwide Semiconductor Market  
Total Integrated Circuit Market Share Estimates  
(Millions of Dollars)**

European Companies	1,080	1,150	1,470	2,273	1,915	2,269	2,845	3,429
ASEA-Brown Boveri	5	7	7	13	18	22	26	28
Austria Mikro Systeme							32	44
Ericsson							39	52
ES2							7	13
Eurosil	15	15	15	20	21	32	25	29
Ferranti	34	68	68	85	78	92		
Inmos	4	26	58	146	85	80	91	110
Matra-Harris	6	13	13	41	42	44	48	71
MEDL	8	9	12	16	20	21	27	29
Mietec							32	42
Philips	590	570	694	1,090	808	1,028	1,186	1,281
Pihser					4			
Plessey	46	50	58	75	89	96	183	237
Rifa	7	7	7	11	12	12		
SGS Thomson	110	126	177	263	240	497	646	833
Siemens	155	160	178	230	205	210	354	483
STC			30	38	16	18	12	21
Telefunken Electronic	38	36	51	63	68	79	110	124
Thomson	59	60	99	174	197			
Others	3	3	3	8	12	38	27	32
Rest of World Companies	35	60	119	164	227	346	565	1,274
Daewoo							1	7
Erso			25	32	26	20	30	
Gold Star				12	30	49	68	136
Hyundai						18	30	106
KEC		3	4	5	8	10	20	25
MIL								
Samsung		12	18	33	75	145	291	850
United Microelectronics		5	23	27	33	69	91	106
Others	35	40	49	55	55	35	34	44

Source: Dataquest  
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# Final Market Share Estimates

Table 3

## Worldwide Semiconductor Market Bipolar Digital Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	2,338	2,412	3,015	4,783	3,684	4,325	4,760	5,200
North American Companies	1,546	1,547	1,933	3,078	2,319	2,515	2,589	2,761
Advanced Micro Devices	135	158	260	427	250	447	500	536
AMCC			7	18	21	19	27	27
Analog Devices								
AT&T						123	79	61
BIT							2	6
Cherry Semiconductor			3	4	3	3		
Chips & Technologies						10	25	30
Fairchild	226	206	246	410	329			
Marris	78	63	44	55	43	46	30	62
Honeywell				37	50	68	44	27
Hughes								
Intel	34	44	55	35	22	22	18	22
Interdesign				6	6			
Intersil	7	1	1					
ITT								
LSI Logic		2	3					
Monolithic Memories	68	70	131	200	170			
Motorola	192	203	258	456	379	393	429	435
National Semiconductor	175	165	210	290	194	511	521	550
Raytheon	14	14	15	37	23	42	51	55
RCA	6	7	6					
Solitron	1	1						
Sprague								
Supertex								
Teledyne	4	4	3	2	3	3	1	2
Texas Instruments	510	520	667	1,077	796	808	854	940
TRW				4	4			
VTC					6	10		
Others	96	89	24	20	20	10	8	8
Japanese Companies	379	451	600	936	782	1,230	1,540	1,791
Fuji Electric	1	1	1	2	1	2		
Fujitsu	99	129	174	305	267	397	495	653
Hitachi	95	111	144	223	195	321	463	501
Matsushita	10	7	13	22	21	28	26	30
Mitsubishi	38	44	68	123	75	134	122	127
NEC	78	89	115	134	129	176	247	292
New JRC						1	1	1
OKI	9	14	17	25	22	19	32	38
Rohm	7	8	10	15				
Sanyo	12	12	14	18	18	23	29	41
Sony			8					
Toshiba	14	16	21	37	33	129	125	108
Others	16	20	15	32	21			

(Continued)



# Final Market Share Estimates

**Table 3 (Continued)**

**Worldwide Semiconductor Market  
Bipolar Digital Market Share Estimates  
(Millions of Dollars)**

European Companies	405	404	464	752	560	551	594	598
Ericsson							12	
Ferranti	14	32	36	46	49	58		
Matra-Harris				4	4		3	
Philips	298	278	344	589	372	389	405	413
Pitner					4			
Plessey	18	19	21	27	30	32	68	94
Rifa	6	6	6	9	9	5		
SGS Thomson	14	5	10	20	26	21	20	20
Siemens	52	56	36	35	41	39	63	36
STC								7
Telefunken Electronic							15	19
Thomson	2	7	10	21	24			
Others	1	1	1	1	1	7	8	9
Rest of World Companies	8	10	18	17	23	29	37	50
Erso			4					
Gold Star				1	7	14	22	32
Others	8	10	14	16	16	15	15	18

Source: Dataquest  
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# Final Market Share Estimates

Table 4

## Worldwide Semiconductor Market TTL Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	1,925	1,962	2,551	4,046	2,856	3,235	3,471	3,680
North American Companies	1,286	1,280	1,701	2,685	1,969	2,139	2,160	2,282
Advanced Micro Devices	135	154	260	424	245	438	491	520
Analog Devices						100	62	48
AT&T						10	25	30
Chips & Technologies								
Fairchild	186	162	184	315	256			
Harris	77	62	44	55	43	29	23	58
Honeywell						23		
Hughes								
Intel	34	44	55	35	22	13		
Intersil	7	1	1					
ITT								
Monolithic Memories	68	70	131	200	170			
Motorola	88	94	150	283	237	246	245	221
National Semiconductor	172	162	205	283	190	450	420	425
Raytheon	14	14	15	30	16	37	46	48
RCA	6	7	6					
Sprague								
Supertex								
Texas Instruments	495	505	650	1,056	786	793	848	932
TRW				4	4			
Others	4	5						
Japanese Companies	287	345	454	713	438	646	825	894
Fujitsu				237	111	162	213	266
Hitachi				170	143	234	341	370
Matsushita				18	17	21	19	21
Mitsubishi				99	59	104	94	57
NEC				104	95	124	157	180
New JRC						1	1	
OKI				20				
Sanyo				14				
Toshiba				30				
Others				21	13			
European Companies	344	327	378	631	428	422	451	454
Ericsson							12	
Ferranti	4	6	3	3	3	4		
Matra-Harris				4	4		3	
Philips	272	254	320	551	337	363	380	393
Plessey							5	8
Rifa	3	3	3	5	5			
SGS Thomson	14	5	10	20	26	19	19	20
Siemens	48	51	31	26	28	29	11	8
Telefunken Electronic							15	19
Thomson	2	7	10	21	24			
Others	1	1	1	1	1	7	6	6
Rest of World Companies	8	10	18	17	21	28	35	50
Enso			4					
Gold Star				1	5	13	20	32
Others	8	10	14	16	16	15	15	18

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 5

## Worldwide Semiconductor Market ECL Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
Total Market	232	260	318	563	597	740	968	1,130
North American Companies	123	139	165	322	293	325	359	402
Advanced Micro Devices		4		3	2	5	5	12
AMCC			7	18	21	19	27	27
AT&T						23	17	13
BIT							2	6
Cherry Semiconductor						3		
Fairchild	31	34	54	90	69			
Honeywell				37	50	45	44	27
Intersil								
LSI Logic		2	3					
Motorola	89	96	96	160	134	144	179	202
National Semiconductor	3	3	5	7	4	61	72	100
Raytheon				7	7	5	5	7
Texas Instruments					6	10		
VTC						10		
Others						10	8	8
Japanese Companies	73	82	111	176	233	359	466	584
Fujitsu				52	140	205	262	336
Hitachi				36	36	76	107	125
Matsushita				4	4	7	7	9
Mitsubishi				21	14	28		
NEC				22	26	41	87	108
OKI				5	5	2	3	3
Rohm				15				
Sanyo				4				
Toshiba				6				3
Others				11	8			
European Companies	36	39	42	65	71	56	143	144
Philips	23	22	22	37	34	22	25	20
Pihler					3			
Plessey	9	12	15	19	21	22	63	86
SGS Thomson						2	1	
Siemens	4	5	5	9	13	10	52	28
STC								7
Others							2	3

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 6

## Worldwide Semiconductor Market Other Bipolar Digital Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
Total Market	181	190	146	174	231	350	321	390
North American Companies	137	128	67	71	57	51	70	77
Advanced Micro Devices					3	4	4	4
Cherry Semiconductor			3	4	3			
Fairchild	9	10	8	5	4			
Harris	1	1				17	7	4
Intel						9	18	22
Interdesign				6	6			
ITT								
Motorola	15	13	12	13	8	3	5	12
National Semiconductor							29	25
Raytheon								
Solitron		1						
Sprague								
Supertex								
Teledyne	4	4	3	2	3	3	1	2
Texas Instruments	15	15	17	21	10	15	6	8
Others	92	84	24	20	20			
Japanese Companies	19	24	35	47	111	225	249	313
Fuji Electric				2	1	2		
Fujitsu				16	16	30	20	51
Hitachi				17	15	11	15	6
Mitsubishi				3	2	2	28	70
NEC				8	8	11	3	4
New JRC								1
OKI					17	17	29	35
Sanyo					18	23	29	41
Toshiba				1	33	129	125	105
European Companies	25	38	44	56	61	73		
Ferranti	10	26	33	43	46	54		
Philips	3	2	2	1	1	4		
Piher					1			
Plessey	9	7	6	8	9	10		
Rifa	3	3	3	4	4	5		
Siemens								
Rest of World Companies					2	1	2	
Gold Star					2	1	2	
Others								

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 7

## Worldwide Semiconductor Market Bipolar Digital Memory Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	558	511	585	774	589	606	621	689
North American Companies	341	295	322	415	309	279	246	213
Advanced Micro Devices	45	57	81	130	96	122	120	104
AT&T						1	1	
Fairchild	64	50	45	45	36			
Harris	50	44	36	44	33	23	6	3
Intel	19	17	15	5				
Intersil	7	1	1					
Monolithic Memories	50	38	42	61	52			
Motorola	20	15	15	18	16	11	10	7
National Semiconductor	25	24	30	35	12	64	45	35
Raytheon	6	6	7	7	20	10	14	14
Supertex								
Texas Instruments	50	43	50	70	44	48	50	50
Others	5							
Japanese Companies	91	126	165	218	176	258	306	417
Fujitsu	46	63	90	136	95	145	178	254
Hitachi	25	40	52	59	55	81	95	119
Matsushita	1							
NEC	18	22	22	23	26	32	33	44
Others	1	1	1					
European Companies	126	90	98	141	104	69	69	59
Matra-Harris				4	4		3	
Philips	120	82	89	121	80	61	61	58
Siemens	4	4	3	5	7	7	4	
Thomson	2	4	6	11	13			
Others						1	1	1

Source: Dataquest  
July 1989

# Final Market Share Estimates

**Table 8**

**Worldwide Semiconductor Market  
Bipolar Digital Logic Market Share Estimates  
(Millions of Dollars)**

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
<b>Total Market</b>	1,780	1,901	2,430	4,009	3,095	3,719	4,139	4,511
<b>North American Companies</b>	1,205	1,252	1,611	2,663	2,010	2,236	2,343	2,548
Advanced Micro Devices	90	101	179	297	154	325	380	432
AMCC			7	18	21	19	27	27
AT&T						122	78	61
BIT							2	6
Cherry Semiconductor			3	4	3	3		
Chips & Technologies						10	25	30
Fairchild	162	156	201	365	293			
Harris	28	19	8	11	10	23	24	59
Honeywell				37	50	68	44	27
Intel	15	27	40	30	22	22	18	22
Interdesign				6	6			
Intersil								
ITT								
LSI Logic		2	3					
Monolithic Memories	18	32	89	139	118			
Motorola	172	188	243	438	363	382	419	428
National Semiconductor	150	141	180	255	182	447	476	515
Raytheon	8	8	8	30	3	32	37	41
RCA	6	7	6					
Solitron	1	1						
Supertex								
Teledyne	4	4	3	2	3	3	1	2
Texas Instruments	460	477	617	1,007	752	760	804	890
TRW				4	4			
VTC					6	10		
Others	91	89	24	20	20	10	8	8
<b>Japanese Companies</b>	288	325	435	718	606	972	1,234	1,374
Fuji Electric	1	1	1	2	1	2		
Fujitsu	53	66	84	169	172	252	317	399
Hitachi	70	71	92	164	140	240	368	382
Matsushita	9	7	13	22	21	28	26	30
Mitsubishi	38	44	68	123	75	134	122	127
NEC	60	67	93	111	103	144	214	248
New JRC						1	1	1
OKI	9	14	17	25	22	19	32	38
Rohm	7	8	10	15				
Sanyo	12	12	14	18	18	23	29	41
Sony			8					
Toshiba	14	16	21	37	33	129	125	108
Others	15	19	14	32	21			

(Continued)

# Final Market Share Estimates

**Table 8 (Continued)**

**Worldwide Semiconductor Market  
Bipolar Digital Logic Market Share Estimates  
(Millions of Dollars)**

European Companies	279	314	366	611	456	482	525	539
Ericsson							12	
Ferranti	14	32	36	46	49	58		
Philips	178	196	255	468	292	328	344	355
Piher					4			
Plessey	18	19	21	27	30	32	68	94
Rifa	6	6	6	9	9	5		
SGS Thomson	14	5	10	20	26	21	20	20
Siemens	48	52	33	30	34	32	59	36
STC								7
Telefunken Electronic							15	19
Thomson		3	4	10	11			
Others	1	1	1	1	1	6	7	8
Rest of World Companies	8	10	18	17	23	29	37	50
Erso			4					
Gold Star				1	7	14	22	32
Others	8	10	14	16	16	15	15	18

Source: Dataquest  
July 1989

# Final Market Share Estimates

**Table 9**

**Worldwide Semiconductor Market  
MOS Market Share Estimates  
(Millions of Dollars)**

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	4,799	5,596	7,951	12,947	10,100	12,815	17,473	26,988
North American Companies	2,823	3,124	4,088	6,201	4,479	5,142	6,880	9,754
Advanced Micro Devices	121	146	224	480	304	317	414	482
Altera					4	12	21	37
AMCC								1
Analog Devices							12	20
AT&T						325	300	380
California Micro Devices							4	5
Catalyst							2	5
Chips & Technologies						31	87	130
Comodore	50	20						
Cypress Semiconductor Corp.				4	18	50	76	135
Electronic Arrays								
Exar				2	2	5	6	7
EXEL				1	4			
Fairchild	65	50	48	45	22			
General Instrument	141	160	100	71	51			
GE Solid State	3	2	3	4	6	223	233	269
Gould AMI Semiconductors	133	156	162	164	140	155	85	101
GTE Microcircuits	26	31	16	5	9	3	4	
Harris	52	46	63	105	111	108	106	121
Holt				3	7	12		
Honeywell					7	34	77	88
Hughes	21	20	25	32	36	39	43	47
JMI				10	12	7	13	15
IMP			16	28	25	32	42	47
Integrated Device Technology		3	10	33	51	72	98	171
Intel	491	581	720	1,166	998	969	1,473	2,328
Interdesign			7	8	7			
Intersil	19	25	23	23	21			
ITT	46	56	56	80	90	107	146	150
Lattice					3	10	13	22
Litronix								
LSI Logic		4	29	84	140	197	262	375
Microchip Technology							89	111
Micron Technology		5	24	117	36	63	115	331
Micro Power Systems		3	2	16	17			
Monolithic Memories					2			
Mosei							1	12
Mostek	210	220	315	467	110			
Motorola	372	425	697	967	668	728	990	1,399
National Semiconductor	255	235	280	430	318	355	415	485
NCR		28	75	80	75	94	116	132
Raytheon							1	2
RCA	110	108	133	210	160			
Rockwell	70	80	57	57	44	65	172	174
Saratoga Semiconductor							4	10
SEEQ			9	53	33	32	50	60
Sierra Semiconductor						5	12	24
Siliconix	12	5	4	4	3	5	7	3
Solid State Scientific	34	33	33	40				
Solitron	2	2	2	2				
Sprague					28	23	14	16
Standard Microsystems	19	26	42	70	54	54	41	41
Supertex	5	6	6	10	8	9		
Synertek	72	88	96	60				
Teledyne	9	2	2	16	2	2	2	
Texas Instruments	350	400	572	889	522	529	784	1,271

(Continued)



# Final Market Share Estimates

Table 9 (Continued)

## Worldwide Semiconductor Market MOS Market Share Estimates (Millions of Dollars)

TAM						6	7	5
Universal			7	9	10	6	6	
VISIC				1				
Vitellic					4	10	40	
VLSI Technology		21	36	69	78	112	172	221
VTC					7	11	17	19
Waferscale						8	20	35
Weitek						17	21	35
Western Digital	27	30	47	68	56	53	70	100
Xicor		3	16	39	32	41	60	87
Xilinx						4	11	27
Zilog	39	44	70	88	59	64	75	90
Zymos			10	22	17	18	26	27
Others	69	60	58	72	72	68	55	55
<b>Japanese Companies</b>	<b>1,662</b>	<b>2,100</b>	<b>3,252</b>	<b>5,721</b>	<b>4,695</b>	<b>6,471</b>	<b>8,921</b>	<b>14,494</b>
Fuji Electric	4	4	4	5	6	7	14	31
Fujitsu	218	280	406	753	631	775	1,014	1,616
Hitachi	288	392	638	1,167	852	1,053	1,173	1,885
Matsushita	91	89	160	283	269	388	592	875
Mitsubishi	99	137	247	541	323	544	812	1,453
NEC	438	549	786	1,414	1,174	1,608	2,006	3,123
New JRC						3	13	27
MMB Semiconductor							104	199
OKI	77	106	197	315	264	371	566	841
Ricoh						55	65	85
Rohm			2	5	5	8	13	54
Sanyo	23	28	50	67	68	88	150	299
Seiko Epson				115	93	147	231	296
Sharp	82	100	146	197	173	193	312	682
Sony			45	38	59	114	144	235
Toshiba	250	312	458	770	736	1,114	1,593	2,639
Yamaha							116	151
Others	92	103	113	51	43	3	3	3
<b>European Companies</b>	<b>294</b>	<b>335</b>	<b>528</b>	<b>912</b>	<b>778</b>	<b>964</b>	<b>1,250</b>	<b>1,684</b>
ASEA-Brown Boveri	5	7	7	13	18	22	26	28
Austria Mikro Systeme							29	40
Ericsson							11	6
ES2							7	13
Eurosil	15	15	15	20	21	32	25	29
Ferranti	4	13	11	12	6	10		
Inmos	4	26	58	146	85	80	91	110
Matra-Harris	6	13	13	33	36	42	43	71
MEDL	8	9	12	16	20	21	27	29
Mietec							32	42
Philips	100	99	155	266	228	312	342	402
Plessey	11	14	19	26	35	37	51	76
Rifa	1	1	1	2	3	4		
SGS Thomson	33	45	68	102	88	249	344	461
Siemens	65	64	80	126	92	89	171	327
STC			30	38	16	18	12	10
Telefunken Electronic	11	5	8	13	13	18	23	20
Thomson	30	23	50	93	107			
Others	1	1	1	6	10	30	16	20
<b>Rest of World Companies</b>	<b>20</b>	<b>37</b>	<b>83</b>	<b>113</b>	<b>148</b>	<b>238</b>	<b>422</b>	<b>1,056</b>
Daewoo								2
Erso			21	30	25	19	29	
Gold Star				1	5	5	20	63
Hyundai						18	30	106
MIL								
Samsung		10	13	25	55	117	242	765
United Microelectronics		5	23	27	33	69	91	106
Others	20	22	26	30	30	10	10	14

Source: Dataquest  
July 1989

# Final Market Share Estimates

**Table 10**

**Worldwide Semiconductor Market  
NMOS Market Share Estimates  
(Millions of Dollars)**

	1981	1982	1983	1984	1985	1986	1987	1988
Total Market	3,175	3,884	5,461	8,824	6,073	6,914	8,368	9,985
North American Companies	1,957	2,335	3,010	4,554	2,827	2,692	3,196	3,920
Advanced Micro Devices	121	146	214	470	304	308	389	407
AT&T						70	40	52
Commodore	48	17						
Electronic Arrays								
EXEL				1	2			
Fairchild	35	32	30	26	8			
General Instrument	107	140	95	64	42	43		
GE Solid State	3	2	3	4	6			
Gould AMI Semiconductors	67	118	118	77	67	62	21	25
GTE Microcircuits	25	26	1					
Harris							15	2
Hughes						2		
IMP			9	11	2	3	3	4
Intel	491	581	720	1,156	976	909	1,122	1,251
Intersil	6	8	5	3				
ITT	21	27	15	36	43	46	77	70
Microchip Technology							64	68
Micron Technology		5	24	117	36	63	115	253
Mostek	189	197	281	416	60			
Motorola	223	280	440	635	378	280	337	450
National Semiconductor	165	152	160	227	110	149	90	125
MCR		25	60	60	45	48	50	57
Rockwell	32	45	41	41	27	39	124	130
SEEQ			9	50	28	27	33	34
Solid State Scientific	1	1	1	1				
Sprague						14	7	7
Standard Microsystems	15	21	37	64	50	48	36	34
Supertex								
Synertek	72	88	96	60				
Texas Instruments	240	300	461	752	428	426	525	786
VLSI Technology		21	34	60	51	37	25	15
Western Digital	27	30	47	68	45			
Xicor		3	16	39	32	40	57	77
Zilog	39	44	70	88	59	58	61	68
Others	30	26	23	28	28	20	5	5
Japanese Companies	1,044	1,345	2,077	3,593	2,732	3,623	4,387	4,990
Fuji Electric	4	3	3					
Fujitsu	185	232	331	615	500	602	734	454
Hitachi	158	241	383	708	493	457	469	678
Matsushita	53	50	103	184	170	239	310	368
Mitsubishi	80	114	186	463	256	436	612	808
NEC	343	441	636	1,125	908	1,190	1,320	1,140
New JRC						2		
OKI	30	42	78	141	110	137	199	304
RicoH						34	39	40
Rohm			1	3				
Sanyo	12	15	28	26	26	31	37	63
Sharp	18	23	36	46	40	60	90	185
Sony			36	19	19	29	30	42

(Continued)

# Final Market Share Estimates

**Table 10 (Continued)**

**Worldwide Semiconductor Market  
NMOS Market Share Estimates  
(Millions of Dollars)**

Toshiba	80	101	165	230	181	404	522	875
Yamaha							23	31
Others	81	83	91	33	29	2	2	2
<b>European Companies</b>	<b>174</b>	<b>201</b>	<b>361</b>	<b>660</b>	<b>478</b>	<b>507</b>	<b>571</b>	<b>706</b>
Austria Mikro Systeme							6	8
Ferranti	2	3	3	3				
Inmos	4	26	58	146	66	33	11	5
Matra-Harris	2	5	1	11	7	5	2	4
MEDL								
Mietec								7
Philips	63	64	103	187	138	179	178	175
Plessey	6	9	13	19	22	11	9	12
Rifa	1	1	1	2	2	2		
SGS Thomson	18	28	44	64	56	148	187	239
Siemens	45	44	63	114	87	84	145	227
STC			29	35	12	13	5	2
Telefunken Electronic	10	5	8	13	13	18	23	20
Thomson	22	15	37	64	72			
Others	1	1	1	2	3	14	5	7
<b>Rest of World Companies</b>		<b>3</b>	<b>13</b>	<b>17</b>	<b>36</b>	<b>92</b>	<b>214</b>	<b>369</b>
Erso			5	5	2	1	2	
Gold Star					1	1	1	7
Hyundai						1	9	33
Samsung				3	21	65	173	299
United Microelectronics		3	8	9	12	24	29	30

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 11

## Worldwide Semiconductor Market PMOS Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	448	375	319	278	143	73	119	214
North American Companies	257	192	183	183	88	48	98	80
Advanced Micro Devices			10	10				
Fairchild	10	5	4	5	3			
General Instrument	31	15		3	2			
Gould AMI Semiconductors	24	8	15	15	3			
GTE Microcircuits	1	1	1					
Hughes	1	1	1	1			2	1
ITT	15	16	18	12	8	6	4	10
Microchip Technology							5	3
Mostek	3	3						
National Semiconductor	10	9	10	8	3			1
Rockwell	38	35	16	15	10	16	8	6
Solid State Scientific			1	1				
Standard Microsystems	4	5	5	5	2	2		
Texas Instruments	100	80	91	97	46	24	79	59
Western Digital								
Others	20	14	11	11	11			
Japanese Companies	129	125	111	74	43	20	16	130
Fujitsu	8	6	7	7	4		1	81
Hitachi	14	9	4	8	3	3	2	43
Matsushita	18	15	12	5	4	4	2	3
Mitsubishi	9	9	12	5	2	2	1	
NEC	30	31	25	32	22	8	7	
OKI	5	5	5	1				
Rohm								1
Sanyo	4	3	2	1				
Sharp	16	18	18	11	5	3	3	2
Toshiba	20	24	21	2	1			
Others	5	5	5	2	2			
European Companies	59	55	22	18	9	3	2	2
MEDL	3	3	3	3	2			
Philips	26	24						
Plessey	5	4	2	3	2	1	1	1
SGS Thomson	4	4						
Siemens	20	20	17	12	5	2	1	1
Telefunken Electronic	1							
Rest of World Companies	3	3	3	3	3	2	3	2
Gold Star						2	3	
Samsung								2
Others	3	3	3	3	3			

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 12

## Worldwide Semiconductor Market CMOS Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	1,176	1,337	2,171	3,845	3,884	5,828	8,953	16,699
North American Companies	609	597	895	1,464	1,564	2,402	3,571	5,710
Advanced Micro Devices						9	25	75
Altera					4	12	21	37
Analog Devices							12	20
AT&T						255	260	328
California Micro Devices							4	5
Catalyst							2	5
Chips & Technologies						31	87	130
Commodore	2	3						
Cypress Semiconductor Corp.				4	18	50	76	135
Exar				2	2	5	6	7
EXEL					2			
Fairchild	20	13	14	14	11			
General Instrument	3	5	5	4	7	11		
GE Solid State						223	227	262
Gould AMI Semiconductors	42	30	29	72	70	93	64	76
GTE Microcircuits		4	14	5	9	3	4	
Harris	52	46	63	105	111	108	91	119
Holt				3	7	12		
Honeywell					7	34	77	88
Hughes	20	19	24	31	36	37	41	46
IMI				10	12	7	13	15
IMP			7	17	23	29	39	43
Integrated Device Technology		3	10	33	51	72	98	171
Intel				10	22	60	351	1,077
Interdesign			7	8	7			
Intersil	13	17	18	20	21			
ITT	10	13	23	32	39	55	65	70
Lattice					3	10	13	22
LSI Logic		4	29	84	140	197	262	374
Microchip Technology							20	40
Micron Technology				16	17			78
Micro Power Systems		3	2		2			
Monolithic Memories								
Mosel							1	12
Mostek	18	20	34	51	50			
Motorola	149	145	257	332	290	448	653	949
National Semiconductor	80	74	110	195	205	206	325	350
NCR		3	15	20	30	46	66	75
Raytheon							1	2
RCA	110	108	133	210	160			
Rockwell				1	7	10	40	38
SEEQ				3	5	5	17	26
Sierra Semiconductor						5	12	24
Siliconix	12	5	4	4	3	5	7	3
Solid State Scientific	33	32	31	38				
Solitron	2	2	2	2				
Sprague					28	9	7	9
Standard Microsystems				1	2	4	5	7
Supertex	5	6	6	10	8	9		
Teledyne	9	2	2	16	2	2	2	
Texas Instruments	10	20	20	40	48	79	180	415
TRW					6	7		5
Universal				7	9	10	6	6
VISIC					1			
Vitellic						4	10	40

(Continued)

# Final Market Share Estimates

Table 12 (Continued)

## Worldwide Semiconductor Market CMOS Market Share Estimates (Millions of Dollars)

VLSI Technology			2	9	27	75	147	206
VTC					7	11	17	19
Waferscale						8	20	35
Weitek						17	21	35
Western Digital					11	53	70	100
Xicor						1	3	10
Xilinx						4	11	27
Zilog						6	14	22
Zymos			10	22	17	18	26	27
Others	19	20	24	33	33	48	45	45
<b>Japanese Companies</b>	<b>489</b>	<b>630</b>	<b>1,064</b>	<b>2,054</b>	<b>1,920</b>	<b>2,828</b>	<b>4,514</b>	<b>9,348</b>
Fuji Electric		1	1	5	6	7	13	30
Fujitsu	25	42	68	131	126	173	279	1,081
Hitachi	116	142	251	451	356	593	699	1,157
Matsushita	20	24	45	94	95	145	280	504
Mitsubishi	10	14	49	73	66	106	199	645
NEC	65	77	125	257	244	410	679	1,965
New JRC						1	13	27
NEB Semiconductor							104	199
OKI	42	59	114	173	154	234	367	537
Ricoh						21	26	45
Rohm			1	2	5	8	13	53
Sanyo	7	10	20	40	42	57	113	236
Seiko Epson				115	93	147	231	296
Sharp	48	59	92	140	128	130	219	495
Sony			9	19	40	85	114	193
Toshiba	150	187	272	538	554	710	1,071	1,764
Yamaha							93	120
Others	6	15	17	16	12	1	1	1
<b>European Companies</b>	<b>61</b>	<b>79</b>	<b>145</b>	<b>234</b>	<b>291</b>	<b>454</b>	<b>663</b>	<b>956</b>
ASEA-Brown Boveri	5	7	7	13	18	22	26	28
Austria Mikro Systeme							23	32
Ericsson							11	6
ES2							7	13
Eurosil	15	15	15	20	21	32	25	29
Ferranti	2	10	8	9	6	10		
Inmos					19	47	80	105
Matra-Harris	4	8	12	22	29	37	41	67
MEDL	5	6	9	13	18	21	27	29
Mietec							18	17
Philips	11	11	52	79	90	133	164	227
Plessey		1	4	4	11	25	41	63
Rifa					1	2		
SGS Thomson	11	13	24	38	32	101	157	222
Siemens						3	25	99
STC			1	3	4	5	7	6
Thomson	8	8	13	29	35			
Others				4	7	16	11	13
<b>Rest of World Companies</b>	<b>17</b>	<b>31</b>	<b>67</b>	<b>93</b>	<b>109</b>	<b>144</b>	<b>205</b>	<b>685</b>
Daewoo								2
Erso			16	25	23	18	27	
Gold Star				1	4	2	16	56
Hyundai						17	21	73
Samsung		10	13	22	34	52	69	464
United Microelectronics		2	15	18	21	45	62	76
Others	17	19	23	27	27	10	10	14

Source: Dataquest  
July 1989

# Final Market Share Estimates

**Table 13**

**Worldwide Semiconductor Market  
BiCMOS Market Share Estimates  
(Millions of Dollars)**

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market							33	90
North American Companies							15	44
AMCC								1
GE Solid State							6	7
LSI Logic								1
National Semiconductor								9
Saratoga Semiconductor							4	10
Texas Instruments								11
Others							5	5
Japanese Companies							4	26
Fuji Electric							1	1
Hitachi							3	7
NEC								18
European Companies							14	20
Mitetec							14	18
STC								2

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 14

## Worldwide Semiconductor Market MOS Memory Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
Total Market	2,071	2,705	3,719	6,225	3,816	4,511	6,056	11,692
North American Companies	1,294	1,545	1,795	2,605	1,364	1,356	1,701	2,836
Advanced Micro Devices	98	112	161	258	181	128	155	207
AT&T						55	25	24
Catalyst							2	5
Commodore	25	30						
Cypress Semiconductor Corp.				4	18	42	57	94
Exar						2	2	3
EXEL				1	3			
Fairchild	16	7	5	4	4			
General Instrument	71	99	54	43	26	31		
GE Solid State						24	23	29
Gould AMI Semiconductors	34	54	42	29	12	11	8	15
GTE Microcircuits	25	26	5	2				
Harris	22	18	21	35	30	40	36	26
Honeywell						7	5	14
Hughes	3	2	3	4	4	2	2	
IMP			2					
Integrated Device Technology		3	10	30	49	66	85	135
Intel	247	290	325	380	288	299	326	392
Intersil	10	15	5	3	2			
ITT	16	20	1					
Lattice					3	8	4	2
Microchip Technology							59	82
Micron Technology		5	24	117	36	63	115	331
Micro Power Systems		1						
Mosel							1	12
Mostek	150	152	215	350	60			
Motorola	106	157	233	314	100	51	89	236
National Semiconductor	117	110	95	110	50	57	80	135
MCR		22	53	22	10	16	6	6
RCA	29	32	28	40	26			
Rockwell	35	40	16	9	2	1		
Saratoga Semiconductor							4	10
SEEQ			9	50	28	27	37	46
Solid State Scientific	2	3	10	6				
Sprague					2	7		
Supertex	2	2	1	1	1			
Synertek	56	68	47	30				
Texas Instruments	200	250	371	670	349	325	445	834
VISIC					1			
Vitellic						4	10	40
VLSI Technology		16	20	24	17	24	23	16
Waferscale						5	12	25
Xicor		3	16	39	32	41	60	87
Zilog								
Others	30	28	23	30	30	20	30	30

(Continued)



# Final Market Share Estimates

**Table 14 (Continued)**

**Worldwide Semiconductor Market  
MOS Memory Market Share Estimates  
(Millions of Dollars)**

Japanese Companies	714	1,057	1,720	3,272	2,193	2,878	3,909	7,597
Fujitsu	145	190	278	527	412	485	634	1,067
Hitachi	200	291	500	971	662	719	576	1,114
Matsushita	9	9	29	80	58	71	91	230
Mitsubishi	34	81	158	370	147	289	492	966
NEC	185	236	343	713	470	586	838	1,490
NMB Semiconductor							104	199
OKI	31	59	101	149	91	90	193	353
Ricoh						16	18	26
Rohm								8
Sanyo				1	1	5	27	87
Seiko Epson				23	13	44	71	94
Sharp	11	16	34	32	28	55	130	344
Sony			4	4	12	39	56	103
Toshiba	80	142	221	396	297	479	679	1,516
Others	19	33	52	6	3			
European Companies	63	101	192	329	221	200	235	464
Austria Mikro Systeme							2	4
Eurosil	3	2	2					
Inmos	4	26	58	146	83	69	43	53
Matra-Harris	5	8	10	15	15	16	13	28
NEDL						4	5	5
Philips	24	26	27	32	35	14	18	35
SGS Thomson	13	12	15	22	24	52	95	185
Siemens	10	20	29	45	26	31	52	150
STC			26	31	8	10	6	2
Thomson	4	7	25	38	30			
Others						4	1	2
Rest of World Companies		2	12	19	38	77	211	795
Erso			4	7	5	3	5	
Gold Star					1			27
Hyundai						4	30	106
Samsung				3	21	65	170	650
United Microelectronics		1	5	6	8	5	6	12
Others		1	3	3	3			

Source: Dataquest  
July 1989

# Final Market Share Estimates

**Table 15**

**Worldwide Semiconductor Market  
MOS Microdevices Market Share Estimates  
(Millions of Dollars)**

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	1,084	1,318	1,979	3,229	2,745	3,489	5,108	7,144
North American Companies	688	801	1,162	1,873	1,543	1,707	2,663	3,872
Advanced Micro Devices	17	28	58	203	86	117	178	183
Analog Devices							12	20
AT&T						45	50	39
California Micro Devices							1	1
Chips & Technologies						31	87	130
Commodore	3							
Cypress Semiconductor Corp.								7
EXEL					1			
Fairchild	24	23	24	17	10			
General Instrument	11	20	9	7	8	9		
GE Solid State						27	41	48
Gould AMI Semiconductors	9	12	9	8	7	6		
GTE Microcircuits				1	5		1	
Harris	2	8	26	52	58	42	44	62
Hughes	1	2	2	3	3	2	2	2
IMI								1
Integrated Device Technology					1	2	5	15
Intel	216	258	358	743	670	628	1,087	1,835
Intersil	4	5	6	5	19			
ITT	1	3	8	10	11	13	21	15
LSI Logic								18
Microchip Technology							19	18
Mostek	26	28	42	55	20			
Motorola	124	128	210	291	272	342	520	699
National Semiconductor	70	63	75	115	106	122	140	150
NCR			6	10	9	10	8	6
RCA	14	18	27	34	28			
Rockwell	10	18	25	32	26	40	46	51
Sierra Semiconductor							1	1
Standard Microsystems	10	16	30	50	40	43	36	34
Synertek	11	16	29	15				
Texas Instruments	80	95	135	117	88	92	169	234
VLSI Technology							18	54
Weitek						17	21	35
Western Digital	6	7	8	12	11	50	70	100
Zilog	39	44	70	88	59	64	75	90
Zymos							4	17
Others	10	7	5	5	5	5	7	7
Japanese Companies	359	467	720	1,154	1,030	1,547	2,096	2,817
Fujitsu	48	60	85	121	106	120	146	202
Hitachi	50	66	85	120	110	228	402	525
Matsushita	45	48	88	119	111	167	199	230
Mitsubishi	20	25	54	156	122	205	267	381
NEC	142	166	237	411	375	478	566	790
OKI	2	6	19	46	45	68	101	134
Ricoh						11	14	19
Rohm			1	2	1	2	3	16
Sanyo		5	23	35	36	44	53	70
Seiko Epson				1			6	12
Sharp			45	62	46	26	34	54
Sony	25	29	25	25		17	21	37
Toshiba	8	30	45	70	69	180	283	346
Others	19	32	13	11	9	1	1	1

(Continued)

# Final Market Share Estimates

**Table 15 (Continued)**

**Worldwide Semiconductor Market  
MOS Microdevices Market Share Estimates  
(Millions of Dollars)**

European Companies	33	46	90	191	156	215	310	401
Eurosil	1	2	2	2	2	4	3	2
Ferranti		2	2	1				
Inmos					2	11	48	57
Matra-Harris	1	5	1	11	12	18	19	21
MEDL							1	1
Philips	17	18	45	104	64	85	100	114
SGS Thomson	6	10	24	31	20	80	95	118
Siemens	4	3	6	19	15	17	44	88
Thomson	4	6	10	23	40			
Rest of World Companies	4	4	7	11	16	20	39	54
Erso					1	1	2	
Gold Star				1	2	1	1	4
Samsung							8	15
United Microelectronics			1	4	7	18	28	35
Others	4	4	6	6	6			

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 16

## Worldwide Semiconductor Market MOS Logic Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	1,644	1,573	2,253	3,493	3,540	4,815	6,309	8,152
North American Companies	841	778	1,131	1,723	1,572	2,079	2,516	3,046
Advanced Micro Devices	6	6	5	19	37	72	81	92
Altera					4	12	21	37
AMCC								1
AT&T						225	225	317
California Micro Devices							3	4
Commodore	22	8						
Cypress Semiconductor Corp.						8	19	34
Exar				2	2	3	4	4
Fairchild	25	20	19	24	8			
General Instrument	59	41	37	21	17	14		
GE Solid State	3	2	3	4	6	172	169	192
Gould AMI Semiconductors	90	90	111	127	121	138	77	86
GTE Microcircuits	1	5	11	2	4	3	3	
Harris	28	20	16	18	23	26	26	33
Holt				3	7	12		
Honeywell					7	27	72	74
Hughes	17	16	20	25	29	35	39	45
IMI				10	12	7	13	14
IHP			14	28	25	32	42	47
Integrated Device Technology				3	1	4	8	21
Intel	28	33	37	43	40	42	60	101
Interdesign			7	8	7			
Intersil	5	5	12	15				
ITT	29	33	47	70	79	94	125	135
Lattice						2	9	20
LSI Logic		4	29	84	140	197	262	357
Microchip Technology							11	11
Micro Power Systems		2	2	16	17			
Monolithic Memories					2			
Mostek	34	40	58	62	30			
Motorola	142	140	254	362	296	335	381	464
National Semiconductor	68	62	110	205	162	176	195	200
NCR		6	16	48	56	68	102	120
Raytheon							1	2
RCA	67	58	78	136	106			
Rockwell	25	22	16	16	16	24	126	123
SEEQ				3	5	5	13	14
Sierra Semiconductor						5	11	23
Siliconix	12	5	4	4	3	5	7	3
Solid State Scientific	32	30	23	34				
Solitron	2	2	2	2				
Sprague					26	16	14	16
Standard Microsystems	9	10	12	20	14	11	5	7
Supertex	3	4	5	9	7	9		
Synertek	5	4	20	15				
Teledyne	9	2	2	16	2	2	2	
Texas Instruments	70	55	66	102	85	112	170	203
TRW						6	7	5
Universal				7	9	10	6	6
VLSI Technology		5	16	45	61	88	131	151
VTC					7	11	17	19
Waferscale						3	8	10
Western Digital	21	23	39	56	45	3		
Xilinx						4	11	27
Zymos			10	22	17	18	22	10
Others	29	25	30	37	37	43	18	18

(Continued)

# Final Market Share Estimates

Table 16 (Continued)

## Worldwide Semiconductor Market MOS Logic Market Share Estimates (Millions of Dollars)

Japanese Companies	589	576	812	1,295	1,473	2,046	2,916	4,080
Fuji Electric	4	4	4	5	6	7	14	31
Fujitsu	25	30	43	105	113	170	234	347
Hitachi	38	35	53	76	81	106	195	246
Matsushita	37	32	43	84	100	150	302	415
Mitsubishi	45	31	35	15	55	50	53	106
NEC	111	147	206	290	329	544	602	843
New JRC						3	13	27
OKI	44	41	77	120	128	213	272	354
Ricoh						28	33	40
Rohm			1	3	4	6	10	30
Sanyo	23	23	27	31	31	39	70	142
Seiko Epson				91	80	103	154	190
Sharp	46	55	67	103	99	112	148	284
Sony			16	34	47	58	67	95
Toshiba	162	140	192	304	370	455	631	777
Yamaha							116	151
Others	54	38	48	34	31	2	2	2
European Companies	198	188	246	392	401	549	705	819
ASEA-Brown Boveri	5	7	7	13	18	22	26	28
Austria Mikro Systeme							27	36
Ericsson							11	6
ES2							7	13
Eurosil	11	11	11	18	19	28	22	27
Ferranti	4	11	9	11	6	10		
Matra-Harris			2	7	9	8	11	22
MEDL	8	9	12	16	20	17	21	23
Mietec							32	42
Philips	59	55	83	130	129	213	224	253
Plessey	11	14	19	26	35	37	51	76
Rifa	1	1	1	2	3	4		
SBS Thomson	14	23	29	49	44	117	154	158
Siemens	51	41	45	62	50	41	75	89
STC			4	7	8	8	6	8
Telefunken Electronic	11	5	8	13	13	18	23	20
Thomson	22	10	15	32	37			
Others	1	1	1	6	10	26	15	18
Rest of World Companies	16	31	64	83	94	141	172	207
Daewoo								2
Erso			17	23	19	15	22	
Gold Star					2	4	19	32
Hyundai						14		
Samsung		10	13	22	34	52	64	100
United Microelectronics		4	17	17	18	46	57	59
Others	16	17	17	21	21	10	10	14
SWAG for ROW Companies								

Source: Dataquest  
July 1989

# Final Market Share Estimates

**Table 17 (Continued)**

**Worldwide Semiconductor Market  
Analog Market Share Estimates  
(Millions of Dollars)**

Japanese Companies	1,266	1,123	1,559	1,843	1,932	2,809	3,520	4,090
Fuji Electric	8	10	20	24	13	26	28	33
Fujitsu	18	18	26	40	42	75	151	151
Hitachi	119	106	130	179	189	265	310	343
Matsushita	176	154	194	287	305	379	376	423
Mitsubishi	75	63	69	102	106	195	305	395
NEC	165	156	192	290	300	360	542	469
New JRC						72	95	118
OKI	2	1	2	3	3	14	21	23
Rohm	32	32	46	91	99	178	235	271
Sanken	18	19	25	47	53	81	119	157
Sanyo	113	106	183	220	228	296	377	471
Seiko Epson						18	14	15
Sharp	14	15	18	24	28	43	55	69
Sony			50	84	96	167	217	386
Toshiba	130	101	134	228	235	373	476	569
Others	396	341	470	224	235	267	199	197
European Companies	381	411	478	609	577	754	1,001	1,147
Austria Mikro Systeme							3	4
Ericsson							16	46
Ferranti	16	23	21	27	23	24		
Matra-Harris				4	2	2	2	
Philips	192	193	195	235	208	327	439	466
Plessey	17	17	18	22	24	27	64	67
Rifa						3		
SGS Thomson	63	76	99	141	126	227	282	352
Siemens	38	40	62	69	72	82	120	120
STC								4
Telefunken Electronic	27	31	43	50	55	61	72	85
Thomson	27	30	39	60	66			
Others	1	1	1	1	1	1	3	3
Rest of World Companies	7	13	18	34	56	79	106	168
Daewoo							1	5
Ersa				2	1	1	1	
Gold Star				10	18	30	26	41
KEC		3	4	5	8	10	20	25
Samsung		2	5	8	20	28	49	85
Others	7	8	9	9	9	10	9	12

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 17

## Worldwide Semiconductor Market Analog Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
Total Market	2,886	2,849	3,734	4,888	4,766	6,478	7,654	8,880
North American Companies	1,232	1,302	1,679	2,402	2,201	2,836	3,027	3,475
Advanced Micro Devices	23	25	21	30	61	64	72	66
Analog Devices	89	101	145	218	226	243	280	340
AT&T						282	216	247
Burr-Brown				71	78	113	120	144
California Micro Devices							20	23
Cherry Semiconductor	6	10	10	12	11	19	29	33
Exar				36	30	36	38	40
Fairchild	79	77	90	140	100			
General Instrument	11	12	13	20	19	15		
GE Solid State						127	125	120
GTE Microcircuits		1	3	19	18	19	20	
Harris	35	47	64	96	93	113	139	146
Holt				7	5		9	9
Honeywell							26	27
IMI						5		
Interdesign			18	20	18			
Intersil	40	36	54	55	50			
ITT	32	34	34	45	50	61	51	64
Linear Technology			4	16	19	29	43	59
Maxim							22	35
Micro Linear							12	24
Micro Power Systems		11	17	10	11	32	23	26
Mitel				35	29	33	39	43
Motorola	166	163	195	270	234	282	339	425
National Semiconductor	256	255	374	433	370	497	495	540
Precision Monolithics	34	40	50	70	64	73	78	85
Raytheon	20	20	30	36	28	27	25	27
RCA	76	70	72	93	65			
Rockwell						59		
Sierra Semiconductor						3	12	23
Siliconix	23	30	36	50	60	62	63	67
Silicon General							25	35
Silicon Systems	13	16	28	64	51	75	88	125
Solitron	2	2	2	4	8	12	13	13
Sprague	35	37	40	57	74	85	78	86
Supertex							10	11
Teledyne	2	11	14	2	11	20	30	33
Texas Instruments	215	235	296	409	335	352	386	426
TRW	20	31	43	50	39	18	18	20
Unirode		2	4	9	8	16	23	51
Universal							2	4
VTC					11	16	27	27
Xicor							3	3
Others	55	36	22	25	25	48	28	28

(Continued)

# Final Market Share Estimates

Table 18

## Worldwide Semiconductor Market Total Discrete Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	.....	-----	-----	.....	-----	-----	.....	.....
Total Market	3,981	3,553	3,865	4,986	4,579	5,730	6,655	7,612
North American Companies	1,612	1,467	1,493	1,822	1,647	1,943	2,051	2,171
Acrian	2	17	18	21	18	13	15	21
AT&T						247	200	161
Communications Transistor	10							
Fairchild	76	62	64	66	39			
General Instrument	74	73	85	130	100	115	132	164
General Motors	13							
GE Solid State	101	85	94	104	92	139	146	145
Hewlett-Packard	22	24	30	40	40	52	57	57
Honeywell							10	10
International Rectifier	84	80	81	115	128	125	151	192
Intersil	9	9	2	11	8			
ITT	96	100	95	125	130	144	160	146
Motorola	451	419	482	607	532	604	652	752
National Semiconductor	43	44	40	45	37	64	75	75
Powerex						94	106	115
Raytheon	17	18	20	22	28	15	12	15
RCA	94	79	74	88	76			
Siliconix	25	25	30	43	47	45	45	61
Solid State Scientific								
Solitron	24	24	29	31	30	30	34	33
Sprague	5	9	15	27	13	14	17	18
Supertex	3	3	4	3	5	8	9	10
Teledyne	4	4	3	3				
Texas Instruments	150	90	48	59	56	58	64	63
TRW	58	51	34	29	36	43	49	
Univode	70	71	77	97	81	66	46	62
VQSI	31	28	27	27	22	17	21	21
Westinghouse	59	53	58	52	52			
Others	91	99	83	77	77	50	50	50
Japanese Companies	1,618	1,364	1,678	2,330	2,100	2,745	3,376	4,056
Fuji Electric	93	80	90	132	126	163	206	279
Fujitsu	25	23	32	40	37	53	70	82
Hitachi	275	240	331	430	393	476	625	707
Matsushita	181	146	188	247	227	266	318	377
Mitsubishi	109	94	119	185	140	221	227	310
NEC	291	263	293	379	351	426	518	571
New JRC						7	10	8
OKI	5	4	3	4	4	6	7	9
Rohm	61	48	74	112	110	171	200	287
Sanken	72	62	67	109	97	133	162	207
Sanyo	47	64	58	105	103	159	210	210
Sony			16	34	42	62	72	112
Toshiba	304	217	272	418	368	556	703	864
Others	155	123	135	135	102	46	48	33

(Continued)



# Final Market Share Estimates

**Table 18 (Continued)**

**Worldwide Semiconductor Market  
Total Discrete Market Share Estimates  
(Millions of Dollars)**

European Companies	741	686	642	764	767	968	1,125	1,250
ASEA-Brown Boveri	4	5	4	5	5	36	69	76
Brown-Boveri	24	24	20	25	29			
Fagor								27
Ferranti	14	14	17	20	20	18		
MEDL	11	12	13	15	15	18	20	22
Philips	219	208	204	217	232	298	390	432
Pihler	8	6	5	6	10	7		
Plessey							22	25
Semikron	29	34	36	40	48	72	79	91
SGS Thomson	50	49	53	72	60	199	213	254
Siemens	146	131	114	150	140	215	218	201
STC			4	2	1			1
TAG	21	21	17	20	18	18	21	23
Telefunken Electronic	82	82	53	60	61	82	86	91
Thomson	121	88	96	127	123			
Others	12	12	6	5	5	5	7	7
Rest of World Companies	10	36	52	70	65	74	103	135
Gold Star				3	3	1	1	1
KEC		11	20	30	32	38	55	65
Samsung		15	22	27	20	25	37	55
Others	10	10	10	10	10	10	10	14

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 19

## Worldwide Semiconductor Market Transistor Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	2,000	1,803	1,946	2,465	2,269	2,802	3,383	3,908
North American Companies	824	748	734	876	809	895	951	991
Acrian	2	17	18	21	18	13	15	21
AT&T						32	27	20
Communications Transistor	10							
Fairchild	35	28	24	22	12			
General Instrument								
General Motors	11							
GE Solid State	33	35	32	33	27	102	98	106
Hewlett-Packard	13	11	10	11	14	18	18	18
International Rectifier	14	18	20	34	43	45	51	63
Intersil	9	9	2	11	8			
ITT	21	24	26	36	38	53	57	45
Motorola	296	276	308	374	321	361	390	450
National Semiconductor	43	44	40	45	37	33	40	41
Powerex						5	11	15
Raytheon	17	18	20	16	23	15	12	15
RCA	74	61	59	70	62			
Siliconix	25	25	30	43	47	45	45	61
Solid State Scientific								
Solitron	16	16	20	21	20	25	29	28
Sprague	5	9	13	13	13	12	13	13
Supertex	3	3	4	3	5	8	9	10
Teledyne	4	4	3	3				
Texas Instruments	115	80	45	57	54	58	64	63
TRW	58	51	34	28	36	43	49	
Unitrode	9	10	15	15	11	7	3	2
Westinghouse	1	1	1	5	5			
Others	10	8	10	15	15	20	20	20
Japanese Companies	820	702	854	1,153	1,035	1,410	1,827	2,243
Fuji Electric	14	13	17	31	29	40	57	98
Fujitsu	25	23	32	40	37	53	70	82
Hitachi	108	90	123	155	137	173	232	271
Matsushita	110	94	122	157	140	191	240	285
Mitsubishi	39	33	38	56	64	94	89	114
NEC	171	153	162	205	179	216	338	384
OKI	5	4	1					
Rohm	29	20	31	74	76	117	134	206
Saniken	29	27	30	44	38	43	48	61
Sanyo	33	46	51	84	84	109	151	170
Sony			14	8	7	16	19	35
Toshiba	157	108	133	200	173	325	415	512
Others	100	91	100	99	71	33	34	25

(Continued)

# Final Market Share Estimates

**Table 19 (Continued)**

**Worldwide Semiconductor Market  
Transistor Market Share Estimates  
(Millions of Dollars)**

European Companies	351	322	311	371	365	428	507	551
ASEA-Brown Boveri							1	1
Brown-Boveri	7	6	6	7	8			
Ferranti	7	7	9	11	11	7		
MEDL	2	3	3	3	3	4	5	6
Philips	132	126	124	131	142	169	233	248
Piher	5	4	3	4	7	5		
Plessey							9	10
Semikron								1
SGS Thomson	50	49	53	72	60	96	113	142
Siemens	68	60	52	68	64	115	117	111
Telefunken Electronic	29	29	20	22	23	30	26	29
Thomson	45	33	38	50	44			
Others	6	5	3	3	3	2	3	3
Rest of World Companies	5	31	47	65	60	69	98	123
Gold Star				3	3	1	1	1
KEC		11	20	30	32	38	55	60
Samsung		15	22	27	20	25	37	55
Others	5	5	5	5	5	5	5	7

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 20

## Worldwide Semiconductor Market Diode Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
Total Market	1,408	1,247	1,362	1,805	1,636	1,923	2,176	2,474
North American Companies	571	544	583	731	644	686	728	767
AT&T						49	41	31
Fairchild	41	34	40	43	27			
General Instrument	74	73	85	130	100	115	132	164
General Motors	2							
GE Solid State	23	14	12	13	12	8	8	7
Hewlett-Packard	9	13	20	29	26	34	39	39
Honeywell							10	10
International Rectifier	47	42	41	58	62	54	64	75
ITT	64	67	69	89	92	91	103	67
Motorola	121	113	133	167	155	176	182	214
National Semiconductor						31	35	34
Powerex						33	30	30
RCA	2	2	3	3	3			
Solid State Scientific								
Solitron	8	8	9	10	10	5	5	5
Sprague			2	14		2	2	3
Teledyne								
Texas Instruments	25	5						
TRW				1				
Unitrode	52	51	56	74	62	51	36	47
VQSI	31	28	27	27	22	17	21	21
Westinghouse	22	20	22	20	20			
Others	50	74	64	53	53	20	20	20
Japanese Companies	567	458	561	819	732	926	1,106	1,285
Fuji Electric	45	33	39	60	57	79	97	117
Hitachi	135	120	164	213	194	235	315	343
Matsushita	55	38	52	68	60	71	78	92
Mitsubishi	22	19	15	23	3	4	5	5
NEC	84	77	88	114	105	132	118	123
New JRC						1	10	8
Rohm	27	19	29	38	34	54	66	81
Sanken	35	29	31	65	59	90	114	146
Sanyo	11	15	7	21	19	25	28	32
Sony			2	26	35	46	53	77
Toshiba	112	80	106	163	142	179	211	256
Others	41	28	29	28	24	10	11	5

(Continued)

# Final Market Share Estimates

**Table 20 (Continued)**

**Worldwide Semiconductor Market  
Diode Market Share Estimates  
(Millions of Dollars)**

European Companies	265	240	213	250	255	306	337	410
ASEA-Brown Boveri						11	15	16
Brown-Boveri	9	10	7	8	9			
Fagor								27
Ferranti	7	7	8	9	9	11		
MEDL	4	4	4	4	4	5	5	5
Philips	80	76	74	78	81	119	137	159
Piher	2	1	1	1	2	1		
Plessey							13	15
Semikron	10	12	12	14	18	28	30	35
SGS Thomson						36	44	68
Siemens	53	48	41	54	50	56	57	50
STC								1
Telefunken Electronic	38	38	22	24	24	37	34	32
Thomson	59	40	43	57	57			
Others	3	4	1	1	1	2	2	2
Rest of World Companies	5	5	5	5	5	5	5	12
KEC								5
Others	5	5	5	5	5	5	5	7

Source: Dataquest  
July 1989

# Final Market Share Estimates

**Table 21**

**Worldwide Semiconductor Market  
Thyristor Market Share Estimates  
(Millions of Dollars)**

	1981	1982	1983	1984	1985	1986	1987	1988
	-----	-----	-----	-----	-----	-----	-----	-----
<b>Total Market</b>	<b>362</b>	<b>313</b>	<b>314</b>	<b>368</b>	<b>394</b>	<b>439</b>	<b>500</b>	<b>567</b>
<b>North American Companies</b>	<b>157</b>	<b>131</b>	<b>140</b>	<b>147</b>	<b>134</b>	<b>129</b>	<b>147</b>	<b>161</b>
GE Solid State	34	26	32	35	32	8	8	3
International Rectifier	23	20	20	23	23	19	27	32
ITT								
Motorola	27	23	26	33	27	32	34	39
Powerex						56	65	70
Raytheon								
RCA	18	16	12	15	11			
Texas Instruments	6	3	2	1	1			
Unitorde	7	8	4	4	4	4	3	7
Westinghouse	36	32	35	27	27			
Others	6	3	9	9	9	10	10	10
<b>Japanese Companies</b>	<b>106</b>	<b>87</b>	<b>89</b>	<b>118</b>	<b>152</b>	<b>169</b>	<b>168</b>	<b>198</b>
Fuji Electric	2	2	2	3	3	2	3	3
Hitachi	16	11	17	22	22	25	29	36
Matsushita	5	4	4	5	4			
Mitsubishi	29	25	15	23	37	56	54	61
NEC	21	19	21	28	29	34	15	16
Sanken	8	6	6					
Toshiba	21	16	19	30	51	50	65	80
Others	4	4	5	7	6	2	2	2
<b>European Companies</b>	<b>99</b>	<b>95</b>	<b>85</b>	<b>103</b>	<b>108</b>	<b>141</b>	<b>185</b>	<b>208</b>
ASEA-Brown Boveri	2	3	2	2	2	19	43	48
Brown-Boveri	5	5	5	7	9			
MEDL	3	3	3	4	4	9	10	11
Philips	6	5	5	6	9	7	10	12
Pihler	1	1	1	1	1	1		
Semikron	11	13	14	15	17	22	26	29
SGS Thomson						27	28	44
Siemens	23	20	18	24	22	27	27	21
TAG	19	20	16	18	18	18	21	23
Telefunken Electronic	13	13	10	12	12	11	19	19
Thomson	16	12	11	14	14			
Others							1	1

Source: Dataquest  
July 1989

# Final Market Share Estimates

**Table 22**

**Worldwide Semiconductor Market  
Other Discrete Market Share Estimates  
(Millions of Dollars)**

	1981	1982	1983	1984	1985	1986	1987	1988
<b>Total Market</b>	<b>211</b>	<b>190</b>	<b>243</b>	<b>348</b>	<b>279</b>	<b>566</b>	<b>596</b>	<b>663</b>
<b>North American Companies</b>	<b>60</b>	<b>44</b>	<b>36</b>	<b>68</b>	<b>60</b>	<b>233</b>	<b>225</b>	<b>252</b>
AT&T						166	132	110
Fairchild				1				
GE Solid State	11	10	18	23	21	21	32	29
International Rectifier						7	9	22
ITT	11	9						34
Motorola	7	7	15	33	29	35	46	49
National Semiconductor								
Raytheon				6	5			
RCA								
Sprague							2	2
Texas Instruments	4	2	1	1	1			
Unitrode	2	2	2	4	4	4	4	6
Others	25	14						
<b>Japanese Companies</b>	<b>125</b>	<b>117</b>	<b>174</b>	<b>240</b>	<b>180</b>	<b>240</b>	<b>275</b>	<b>330</b>
Fuji Electric	32	32	32	38	38	42	49	61
Hitachi	16	19	27	40	39	43	49	57
Matsushita	11	10	10	17	23	4		
Mitsubishi	19	17	51	83	35	67	79	130
NEC	15	15	22	32	38	44	47	48
New JRC						6		
OKI			2	4	4	6	7	9
Rohm	5	8	14					
Sanyo	3	3				25	31	8
Toshiba	14	13	14	25	2	2	12	16
Others	10		1	1	1	1	1	1
<b>European Companies</b>	<b>26</b>	<b>29</b>	<b>33</b>	<b>40</b>	<b>39</b>	<b>93</b>	<b>96</b>	<b>81</b>
ASEA-Brown Boveri	2	2	2	3	3	6	10	11
Brown-Boveri	3	3	2	3	3			
MEDL	2	2	3	4	4			
Philips	1	1	1	2		3	10	13
Semikron	8	9	10	11	13	22	23	26
SGS Thomson						40	28	
Siemens	2	3	3	4	4	17	17	19
STC			4	2	1			
TAG	2	1	1	2				
Telefunken Electronic	2	2	1	2	2	4	7	11
Thomson	1	3	4	6	8			
Others	3	3	2	1	1	1	1	1

Source: Dataquest  
July 1989

# Final Market Share Estimates

Table 23

## Worldwide Semiconductor Market Total Optoelectronic Market Share Estimates (Millions of Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988
Total Market	797	822	972	1,221	1,213	1,486	1,709	2,179
North American Companies	388	389	372	445	405	373	383	425
AT&T						6	7	10
Fairchild	16	15	7	4	2			
General Instrument	40	37	43	51	38	34	28	
GE Solid State	17	15	18	28	20	32	16	21
Hewlett-Packard	70	78	100	142	166	166	186	213
Honeywell	18	20	24	27	31	35	30	30
International Rectifier	2	2	3					
ITT	1							
Litronix	22	23						
Monsanto								
Motorola	9	9	15	19	17	18	24	24
National Semiconductor	13	9	10	15	6			
Quality Technologies								40
RCA	7	9	12	11	9			
Spectronics								
Texas Instruments	70	60	55	50	33	34	39	41
TRW	36	34	41	64	46	38	43	36
Others	67	78	44	34	37	10	10	10
Japanese Companies	327	338	494	626	636	905	1,093	1,511
Fuji Electric	5	7	9	12	10	7	4	3
Fujitsu	15	15	35	52	43	62	71	105
Hitachi	30	30	34	52	42	42	47	70
Matsushita	29	31	45	89	84	115	145	178
Mitsubishi		2	2	13	18	29	26	27
NEC	21	22	27	34	30	45	55	88
New JRC						9	11	15
OKI	5	4	10	15	14	18	25	36
Rohm	13	13	19	29	34	56	70	109
Sanken	9	9	11	6	6	10	13	19
Sanyo	31	31	46	45	40	49	85	62
Sharp	62	77	115	116	127	197	223	285
Sony			9	13	55	115	138	217
Toshiba	76	69	98	108	96	109	132	215
Others	31	28	34	42	37	42	48	82
European Companies	82	93	103	146	169	206	230	238
ASEA-Brown Boveri	1	1	3	4	5	6	8	9
Ericsson							2	
Philips	19	19	19	18	25	35	26	25
Plessey	3	3	3	7	10	16	17	22
Rifa						2		
Siemens	36	38	41	70	75	77	85	100
Telefunken Electronic	18	25	30	38	41	58	77	74
Thomson					4			
Others	5	7	7	9	9	12	15	8
Rest of World Companies		2	3	4	3	2	3	5
KEC		1	2	3	2	2	3	5
Others		1	1	1	1			

Source: Dataquest  
July 1989

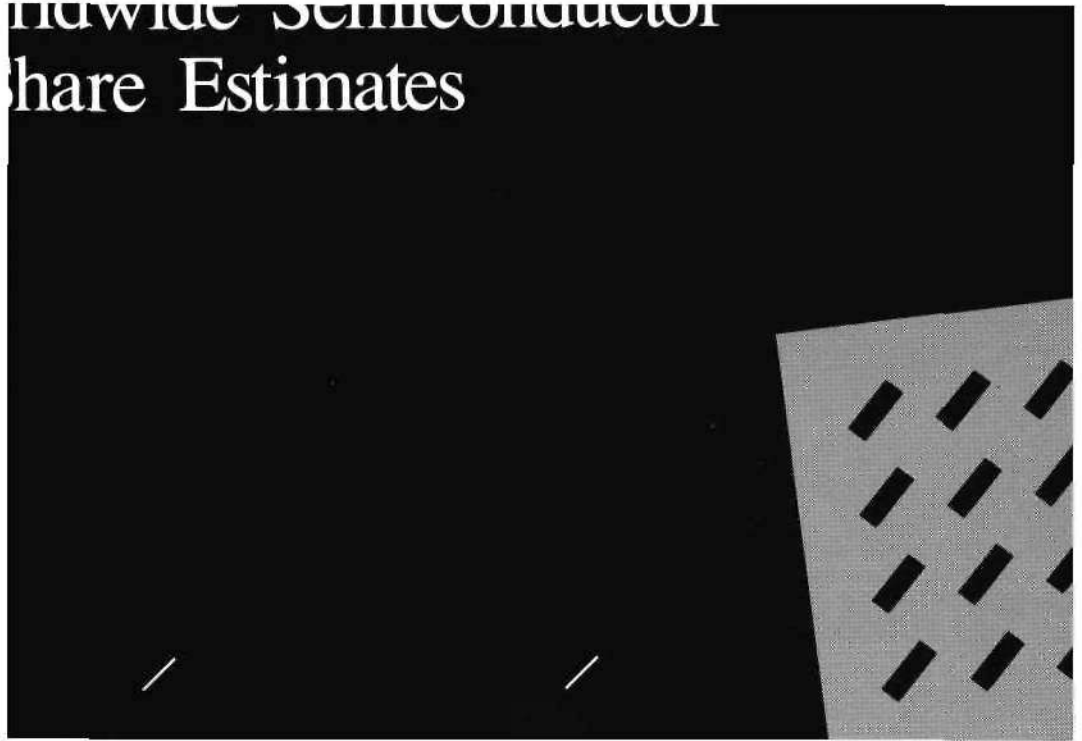


# Final Market Share Estimates

## NOTES TO MARKET SHARE TABLES

1. Beginning in 1986, revenue for Advanced Micro Devices (AMD) and Monolithic Memories Inc. (MMI) is combined under AMD.
2. Beginning in 1986, revenue for Fairchild and National Semiconductor is combined under National Semiconductor.
3. Beginning in 1986, revenue for SGS and Thomson is combined under SGS-Thomson.
4. Plessey revenue includes Ferranti revenue from 1987 onward.
5. Philips revenue includes Signetics revenue.
6. Beginning in 1986, GE, RCA, and Intersil revenue is consolidated as GE Solid State.
7. Beginning in 1986, revenue for Exel is included under Exar.
8. Beginning in 1986, revenue for Mostek is included under SGS-Thomson.
9. VQSI was formerly known as Varo.
10. ASEA Brown Boveri includes Brown Boveri revenue from 1987 onward.
11. Ericsson was known as Rifa prior to March 1, 1988.
12. Powerex revenue includes Westinghouse revenue from 1986 onward.

# Global Semiconductor Share Estimates



# Final Worldwide Semiconductor Market Share Estimates

*May 1990*

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**Dataquest**

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# *Final Worldwide Semiconductor Market Share Estimates*

These market share estimates provide our final estimates of 1989. The tables cover history for the period 1987 to 1989 for the major categories of semiconductors.

## **Background**

An integral part of Dataquest's Semiconductor Industry Service database is analyzing the semiconductor markets by estimating each manufacturer's market share. These analyses provide insights into semiconductor markets and reinforce estimates of consumption, production, and company revenue that were made using other data. An index of all tables is included for easy reference. Information on further product detail may be requested through the client inquiry privilege.

The semiconductor market is divided among North American companies, Japanese companies, European companies, and Asia/Pacific companies, based on the location of their main offices. All of the major companies are included in this database.

The totals given for each company reflect worldwide production. For example, although Texas Instruments manufactures semiconductors in many parts of the world, its entire production is included under the North American companies market share section. In contrast, some, but not all, foreign-owned subsidiaries are included in the North American totals and not in the total of the parent company location. For example, Exar, a subsidiary of the Japanese company Rohm, is included as a North American company. On the other hand, revenue for Signetics is included under Philips, a European company. The total for North American companies, therefore, is not the same as for North American semiconductor production.

## **Merchant versus Captive Consumption**

Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. The data excludes totally captive sup-

pliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

## *Hybrid Circuits*

Hybrid integrated circuits, while primarily a special packaging arrangement, are included in Table 15, under Analog ICs. Only those hybrids are included that are made in the division or other organization whose primary product is semiconductors. Several major manufacturers also manufacture hybrids in other divisions; where we have identified these manufacturers, they are excluded. A split between monolithics and hybrid analog circuits is available through the client inquiry service.

## *Exchange Rate Conventions*

Estimates of Japanese consumption or factory shipments use the exchange rate (dollar/yen) for the given year. Refer to Table 0 for the exchange rates used. In viewing the year-to-year Japanese market growth rate, one must consider the different exchange rates in effect during the year. For the European market, the value of shipments is estimated directly in dollars.

## **Data Sources**

In both the United States and Europe, there is no official body—government organization, industry association, or trade publication—that maintains complete or even near-complete statistics on the semiconductor industry. In Japan, some statistics are kept by MITI. We believe that the estimates presented here are the most accurate and meaningful generally available today. The sources of the data presented in the tables are as follows:

- Revenue published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons

- Government data or trade association data such as those from WSTS, MITI, and EIA
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant projected world economic data

## Need for Careful Interpretation

Construction of the tables involves combining data from many countries, each of which has different and changing exchange rates. Dataquest uses average

exchange rates for each year and, as far as possible, the estimates are prepared in terms of local currencies before conversion to U.S. dollars or yen.

Despite the care taken in gathering and analyzing the available data and in attempting to categorize those data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in these tables. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between these data and those provided by others.

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## Yen per U.S. Dollar Exchange Rates

Year	Exchange Rate
1987	144
1988	130
1989	138

Source: International Monetary Fund  
Far Eastern Economic Review  
Dataquest  
May 1990

## Notes to Market Share Tables

1. ABB-HAFO was formerly known as ASEA Brown Boveri.
2. ABB-IXYS was formerly the West German-based power semiconductor division of ASEA Brown Boveri.
3. Ericsson was known as Rifa prior to March 1, 1988.
4. Harris revenue includes GE Solid State revenue from 1989 onward.
5. Inmos revenue is included in SGS-Thomson revenue from 1989 onward.
6. Matra MHS was formerly known as Matra-Harris Semiconducteurs.
7. Philips revenue includes Signetics revenue.
8. Plessey revenue includes Ferranti revenue from 1987 onward.
9. SGS-Thomson revenue includes Inmos revenue from 1989 onward.
10. Thomson Composants Militaires et Spatiaux (TMS) revenue was formerly included in SGS-Thomson (30 percent) and the Other European Companies category (70 percent).
11. VQSI was formerly known as Varo.
12. Micro Quality Semiconductor was formerly known as VQSL.
13. In 1989 AT&T revenue, previously classified as MOS logic, has been reclassified as microcomponent.
14. In 1989, Rockwell revenue previously classified as MOS logic has been reclassified as analog.
15. Prior to 1989, Sanyo revenue was understated.
16. Collection of BiCMOS revenue data began in 1987.



Table 1

**Worldwide Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	38,251	50,859	57,213	100.0%	100.0%	100.0%
<b>North American Companies</b>	14,930	18,586	19,978	39.0%	36.5%	34.9%
Acrian	15	21	26	0	0	0
Actel	NA	NA	7	NA	NA	0
Advanced Micro Devices	986	1,084	1,100	2.6%	2.1%	1.9%
Altera	21	37	59	0.1%	0.1%	0.1%
Analog Devices	292	360	357	0.8%	0.7%	0.6%
Applied Micro Circuits Corp.	27	28	22	0.1%	0.1%	0
AT&T	802	859	873	2.1%	1.7%	1.5%
Atmel	NA	NA	94	NA	NA	0.2%
Bipolar Integrated Technology	2	6	1	0	0	0
Brooktree	NA	NA	52	NA	NA	0.1%
Burr-Brown	120	144	141	0.3%	0.3%	0.2%
California Micro Devices	24	28	30	0.1%	0.1%	0.1%
Catalyst	2	5	31	0	0	0.1%
Cherry Semiconductor	29	33	32	0.1%	0.1%	0.1%
Chips & Technologies	112	160	240	0.3%	0.3%	0.4%
Cirrus Logic	NA	NA	29	NA	NA	0.1%
Comlinear	NA	NA	10	NA	NA	0
Crystal	NA	NA	12	NA	NA	0
Cypress Semiconductor	76	135	196	0.2%	0.3%	0.3%
Elantec	NA	NA	12	NA	NA	0
Exar	44	47	49	0.1%	0.1%	0.1%
General Electric	520	555	0	1.4%	1.1%	0
General Instrument	160	164	170	0.4%	0.3%	0.3%
Gennum	NA	NA	20	NA	NA	0
Gould AMI	85	101	117	0.2%	0.2%	0.2%
GTE Microcircuits	24	0	0	0.1%	0	0
Harris	275	329	830	0.7%	0.6%	1.5%
Hewlett-Packard	243	270	269	0.6%	0.5%	0.5%
Holt	9	9	9	0	0	0
Honeywell	187	182	56	0.5%	0.4%	0.1%
Hughes	43	47	37	0.1%	0.1%	0.1%
IC Sensors	NA	NA	7	NA	NA	0
IMI	13	15	15	0	0	0
Inova	NA	NA	21	NA	NA	0
Integrated CMOS Systems	NA	NA	11	NA	NA	0

(Continued)

Table 1 (Continued)  
 Worldwide Semiconductor Market  
 Total Semiconductor Market Share Estimates  
 Sales by Manufacturers  
 (Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
North American Companies (Continued)						
Integrated Device Technology	98	171	204	0.3%	0.3%	0.4%
Intel	1,491	2,350	2,430	3.9%	4.6%	4.2%
International CMOS Technology	NA	NA	9	NA	NA	0
Int'l. Microelectronic Prod.	42	47	53	0.1%	0.1%	0.1%
International Rectifier	151	192	190	0.4%	0.4%	0.3%
ITT	357	360	390	0.9%	0.7%	0.7%
Kulite	NA	NA	25	NA	NA	0
Lattice	13	22	31	0	0	0.1%
Linear Technology	43	59	70	0.1%	0.1%	0.1%
LSI Logic	262	375	512	0.7%	0.7%	0.9%
Macronix	NA	NA	31	NA	NA	0.1%
Maxim	22	35	43	0.1%	0.1%	0.1%
Micro Linear	12	24	28	0	0	0
Micro Power Systems	23	26	21	0.1%	0.1%	0
Micro Quality Semiconductor	0	0	2	0	0	0
Microchip Technology	89	111	124	0.2%	0.2%	0.2%
Micron Technology	115	331	395	0.3%	0.7%	0.7%
Mitel	39	43	54	0.1%	0.1%	0.1%
MOSel	1	12	20	0	0	0
Motorola	2,434	3,035	3,319	6.4%	6.0%	5.8%
National Semiconductor	1,506	1,650	1,618	3.9%	3.2%	2.8%
NCR	116	132	120	0.3%	0.3%	0.2%
Optek	NA	NA	77	NA	NA	0.1%
Performance Semiconductor	NA	NA	32	NA	NA	0.1%
Powerex	106	115	105	0.3%	0.2%	0.2%
Precision Monolithics	78	85	88	0.2%	0.2%	0.2%
Quality Technologies	NA	40	38	NA	0.1%	0.1%
Raytheon	89	99	96	0.2%	0.2%	0.2%
Rockwell	172	174	165	0.4%	0.3%	0.3%
Saratoga Semiconductor	4	10	10	0	0	0
SEEQ Technology	50	60	53	0.1%	0.1%	0.1%
Sierra Semiconductor	24	47	55	0.1%	0.1%	0.1%
Silicon General	25	35	36	0.1%	0.1%	0.1%
Silicon Systems	88	125	112	0.2%	0.2%	0.2%
Siliconix	115	131	121	0.3%	0.3%	0.2%
Sipex	NA	NA	22	NA	NA	0
Solitron	47	46	37	0.1%	0.1%	0.1%
Sprague	109	120	137	0.3%	0.2%	0.2%

(Continued)

Table 1 (Continued)

**Worldwide Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Standard Microsystems	41	41	42	0.1%	0.1%	0.1%
Supertex	19	21	23	0	0	0
Teledyne	33	35	23	0.1%	0.1%	0
Texas Instruments	2,127	2,741	2,787	5.6%	5.4%	4.9%
TRW	117	61	27	0.3%	0.1%	0
Unitrode	69	113	109	0.2%	0.2%	0.2%
Universal	8	10	13	0	0	0
Vitellic	10	40	66	0	0.1%	0.1%
VLSI Technology	172	221	286	0.4%	0.4%	0.5%
VQSI	21	21	0	0.1%	0	0
VTC Inc.	44	46	44	0.1%	0.1%	0.1%
WaferScale Integration	20	35	35	0.1%	0.1%	0.1%
Weitek	21	35	49	0.1%	0.1%	0.1%
Western Digital	70	100	135	0.2%	0.2%	0.2%
Xicor	63	90	90	0.2%	0.2%	0.2%
Xilinx	11	27	44	0	0.1%	0.1%
Zilog	75	90	99	0.2%	0.2%	0.2%
ZyMOS	26	27	37	0.1%	0.1%	0.1%
Other North American Companies	151	151	261	0.4%	0.3%	0.5%
<b>Japanese Companies</b>						
Fuji Electric	252	346	362	0.7%	0.7%	0.6%
Fujitsu	1,801	2,607	2,963	4.7%	5.1%	5.2%
Hitachi	2,618	3,506	3,974	6.8%	6.9%	6.9%
Matsushita	1,457	1,883	1,882	3.8%	3.7%	3.3%
Mitsubishi	1,492	2,312	2,579	3.9%	4.5%	4.5%
NEC	3,368	4,543	5,015	8.8%	8.9%	8.8%
New JRC	130	169	171	0.3%	0.3%	0.3%
NMB Semiconductor	104	199	247	0.3%	0.4%	0.4%
Oki Semiconductor	651	947	1,154	1.7%	1.9%	2.0%
Ricoh	65	85	91	0.2%	0.2%	0.2%
Rohm	518	721	740	1.4%	1.4%	1.3%
Sanken	294	383	387	0.8%	0.8%	0.7%
Sanyo	851	1,083	1,365	2.2%	2.1%	2.4%
Seiko-Epson	245	311	368	0.6%	0.6%	0.6%
Sharp	590	1,036	1,230	1.5%	2.0%	2.1%
Sony	571	950	1,077	1.5%	1.9%	1.9%

(Continued)

Table 1 (Continued)

**Worldwide Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Toshiba	3,029	4,395	4,930	7.9%	8.6%	8.6%
Yamaha	116	151	143	0.3%	0.3%	0.2%
Other Japanese Companies	298	315	1,131	0.8%	0.6%	2.0%
<b>European Companies</b>						
ABB-HAFO	103	113	37	0.3%	0.2%	0.1%
ABB-LXYS	0	0	50	0	0	0.1%
Austria Mikro Systeme	32	44	56	0.1%	0.1%	0.1%
Ericsson	41	52	54	0.1%	0.1%	0.1%
European Silicon Structures	7	13	18	0	0	0
Eurosil	25	29	30	0.1%	0.1%	0.1%
Fagor	NA	27	29	NA	0.1%	0.1%
Inmos	91	110	0	0.2%	0.2%	0
Matra MHS	48	71	85	0.1%	0.1%	0.1%
MEDL	47	51	60	0.1%	0.1%	0.1%
Mietec	32	42	52	0.1%	0.1%	0.1%
Philips	1,602	1,738	1,716	4.2%	3.4%	3.0%
Plessey	222	284	240	0.6%	0.6%	0.4%
Semikron	79	91	95	0.2%	0.2%	0.2%
SGS-Thomson	859	1,087	1,301	2.2%	2.1%	2.3%
Siemens	657	784	1,194	1.7%	1.5%	2.1%
STC	12	22	19	0	0	0
TAG	21	23	22	0.1%	0	0
Telefunken Electronic	273	289	299	0.7%	0.6%	0.5%
TMS	NA	NA	45	NA	NA	0.1%
Other European Companies	49	47	41	0.1%	0.1%	0.1%
<b>Asia/Pacific Companies</b>						
Daewoo	1	7	10	0	0	0
ERSO	30	0	0	0.1%	0	0
Hyundai	30	106	210	0.1%	0.2%	0.4%
Korean Electronic Co.	78	95	105	0.2%	0.2%	0.2%
Samsung	328	905	1,260	0.9%	1.8%	2.2%
United Microelectronics	91	106	210	0.2%	0.2%	0.4%
Other Asia/Pacific Companies	44	58	40	0.1%	0.1%	0.1%

NA = Not available

Source: Dataquest  
May 1990

Table 2

**Worldwide Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	29,887	41,068	46,924	100.0%	100.0%	100.0%
North American Companies	12,496	15,990	17,400	41.8%	38.9%	37.1%
Actel	NA	NA	7	NA	NA	0
Advanced Micro Devices	986	1,084	1,100	3.3%	2.6%	2.3%
Altera	21	37	59	0.1%	0.1%	0.1%
Analog Devices	292	360	357	1.0%	0.9%	0.8%
Applied Micro Circuits Corp.	27	28	22	0.1%	0.1%	0
AT&T	595	688	716	2.0%	1.7%	1.5%
Atmel	NA	NA	94	NA	NA	0.2%
Bipolar Integrated Technology	2	6	1	0	0	0
Brooktree	NA	NA	52	NA	NA	0.1%
Burr-Brown	120	144	141	0.4%	0.4%	0.3%
California Micro Devices	24	28	30	0.1%	0.1%	0.1%
Catalyst	2	5	31	0	0	0.1%
Cherry Semiconductor	29	33	32	0.1%	0.1%	0.1%
Chips & Technologies	112	160	240	0.4%	0.4%	0.5%
Cirrus Logic	NA	NA	29	NA	NA	0.1%
Conlinear	NA	NA	10	NA	NA	0
Crystal	NA	NA	12	NA	NA	0
Cypress Semiconductor	76	135	196	0.3%	0.3%	0.4%
Elantec	NA	NA	12	NA	NA	0
Exar	44	47	49	0.1%	0.1%	0.1%
General Electric	358	389	0	1.2%	0.9%	0
Gennum	NA	NA	20	NA	NA	0
Gould AMI	85	101	117	0.3%	0.2%	0.2%
GTE Microcircuits	24	0	0	0.1%	0	0
Harris	275	329	692	0.9%	0.8%	1.5%
Holt	9	9	9	0	0	0
Honeywell	147	142	25	0.5%	0.3%	0.1%
Hughes	43	47	37	0.1%	0.1%	0.1%
IC Sensors	NA	NA	7	NA	NA	0
IMI	13	15	15	0	0	0
Inova	NA	NA	21	NA	NA	0
Integrated CMOS Systems	NA	NA	11	NA	NA	0
Integrated Device Technology	98	171	204	0.3%	0.4%	0.4%
Intel	1,491	2,350	2,430	5.0%	5.7%	5.2%
International CMOS Technology	NA	NA	9	NA	NA	0

(Continued)

Table 2 (Continued)

**Worldwide Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Int'l. Microelectronic Prod.	42	47	53	0.1%	0.1%	0.1%
International Rectifier	0	0	3	0	0	0
ITT	197	214	235	0.7%	0.5%	0.5%
Kulite	NA	NA	25	NA	NA	0.1%
Lattice	13	22	31	0	0.1%	0.1%
Linear Technology	43	59	70	0.1%	0.1%	0.1%
LSI Logic	262	375	512	0.9%	0.9%	1.1%
Macronix	NA	NA	31	NA	NA	0.1%
Maxim	22	35	43	0.1%	0.1%	0.1%
Micro Linear	12	24	28	0	0.1%	0.1%
Micro Power Systems	23	26	21	0.1%	0.1%	0
Microchip Technology	89	111	124	0.3%	0.3%	0.3%
Micron Technology	115	331	395	0.4%	0.8%	0.8%
Mitel	39	43	54	0.1%	0.1%	0.1%
MOSel	1	12	20	0	0	0
Motorola	1,758	2,259	2,519	5.9%	5.5%	5.4%
National Semiconductor	1,431	1,575	1,548	4.8%	3.8%	3.3%
NCR	116	132	120	0.4%	0.3%	0.3%
Performance Semiconductor	NA	NA	32	NA	NA	0.1%
Precision Monolithics	78	85	88	0.3%	0.2%	0.2%
Raytheon	77	84	82	0.3%	0.2%	0.2%
Rockwell	172	174	165	0.6%	0.4%	0.4%
Saratoga Semiconductor	4	10	10	0	0	0
SEEQ Technology	50	60	53	0.2%	0.1%	0.1%
Sierra Semiconductor	24	47	55	0.1%	0.1%	0.1%
Silicon General	25	35	36	0.1%	0.1%	0.1%
Silicon Systems	88	125	112	0.3%	0.3%	0.2%
Siliconix	70	70	54	0.2%	0.2%	0.1%
Sipex	NA	NA	22	NA	NA	0
Solitron	13	13	10	0	0	0
Sprague	92	102	114	0.3%	0.2%	0.2%
Standard Microsystems	41	41	42	0.1%	0.1%	0.1%
Supertex	10	11	15	0	0	0
Teledyne	33	35	23	0.1%	0.1%	0
Texas Instruments	2,024	2,637	2,691	6.8%	6.4%	5.7%
TRW	25	25	27	0.1%	0.1%	0.1%
Unitrode	23	51	50	0.1%	0.1%	0.1%

(Continued)

Table 2 (Continued)

**Worldwide Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Universal	8	10	13	0	0	0
Vitellic	10	40	66	0	0.1%	0.1%
VLSI Technology	172	221	286	0.6%	0.5%	0.6%
VTC Inc.	44	46	44	0.1%	0.1%	0.1%
WaferScale Integration	20	35	35	0.1%	0.1%	0.1%
Weitek	21	35	49	0.1%	0.1%	0.1%
Western Digital	70	100	135	0.2%	0.2%	0.3%
Xicor	63	90	90	0.2%	0.2%	0.2%
Xilinx	11	27	44	0	0.1%	0.1%
Zilog	75	90	99	0.3%	0.2%	0.2%
ZyMOS	26	27	37	0.1%	0.1%	0.1%
Other North American Companies	91	91	202	0.3%	0.2%	0.4%
<b>Japanese Companies</b>						
Fuji Electric	42	64	74	0.1%	0.2%	0.2%
Fujitsu	1,660	2,420	2,738	5.6%	5.9%	5.8%
Hitachi	1,946	2,729	3,218	6.5%	6.6%	6.9%
Matsushita	994	1,328	1,244	3.3%	3.2%	2.7%
Mitsubishi	1,239	1,975	2,185	4.1%	4.8%	4.7%
NEC	2,795	3,884	4,321	9.4%	9.5%	9.2%
New JRC	109	146	154	0.4%	0.4%	0.3%
NMB Semiconductor	104	199	247	0.3%	0.5%	0.5%
Oki Semiconductor	619	902	1,111	2.1%	2.2%	2.4%
Ricoh	65	85	91	0.2%	0.2%	0.2%
Rohm	248	325	343	0.8%	0.8%	0.7%
Sanken	119	157	156	0.4%	0.4%	0.3%
Sanyo	556	811	975	1.9%	2.0%	2.1%
Seiko-Epson	245	311	368	0.8%	0.8%	0.8%
Sharp	367	751	902	1.2%	1.8%	1.9%
Sony	361	621	732	1.2%	1.5%	1.6%
Toshiba	2,194	3,316	3,774	7.3%	8.1%	8.0%
Yamaha	116	151	143	0.4%	0.4%	0.3%
Other Japanese Companies	202	200	1,024	0.7%	0.5%	2.2%
<b>European Companies</b>						
ABB-HAFO	26	28	23	0.1%	0.1%	0
Austria Mikro Systeme	32	44	56	0.1%	0.1%	0.1%

(Continued)

Table 2 (Continued)

**Worldwide Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>European Companies (Continued)</b>						
Ericsson	39	52	54	0.1%	0.1%	0.1%
European Silicon Structures	7	13	18	0	0	0
Eurosil	25	29	30	0.1%	0.1%	0.1%
Inmos	91	110	0	0.3%	0.3%	0
Matra MHS	48	71	85	0.2%	0.2%	0.2%
MEDL	27	29	39	0.1%	0.1%	0.1%
Mietec	32	42	52	0.1%	0.1%	0.1%
Philips	1,186	1,281	1,250	4.0%	3.1%	2.7%
Plessey	183	237	240	0.6%	0.6%	0.5%
SGS-Thomson	646	833	1,019	2.2%	2.0%	2.2%
Siemens	354	483	847	1.2%	1.2%	1.8%
STC	12	21	17	0	0.1%	0
Telefunken Electronic	110	124	126	0.4%	0.3%	0.3%
TMS	NA	NA	33	NA	NA	0.1%
Other European Companies	27	32	26	0.1%	0.1%	0.1%
	565	1,274	1,809	1.9%	3.1%	3.9%
<b>Asia/Pacific Companies</b>						
Daewoo	1	7	10	0	0	0
ERSO	30	0	0	0.1%	0	0
Goldstar	68	136	147	0.2%	0.3%	0.3%
Hyundai	30	106	210	0.1%	0.3%	0.4%
Korean Electronic Co.	20	25	24	0.1%	0.1%	0.1%
Samsung	291	850	1,182	1.0%	2.1%	2.5%
United Microelectronics	91	106	210	0.3%	0.3%	0.4%
Other Asia/Pacific Companies	34	44	26	0.1%	0.1%	0.1%

NA = Not available

Source: Dataquest  
May 1990



Table 3

**Worldwide Semiconductor Market  
Bipolar Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>4,760</b>	<b>5,200</b>	<b>4,510</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>North American Companies</b>	<b>2,589</b>	<b>2,761</b>	<b>2,221</b>	<b>54.4%</b>	<b>53.1%</b>	<b>49.2%</b>
Advanced Micro Devices	500	536	474	10.5%	10.3%	10.5%
Applied Micro Circuits Corp.	27	27	20	0.6%	0.5%	0.4%
AT&T	79	61	56	1.7%	1.2%	1.2%
Atmel	NA	NA	8	NA	NA	0.2%
Bipolar Integrated Technology	2	6	1	0	0.1%	0
Chips & Technologies	25	30	24	0.5%	0.6%	0.5%
Harris	30	62	50	0.6%	1.2%	1.1%
Honeywell	44	27	0	0.9%	0.5%	0
Intel	18	22	10	0.4%	0.4%	0.2%
Motorola	429	435	369	9.0%	8.4%	8.2%
National Semiconductor	521	550	458	10.9%	10.6%	10.2%
Raytheon	51	55	55	1.1%	1.1%	1.2%
Teledyne	1	2	3	0	0	0.1%
Texas Instruments	854	940	671	17.9%	18.1%	14.9%
TRW	0	0	7	0	0	0.2%
Other North American Companies	8	8	15	0.2%	0.2%	0.3%
<b>Japanese Companies</b>	<b>1,540</b>	<b>1,791</b>	<b>1,755</b>	<b>32.4%</b>	<b>34.4%</b>	<b>38.9%</b>
Fujitsu	495	653	617	10.4%	12.6%	13.7%
Hitachi	463	501	479	9.7%	9.6%	10.6%
Matsushita	26	30	14	0.5%	0.6%	0.3%
Mitsubishi	122	127	125	2.6%	2.4%	2.8%
NEC	247	292	302	5.2%	5.6%	6.7%
New JRC	1	1	1	0	0	0
Oki Semiconductor	32	38	48	0.7%	0.7%	1.1%
Sanyo	29	41	67	0.6%	0.8%	1.5%
Toshiba	125	108	102	2.6%	2.1%	2.3%
<b>European Companies</b>	<b>594</b>	<b>598</b>	<b>502</b>	<b>12.5%</b>	<b>11.5%</b>	<b>11.1%</b>
Ericsson	12	0	0	0.3%	0	0
Matra MHS	3	0	0	0.1%	0	0
Philips	405	413	306	8.5%	7.9%	6.8%
Plessey	68	94	122	1.4%	1.8%	2.7%
SGS-Thomson	20	20	7	0.4%	0.4%	0.2%
Siemens	63	36	54	1.3%	0.7%	1.2%

(Continued)

Table 3 (Continued)

**Worldwide Semiconductor Market  
Bipolar Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>European Companies (Continued)</b>						
STC	0	7	4	0	0.1%	0.1%
Telefunken Electronic	15	19	5	0.3%	0.4%	0.1%
Other European Companies	8	9	4	0.2%	0.2%	0.1%
	37	50	32	0.8%	1.0%	0.7%
<b>Asia/Pacific Companies</b>						
Goldstar	22	32	32	0.5%	0.6%	0.7%
Other Asia/Pacific Companies	15	18	0	0.3%	0.3%	0

NA = Not available

Source: Dataquest  
May 1990

Table 4

**Worldwide Semiconductor Market  
TTL/Other Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	3,791	4,071	3,402	100.0%	100.0%	100.0%
North American Companies	2,230	2,359	1,791	58.8%	57.9%	52.6%
Advanced Micro Devices	495	524	401	13.1%	12.9%	11.8%
AT&T	62	48	44	1.6%	1.2%	1.3%
Chips & Technologies	25	30	24	0.7%	0.7%	0.7%
Harris	30	62	50	0.8%	1.5%	1.5%
Intel	18	22	10	0.5%	0.5%	0.3%
Motorola	250	233	184	6.6%	5.7%	5.4%
National Semiconductor	449	450	357	11.8%	11.1%	10.5%
Raytheon	46	48	47	1.2%	1.2%	1.4%
Teledyne	1	2	3	0	0	0.1%
Texas Instruments	854	940	671	22.5%	23.1%	19.7%
Japanese Companies	1,075	1,208	1,176	28.4%	29.7%	34.6%
Fujitsu	233	317	294	6.1%	7.8%	8.6%
Hitachi	356	376	357	9.4%	9.2%	10.5%
Matsushita	19	21	10	0.5%	0.5%	0.3%
Mitsubishi	122	127	125	3.2%	3.1%	3.7%
NEC	160	184	195	4.2%	4.5%	5.7%
New JRC	1	1	1	0	0	0
NMB Semiconductor	1	1	0	0	0	0
Oki Semiconductor	29	35	43	0.8%	0.9%	1.3%
Sanyo	29	41	67	0.8%	1.0%	2.0%
Toshiba	125	105	84	3.3%	2.6%	2.5%
European Companies	451	454	403	11.9%	11.2%	11.8%
Ericsson	12	0	0	0.3%	0	0
Matra MHS	3	0	0	0.1%	0	0
Philips	380	393	290	10.0%	9.7%	8.5%
Plessey	5	8	82	0.1%	0.2%	2.4%
SGS-Thomson	19	20	7	0.5%	0.5%	0.2%
Siemens	11	8	16	0.3%	0.2%	0.5%
Telefunken Electronic	15	19	5	0.4%	0.5%	0.1%
Other European Companies	6	6	3	0.2%	0.1%	0.1%
Asia/Pacific Companies	35	50	32	0.9%	1.2%	0.9%
Goldstar	20	32	32	0.5%	0.8%	0.9%
Other Asia/Pacific Companies	15	18	0	0.4%	0.4%	0

Source: Dataquest  
May 1990

Table 5

**Worldwide Semiconductor Market  
ECL Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	970	1,130	1,108	100.0%	100.0%	100.0%
North American Companies	359	402	430	37.0%	35.6%	38.8%
Advanced Micro Devices	5	12	73	0.5%	1.1%	6.6%
Applied Micro Circuits Corp.	27	27	20	2.8%	2.4%	1.8%
AT&T	17	13	12	1.8%	1.2%	1.1%
Atmel	NA	NA	8	NA	NA	0.7%
Bipolar Integrated Technology	2	6	1	0.2%	0.5%	0.1%
Honeywell	44	27	0	4.5%	2.4%	0
Motorola	179	202	185	18.5%	17.9%	16.7%
National Semiconductor	72	100	101	7.4%	8.8%	9.1%
Raytheon	5	7	8	0.5%	0.6%	0.7%
TRW	0	0	7	0	0	0.6%
Other North American Companies	8	8	15	0.8%	0.7%	1.4%
Japanese Companies	466	584	579	48.0%	51.7%	52.3%
Fujitsu	262	336	323	27.0%	29.7%	29.2%
Hitachi	107	125	122	11.0%	11.1%	11.0%
Matsushita	7	9	4	0.7%	0.8%	0.4%
NEC	87	108	107	9.0%	9.6%	9.7%
Oki Semiconductor	3	3	5	0.3%	0.3%	0.5%
Toshiba	0	3	18	0	0.3%	1.6%
European Companies	143	144	99	14.7%	12.7%	8.9%
Philips	25	20	16	2.6%	1.8%	1.4%
Plessey	63	86	40	6.5%	7.6%	3.6%
SGS-Thomson	1	0	0	0.1%	0	0
Siemens	52	28	38	5.4%	2.5%	3.4%
STC	0	7	4	0	0.6%	0.4%
Other European Companies	2	3	1	0.2%	0.3%	0.1%
Asia/Pacific Companies	2	0	0	0.2%	0	0
Goldstar	2	0	0	0.2%	0	0

NA = Not available

Source: Dataquest  
May 1990

Table 6

**Worldwide Semiconductor Market  
Bipolar Digital Memory Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	621	689	540	100.0%	100.0%	100.0%
North American Companies	246	213	167	39.6%	30.9%	30.9%
Advanced Micro Devices	120	104	85	19.3%	15.1%	15.7%
AT&T	1	0	0	0.2%	0	0
Harris	6	3	0	1.0%	0.4%	0
Motorola	10	7	4	1.6%	1.0%	0.7%
National Semiconductor	45	35	56	7.2%	5.1%	10.4%
Raytheon	14	14	12	2.3%	2.0%	2.2%
Texas Instruments	50	50	10	8.1%	7.3%	1.9%
Japanese Companies	306	417	326	49.3%	60.5%	60.4%
Fujitsu	178	254	190	28.7%	36.9%	35.2%
Hitachi	95	119	111	15.3%	17.3%	20.6%
NEC	33	44	25	5.3%	6.4%	4.6%
European Companies	69	59	47	11.1%	8.6%	8.7%
Matra MHS	3	0	0	0.5%	0	0
Philips	61	58	47	9.8%	8.4%	8.7%
Siemens	4	0	0	0.6%	0	0
Other European Companies	1	1	0	0.2%	0.1%	0

Source: Dataquest  
May 1990

Table 7

**Worldwide Semiconductor Market  
Bipolar Digital Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	4,139	4,511	3,970	100.0%	100.0%	100.0%
<b>North American Companies</b>	2,343	2,548	2,054	56.6%	56.5%	51.7%
Advanced Micro Devices	380	432	389	9.2%	9.6%	9.8%
Applied Micro Circuits Corp.	27	27	20	0.7%	0.6%	0.5%
AT&T	78	61	56	1.9%	1.4%	1.4%
Atmel	NA	NA	8	NA	NA	0.2%
Bipolar Integrated Technology	2	6	1	0	0.1%	0
Chips & Technologies	25	30	24	0.6%	0.7%	0.6%
Harris	24	59	50	0.6%	1.3%	1.3%
Honeywell	44	27	0	1.1%	0.6%	0
Intel	18	22	10	0.4%	0.5%	0.3%
Motorola	419	428	365	10.1%	9.5%	9.2%
National Semiconductor	476	515	402	11.5%	11.4%	10.1%
Raytheon	37	41	43	0.9%	0.9%	1.1%
Teledyne	1	2	3	0	0	0.1%
Texas Instruments	804	890	661	19.4%	19.7%	16.6%
TRW	0	0	7	0	0	0.2%
Other North American Companies	8	8	15	0.2%	0.2%	0.4%
<b>Japanese Companies</b>	1,234	1,374	1,429	29.8%	30.5%	36.0%
Fujitsu	317	399	427	7.7%	8.8%	10.8%
Hitachi	368	382	368	8.9%	8.5%	9.3%
Matsushita	26	30	14	0.6%	0.7%	0.4%
Mitsubishi	122	127	125	2.9%	2.8%	3.1%
NEC	214	248	277	5.2%	5.5%	7.0%
New JRC	1	1	1	0	0	0
Oki Semiconductor	32	38	48	0.8%	0.8%	1.2%
Sanyo	29	41	67	0.7%	0.9%	1.7%
Toshiba	125	108	102	3.0%	2.4%	2.6%
<b>European Companies</b>	525	539	455	12.7%	11.9%	11.5%
Ericsson	12	0	0	0.3%	0	0
Philips	344	355	259	8.3%	7.9%	6.5%
Plessey	68	94	122	1.6%	2.1%	3.1%
SGS-Thomson	20	20	7	0.5%	0.4%	0.2%
Siemens	59	36	54	1.4%	0.8%	1.4%

(Continued)

Table 7 (Continued)

Worldwide Semiconductor Market  
Bipolar Digital Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
European Companies (Continued)						
STC	0	7	4	0	0.2%	0.1%
Telefunken Electronic	15	19	5	0.4%	0.4%	0.1%
Other European Companies	7	8	4	0.2%	0.2%	0.1%
	37	50	32	0.9%	1.1%	0.8%
Asia/Pacific Companies						
Goldstar	22	32	32	0.5%	0.7%	0.8%
Other Asia/Pacific Companies	15	18	0	0.4%	0.4%	0

NA = Not available

Source: Dataquest  
May 1990

Table 8

**Worldwide Semiconductor Market  
MOS Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	17,473	26,988	33,024	100.0%	100.0%	100.0%
North American Companies	6,880	9,754	11,277	39.4%	36.1%	34.1%
Actel	NA	NA	7	NA	NA	0
Advanced Micro Devices	414	482	549	2.4%	1.8%	1.7%
Altera	21	37	59	0.1%	0.1%	0.2%
Analog Devices	12	20	20	0.1%	0.1%	0.1%
Applied Micro Circuits Corp.	0	1	2	0	0	0
AT&T	300	380	411	1.7%	1.4%	1.2%
Atmel	NA	NA	73	NA	NA	0.2%
California Micro Devices	4	5	8	0	0	0
Catalyst	2	5	31	0	0	0.1%
Chips & Technologies	87	130	216	0.5%	0.5%	0.7%
Cirrus Logic	NA	NA	29	NA	NA	0.1%
Cypress Semiconductor	76	135	196	0.4%	0.5%	0.6%
Exar	6	7	3	0	0	0
General Electric	233	269	0	1.3%	1.0%	0
Gould AMI	85	101	101	0.5%	0.4%	0.3%
GTE Microcircuits	4	0	0	0	0	0
Harris	106	121	362	0.6%	0.4%	1.1%
Honeywell	77	88	4	0.4%	0.3%	0
Hughes	43	47	37	0.2%	0.2%	0.1%
IMI	13	15	15	0.1%	0.1%	0
Inova	NA	NA	21	NA	NA	0.1%
Integrated CMOS Systems	NA	NA	11	NA	NA	0
Integrated Device Technology	98	171	203	0.6%	0.6%	0.6%
Intel	1,473	2,328	2,420	8.4%	8.6%	7.3%
International CMOS Technology	NA	NA	9	NA	NA	0
Int'l. Microelectronic Prod.	42	47	33	0.2%	0.2%	0.1%
ITT	146	150	185	0.8%	0.6%	0.6%
Lattice	13	22	31	0.1%	0.1%	0.1%
LSI Logic	262	375	512	1.5%	1.4%	1.6%
Macronix	NA	NA	31	NA	NA	0.1%
Microchip Technology	89	111	124	0.5%	0.4%	0.4%
Micron Technology	115	331	395	0.7%	1.2%	1.2%
MOSel	1	12	20	0	0	0.1%
Motorola	990	1,399	1,705	5.7%	5.2%	5.2%

(Continued)



Table 8 (Continued)

Worldwide Semiconductor Market  
MOS Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
North American Companies (Continued)						
National Semiconductor	415	485	532	2.4%	1.8%	1.6%
NCR	116	132	94	0.7%	0.5%	0.3%
Performance Semiconductor	NA	NA	32	NA	NA	0.1%
Raytheon	1	2	0	0	0	0
Rockwell	172	174	42	1.0%	0.6%	0.1%
Saratoga Semiconductor	4	10	10	0	0	0
SEEQ Technology	50	60	53	0.3%	0.2%	0.2%
Sierra Semiconductor	12	24	27	0.1%	0.1%	0.1%
Siliconix	7	3	0	0	0	0
Sprague	14	16	16	0.1%	0.1%	0
Standard Microsystems	41	41	42	0.2%	0.2%	0.1%
Teledyne	2	0	0	0	0	0
Texas Instruments	784	1,271	1,603	4.5%	4.7%	4.9%
TRW	7	5	5	0	0	0
Universal	6	6	9	0	0	0
Vitellic	10	40	66	0.1%	0.1%	0.2%
VLSI Technology	172	221	286	1.0%	0.8%	0.9%
VTC Inc.	17	19	17	0.1%	0.1%	0.1%
WaferScale Integration	20	35	35	0.1%	0.1%	0.1%
Weitek	21	35	49	0.1%	0.1%	0.1%
Western Digital	70	100	135	0.4%	0.4%	0.4%
Xicor	60	87	87	0.3%	0.3%	0.3%
Xilinx	11	27	44	0.1%	0.1%	0.1%
Zilog	75	90	99	0.4%	0.3%	0.3%
ZyMOS	26	27	37	0.1%	0.1%	0.1%
Other North American Companies	55	55	134	0.3%	0.2%	0.4%
Japanese Companies						
Fuji Electric	14	31	31	0.1%	0.1%	0.1%
Fujitsu	1,014	1,616	1,958	5.8%	6.0%	5.9%
Hitachi	1,173	1,885	2,407	6.7%	7.0%	7.3%
Matsushita	592	875	854	3.4%	3.2%	2.6%
Mitsubishi	812	1,453	1,676	4.6%	5.4%	5.1%
NEC	2,006	3,123	3,604	11.5%	11.6%	10.9%
New JRC	13	27	34	0.1%	0.1%	0.1%
NMB Semiconductor	104	199	247	0.6%	0.7%	0.7%

(Continued)

Table 8 (Continued)

**Worldwide Semiconductor Market  
MOS Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Oki Semiconductor	566	841	1,028	3.2%	3.1%	3.1%
Ricoh	65	85	91	0.4%	0.3%	0.3%
Rohm	13	54	66	0.1%	0.2%	0.2%
Sanyo	150	299	378	0.9%	1.1%	1.1%
Seiko-Epson	231	296	354	1.3%	1.1%	1.1%
Sharp	312	682	837	1.8%	2.5%	2.5%
Sony	144	235	371	0.8%	0.9%	1.1%
Toshiba	1,593	2,639	3,100	9.1%	9.8%	9.4%
Yamaha	116	151	130	0.7%	0.6%	0.4%
Other Japanese Companies	3	3	840	0	0	2.5%
<b>European Companies</b>						
ABB-HAFO	26	28	23	0.1%	0.1%	0.1%
Austria Mikro Systeme	29	40	47	0.2%	0.1%	0.1%
Ericsson	11	6	7	0.1%	0	0
European Silicon Structures	7	13	18	0	0	0.1%
Eurosil	25	29	30	0.1%	0.1%	0.1%
Inmos	91	110	0	0.5%	0.4%	0
Matra MHS	43	71	85	0.2%	0.3%	0.3%
MEDL	27	29	35	0.2%	0.1%	0.1%
Mietec	32	42	52	0.2%	0.2%	0.2%
Philips	342	402	422	2.0%	1.5%	1.3%
Plessey	51	76	83	0.3%	0.3%	0.3%
SGS-Thomson	344	461	619	2.0%	1.7%	1.9%
Siemens	171	327	641	1.0%	1.2%	1.9%
STC	12	10	8	0.1%	0	0
Telefunken Electronic	23	20	20	0.1%	0.1%	0.1%
TMS	NA	NA	26	NA	NA	0.1%
Other European Companies	16	20	19	0.1%	0.1%	0.1%
<b>Asia/Pacific Companies</b>						
ERSO	29	0	0	0.2%	0	0
Goldstar	20	63	106	0.1%	0.2%	0.3%
Hyundai	30	106	210	0.2%	0.4%	0.6%
Samsung	242	765	1,066	1.4%	2.8%	3.2%
United Microelectronics	91	106	210	0.5%	0.4%	0.6%
Other Asia/Pacific Companies	10	14	14	0.1%	0.1%	0

NA = Not available

Source: Dataquest  
May 1990

Table 9

**Worldwide Semiconductor Market  
N/PMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>8,482</b>	<b>10,196</b>	<b>10,843</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>North American Companies</b>	<b>3,289</b>	<b>3,997</b>	<b>3,766</b>	<b>38.8%</b>	<b>39.2%</b>	<b>34.7%</b>
Advanced Micro Devices	389	407	327	4.6%	4.0%	3.0%
AT&T	40	52	56	0.5%	0.5%	0.5%
Gould AMI	21	25	101	0.2%	0.2%	0.9%
Harris	15	2	13	0.2%	0	0.1%
Hughes	2	1	1	0	0	0
Intel	1,122	1,251	1,276	13.2%	12.3%	11.8%
Int'l. Microelectronic Prod.	3	4	5	0	0	0
ITT	81	80	80	1.0%	0.8%	0.7%
Macronix	NA	NA	31	NA	NA	0.3%
Microchip Technology	64	68	55	0.8%	0.7%	0.5%
Micron Technology	115	253	298	1.4%	2.5%	2.7%
Motorola	337	450	212	4.0%	4.4%	2.0%
National Semiconductor	90	126	55	1.1%	1.2%	0.5%
NCR	50	57	14	0.6%	0.6%	0.1%
Rockwell	132	136	42	1.6%	1.3%	0.4%
SEEQ Technology	33	34	11	0.4%	0.3%	0.1%
Sprague	7	7	4	0.1%	0.1%	0
Standard Microsystems	36	34	10	0.4%	0.3%	0.1%
Texas Instruments	604	845	1,048	7.1%	8.3%	9.7%
VLSI Technology	25	15	0	0.3%	0.1%	0
Xicor	57	77	68	0.7%	0.8%	0.6%
Zilog	61	68	55	0.7%	0.7%	0.5%
Other North American Companies	5	5	4	0.1%	0	0
<b>Japanese Companies</b>	<b>4,403</b>	<b>5,120</b>	<b>5,886</b>	<b>51.9%</b>	<b>50.2%</b>	<b>54.3%</b>
Fujitsu	735	535	606	8.7%	5.2%	5.6%
Hitachi	471	721	800	5.6%	7.1%	7.4%
Matsushita	312	371	333	3.7%	3.6%	3.1%
Mitsubishi	613	808	908	7.2%	7.9%	8.4%
NEC	1,327	1,140	1,202	15.6%	11.2%	11.1%
Oki Semiconductor	199	304	341	2.3%	3.0%	3.1%
Ricoh	39	40	37	0.5%	0.4%	0.3%
Rohm	0	1	1	0	0	0
Sanyo	37	63	26	0.4%	0.6%	0.2%

(Continued)

Table 9 (Continued)  
 Worldwide Semiconductor Market  
 N/PMOS Market Share Estimates  
 Sales by Manufacturers  
 (Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Sharp	93	187	212	1.1%	1.8%	2.0%
Sony	30	42	52	0.4%	0.4%	0.5%
Toshiba	522	875	926	6.2%	8.6%	8.5%
Yamaha	23	31	43	0.3%	0.3%	0.4%
Other Japanese Companies	2	2	399	0	0	3.7%
	573	708	666	6.8%	6.9%	6.1%
<b>European Companies</b>						
Austria Mikro Systeme	6	8	11	0.1%	0.1%	0.1%
Inmos	11	5	0	0.1%	0	0
Matra MHS	2	4	0	0	0	0
Mietec	0	7	7	0	0.1%	0.1%
Philips	178	175	105	2.1%	1.7%	1.0%
Plessey	10	13	12	0.1%	0.1%	0.1%
SGS-Thomson	187	239	237	2.2%	2.3%	2.2%
Siemens	146	228	260	1.7%	2.2%	2.4%
STC	5	2	2	0.1%	0	0
Telefunken Electronic	23	20	20	0.3%	0.2%	0.2%
TMS	NA	NA	5	NA	NA	0
Other European Companies	5	7	7	0.1%	0.1%	0.1%
	217	371	525	2.6%	3.6%	4.8%
<b>Asia/Pacific Companies</b>						
ERSO	2	0	0	0	0	0
Goldstar	4	7	32	0	0.1%	0.3%
Hyundai	9	33	1	0.1%	0.3%	0
Samsung	173	301	422	2.0%	3.0%	3.9%
United Microelectronics	29	30	70	0.3%	0.3%	0.6%

NA = Not available

Source: Dataquest  
May 1990

Table 10

Worldwide Semiconductor Market  
CMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	8,938	16,584	21,449	100.0%	100.0%	100.0%
	3,556	5,595	7,326	39.8%	33.7%	34.2%
North American Companies						
Actel	NA	NA	7	NA	NA	0
Advanced Micro Devices	25	75	222	0.3%	0.5%	1.0%
Altera	21	37	59	0.2%	0.2%	0.3%
Analog Devices	12	20	20	0.1%	0.1%	0.1%
AT&T	260	328	355	2.9%	2.0%	1.7%
Atmel	NA	NA	73	NA	NA	0.3%
California Micro Devices	4	5	8	0	0	0
Catalyst	2	5	31	0	0	0.1%
Chips & Technologies	87	130	216	1.0%	0.8%	1.0%
Cirrus Logic	NA	NA	29	NA	NA	0.1%
Cypress Semiconductor	76	135	195	0.9%	0.8%	0.9%
Exar	6	7	3	0.1%	0	0
General Electric	227	262	0	2.5%	1.6%	0
Gould AMI	64	76	0	0.7%	0.5%	0
GTE Microcircuits	4	0	0	0	0	0
Harris	91	119	340	1.0%	0.7%	1.6%
Honeywell	77	88	4	0.9%	0.5%	0
Hughes	41	46	36	0.5%	0.3%	0.2%
IMI	13	15	15	0.1%	0.1%	0.1%
Integrated CMOS Systems	NA	NA	11	NA	NA	0.1%
Integrated Device Technology	98	171	202	1.1%	1.0%	0.9%
Intel	351	1,077	1,144	3.9%	6.5%	5.3%
International CMOS Technology	NA	NA	9	NA	NA	0
Int'l. Microelectronic Prod.	39	43	28	0.4%	0.3%	0.1%
ITT	65	70	105	0.7%	0.4%	0.5%
Lattice	13	22	31	0.1%	0.1%	0.1%
LSI Logic	262	374	507	2.9%	2.3%	2.4%
Microchip Technology	5	3	3	0.1%	0	0
Micron Technology	0	0	97	0	0	0.5%
MOSel	1	12	20	0	0.1%	0.1%
Motorola	653	949	1,490	7.3%	5.7%	6.9%
National Semiconductor	325	350	447	3.6%	2.1%	2.1%
NCR	66	75	80	0.7%	0.5%	0.4%
Performance Semiconductor	NA	NA	32	NA	NA	0.1%

(Continued)

Table 10 (Continued)

Worldwide Semiconductor Market  
CMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
North American Companies (Continued)						
Raytheon	1	2	0	0	0	0
Rockwell	40	38	0	0.4%	0.2%	0
SEEQ Technology	17	26	42	0.2%	0.2%	0.2%
Sierra Semiconductor	12	24	27	0.1%	0.1%	0.1%
Siliconix	7	3	0	0.1%	0	0
Sprague	7	9	4	0.1%	0.1%	0
Standard Microsystems	5	7	32	0.1%	0	0.1%
Teledyne	2	0	0	0	0	0
Texas Instruments	180	415	539	2.0%	2.5%	2.5%
TRW	7	5	5	0.1%	0	0
Universal	6	6	9	0.1%	0	0
Vitellic	10	40	66	0.1%	0.2%	0.3%
VLSI Technology	147	206	286	1.6%	1.2%	1.3%
VTC Inc.	17	19	17	0.2%	0.1%	0.1%
WaferScale Integration	20	35	35	0.2%	0.2%	0.2%
Weitek	21	35	49	0.2%	0.2%	0.2%
Western Digital	70	100	135	0.8%	0.6%	0.6%
Xicor	3	10	19	0	0.1%	0.1%
Xilinx	11	27	44	0.1%	0.2%	0.2%
Zilog	14	22	44	0.2%	0.1%	0.2%
ZyMOS	26	27	37	0.3%	0.2%	0.2%
Other North American Companies	45	45	117	0.5%	0.3%	0.5%
Japanese Companies						
Fuji Electric	13	30	25	0.1%	0.2%	0.1%
Fujitsu	279	1,081	1,241	3.1%	6.5%	5.8%
Hitachi	699	1,157	1,454	7.8%	7.0%	6.8%
Matsushita	280	504	521	3.1%	3.0%	2.4%
Mitsubishi	199	645	768	2.2%	3.9%	3.6%
NEC	679	1,965	2,314	7.6%	11.8%	10.8%
New JRC	13	27	34	0.1%	0.2%	0.2%
NMB Semiconductor	104	199	247	1.2%	1.2%	1.2%
Oki Semiconductor	367	537	623	4.1%	3.2%	2.9%
Ricoh	26	45	53	0.3%	0.3%	0.2%
Rohm	13	53	65	0.1%	0.3%	0.3%
Sanyo	113	236	352	1.3%	1.4%	1.6%

(Continued)

Table 10 (Continued)

**Worldwide Semiconductor Market  
CMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Seiko-Epson	231	296	354	2.6%	1.8%	1.7%
Sharp	219	495	625	2.5%	3.0%	2.9%
Sony	114	193	319	1.3%	1.2%	1.5%
Toshiba	1,071	1,764	2,100	12.0%	10.6%	9.8%
Yamaha	93	120	87	1.0%	0.7%	0.4%
Other Japanese Companies	1	1	441	0	0	2.1%
<b>European Companies</b>						
ABB-HAFO	26	28	23	0.3%	0.2%	0.1%
Austria Mikro Systeme	23	32	36	0.3%	0.2%	0.2%
Ericsson	11	6	7	0.1%	0	0
European Silicon Structures	7	13	18	0.1%	0.1%	0.1%
Eurosil	25	29	30	0.3%	0.2%	0.1%
Inmos	80	105	0	0.9%	0.6%	0
Matra MHS	41	67	85	0.5%	0.4%	0.4%
MEDL	27	29	35	0.3%	0.2%	0.2%
Mietec	18	17	22	0.2%	0.1%	0.1%
Philips	164	227	317	1.8%	1.4%	1.5%
Plessey	41	63	71	0.5%	0.4%	0.3%
SGS-Thomson	157	222	372	1.8%	1.3%	1.7%
Siemens	25	99	381	0.3%	0.6%	1.8%
STC	7	6	3	0.1%	0	0
TMS	NA	NA	21	NA	NA	0.1%
Other European Companies	11	13	12	0.1%	0.1%	0.1%
<b>Asia/Pacific Companies</b>						
Daewoo	0	2	0	0	0	0
ERSO	27	0	0	0.3%	0	0
Goldstar	16	56	74	0.2%	0.3%	0.3%
Hyundai	21	73	209	0.2%	0.4%	1.0%
Samsung	69	464	644	0.8%	2.8%	3.0%
United Microelectronics	62	76	140	0.7%	0.5%	0.7%
Other Asia/Pacific Companies	10	14	0	0.1%	0.1%	0

NA = Not available

Source: Dataquest  
May 1990

Table 11

**Worldwide Semiconductor Market  
BiCMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	53	208	732	100.0%	100.0%	100.0%
<b>North American Companies</b>	35	162	185	66.0%	77.9%	25.3%
Applied Micro Circuits Corp.	0	1	2	0	0.5%	0.3%
Cypress Semiconductor	0	0	1	0	0	0.1%
General Electric	6	7	0	11.3%	3.4%	0
Harris	0	0	9	0	0	1.2%
Inova	NA	NA	21	NA	NA	2.9%
Integrated Device Technology	0	0	1	0	0	0.1%
LSI Logic	0	1	5	0	0.5%	0.7%
Microchip Technology	20	40	66	37.7%	19.2%	9.0%
Micron Technology	0	78	0	0	37.5%	0
Motorola	0	0	3	0	0	0.4%
National Semiconductor	0	9	30	0	4.3%	4.1%
Saratoga Semiconductor	4	10	10	7.5%	4.8%	1.4%
Sprague	0	0	8	0	0	1.1%
Texas Instruments	0	11	16	0	5.3%	2.2%
Other North American Companies	5	5	13	9.4%	2.4%	1.8%
<b>Japanese Companies</b>	4	26	497	7.5%	12.5%	67.9%
Fuji Electric	1	1	6	1.9%	0.5%	0.8%
Fujitsu	0	0	111	0	0	15.2%
Hitachi	3	7	153	5.7%	3.4%	20.9%
NEC	0	18	88	0	8.7%	12.0%
Oki Semiconductor	0	0	64	0	0	8.7%
Ricoh	0	0	1	0	0	0.1%
Toshiba	0	0	74	0	0	10.1%
<b>European Companies</b>	14	20	36	26.4%	9.6%	4.9%
Mietec	14	18	23	26.4%	8.7%	3.1%
SGS-Thomson	0	0	10	0	0	1.4%
STC	0	2	3	0	1.0%	0.4%
<b>Asia/Pacific Companies</b>	0	0	14	0	0	1.9%
Other Asia/Pacific Companies	0	0	14	0	0	1.9%

NA = Not available

Source: Dataquest  
May 1990



Table 12

**Worldwide Semiconductor Market  
MOS Memory Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	6,056	11,692	16,361	100.0%	100.0%	100.0%
<b>North American Companies</b>	1,701	2,836	3,688	28.1%	24.3%	22.5%
Advanced Micro Devices	155	207	258	2.6%	1.8%	1.6%
AT&T	25	24	13	0.4%	0.2%	0.1%
Atmel	NA	NA	47	NA	NA	0.3%
Catalyst	2	5	31	0	0	0.2%
Cypress Semiconductor	57	94	149	0.9%	0.8%	0.9%
Exar	2	3	0	0	0	0
General Electric	23	29	0	0.4%	0.2%	0
Gould AMI	8	15	25	0.1%	0.1%	0.2%
Harris	36	26	37	0.6%	0.2%	0.2%
Honeywell	5	14	2	0.1%	0.1%	0
Hughes	2	0	0	0	0	0
Inova	NA	NA	21	NA	NA	0.1%
Integrated Device Technology	85	135	158	1.4%	1.2%	1.0%
Intel	326	392	433	5.4%	3.4%	2.6%
International CMOS Technology	NA	NA	6	NA	NA	0
Int'l. Microelectronic Prod.	0	0	17	0	0	0.1%
ITT	0	0	10	0	0	0.1%
Lattice	4	2	0	0.1%	0	0
Macronix	NA	NA	31	NA	NA	0.2%
Microchip Technology	59	82	94	1.0%	0.7%	0.6%
Micron Technology	115	331	395	1.9%	2.8%	2.4%
MOSel	1	12	20	0	0.1%	0.1%
Motorola	89	236	407	1.5%	2.0%	2.5%
National Semiconductor	80	135	138	1.3%	1.2%	0.8%
NCR	6	6	8	0.1%	0.1%	0
Performance Semiconductor	NA	NA	16	NA	NA	0.1%
Saratoga Semiconductor	4	10	10	0.1%	0.1%	0.1%
SEEQ Technology	37	46	40	0.6%	0.4%	0.2%
Texas Instruments	445	834	1,095	7.3%	7.1%	6.7%
Vitellic	10	40	66	0.2%	0.3%	0.4%
VLSI Technology	23	16	23	0.4%	0.1%	0.1%
WaferScale Integration	12	25	28	0.2%	0.2%	0.2%
Xicor	60	87	87	1.0%	0.7%	0.5%
Other North American Companies	30	30	23	0.5%	0.3%	0.1%

(Continued)

Table 12 (Continued)

Worldwide Semiconductor Market  
MOS Memory Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies</b>	3,909	7,597	10,558	64.5%	65.0%	64.5%
Fujitsu	634	1,067	1,265	10.5%	9.1%	7.7%
Hitachi	576	1,114	1,534	9.5%	9.5%	9.4%
Matsushita	91	230	370	1.5%	2.0%	2.3%
Mitsubishi	492	966	1,161	8.1%	8.3%	7.1%
NEC	838	1,490	1,739	13.8%	12.7%	10.6%
NMB Semiconductor	104	199	247	1.7%	1.7%	1.5%
Oki Semiconductor	193	353	473	3.2%	3.0%	2.9%
Ricoh	18	26	31	0.3%	0.2%	0.2%
Rohm	0	8	10	0	0.1%	0.1%
Sanyo	27	87	130	0.4%	0.7%	0.8%
Seiko-Epson	71	94	141	1.2%	0.8%	0.9%
Sharp	130	344	476	2.1%	2.9%	2.9%
Sony	56	103	228	0.9%	0.9%	1.4%
Toshiba	679	1,516	1,918	11.2%	13.0%	11.7%
Other Japanese Companies	0	0	835	0	0	5.1%
<b>European Companies</b>	235	464	786	3.9%	4.0%	4.8%
Austria Mikro Systeme	2	4	0	0	0	0
Inmos	43	53	0	0.7%	0.5%	0
Matra MHS	13	28	31	0.2%	0.2%	0.2%
MEDL	5	5	7	0.1%	0	0
Philips	18	35	60	0.3%	0.3%	0.4%
Plessey	0	0	3	0	0	0
SGS-Thomson	95	185	269	1.6%	1.6%	1.6%
Siemens	52	150	416	0.9%	1.3%	2.5%
STC	6	2	0	0.1%	0	0
Other European Companies	1	2	0	0	0	0
<b>Asia/Pacific Companies</b>	211	795	1,329	3.5%	6.8%	8.1%
ERSO	5	0	0	0.1%	0	0
Goldstar	0	27	82	0	0.2%	0.5%
Hyundai	30	106	210	0.5%	0.9%	1.3%
Samsung	170	650	935	2.8%	5.6%	5.7%
United Microelectronics	6	12	102	0.1%	0.1%	0.6%

NA = Not available

Source: Dataquest  
May 1990

Table 13

**Worldwide Semiconductor Market  
MOS Microcomponents Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	5,108	7,144	8,202	100.0%	100.0%	100.0%
North American Companies	2,663	3,872	4,526	52.1%	54.2%	55.2%
Advanced Micro Devices	178	183	172	3.5%	2.6%	2.1%
Analog Devices	12	20	20	0.2%	0.3%	0.2%
AT&T <sup>1</sup>	50	39	141	1.0%	0.5%	1.7%
California Micro Devices	1	1	8	0	0	0.1%
Chips & Technologies	87	130	216	1.7%	1.8%	2.6%
Cirrus Logic	NA	NA	29	NA	NA	0.4%
Cypress Semiconductor	0	7	11	0	0.1%	0.1%
General Electric	41	48	0	0.8%	0.7%	0
GTE Microcircuits	1	0	0	0	0	0
Harris	44	62	115	0.9%	0.9%	1.4%
Hughes	2	2	2	0	0	0
IMI	0	1	0	0	0	0
Integrated Device Technology	5	15	13	0.1%	0.2%	0.2%
Intel	1,087	1,835	1,929	21.3%	25.7%	23.5%
ITT	21	15	25	0.4%	0.2%	0.3%
LSI Logic	0	18	67	0	0.3%	0.8%
Microchip Technology	19	18	18	0.4%	0.3%	0.2%
Motorola	520	699	803	10.2%	9.8%	9.8%
National Semiconductor	140	150	172	2.7%	2.1%	2.1%
NCR	8	6	22	0.2%	0.1%	0.3%
Performance Semiconductor	NA	NA	13	NA	NA	0.2%
Rockwell	46	51	42	0.9%	0.7%	0.5%
Sierra Semiconductor	1	1	1	0	0	0
Standard Microsystems	36	34	34	0.7%	0.5%	0.4%
Texas Instruments	169	234	252	3.3%	3.3%	3.1%
TRW	0	0	5	0	0	0.1%
VLSI Technology	18	54	94	0.4%	0.8%	1.1%
WaferScale Integration	0	0	2	0	0	0
Weitek	21	35	49	0.4%	0.5%	0.6%
Western Digital	70	100	135	1.4%	1.4%	1.6%
Zilog	75	90	99	1.5%	1.3%	1.2%
ZyMOS	4	17	30	0.1%	0.2%	0.4%
Other North American Companies	7	7	7	0.1%	0.1%	0.1%

(Continued)

Table 13 (Continued)

**Worldwide Semiconductor Market  
MOS Microcomponents Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies</b>	2,096	2,817	3,190	41.0%	39.4%	38.9%
Fujitsu	146	202	211	2.9%	2.8%	2.6%
Hitachi	402	525	554	7.9%	7.3%	6.8%
Matsushita	199	230	217	3.9%	3.2%	2.6%
Mitsubishi	267	381	435	5.2%	5.3%	5.3%
NEC	566	790	937	11.1%	11.1%	11.4%
Oki Semiconductor	101	134	149	2.0%	1.9%	1.8%
Ricoh	14	19	22	0.3%	0.3%	0.3%
Rohm	3	16	16	0.1%	0.2%	0.2%
Sanyo	53	70	70	1.0%	1.0%	0.9%
Seiko-Epson	6	12	12	0.1%	0.2%	0.1%
Sharp	34	54	112	0.7%	0.8%	1.4%
Sony	21	37	47	0.4%	0.5%	0.6%
Toshiba	283	346	407	5.5%	4.8%	5.0%
Other Japanese Companies	1	1	1	0	0	0
<b>European Companies</b>	310	401	433	6.1%	5.6%	5.3%
Eurosil	3	2	2	0.1%	0	0
Inmos	48	57	0	0.9%	0.8%	0
Matra MHS	19	21	28	0.4%	0.3%	0.3%
MEDL	1	1	3	0	0	0
Philips	100	114	131	2.0%	1.6%	1.6%
Plessey	0	0	3	0	0	0
SGS-Thomson	95	118	161	1.9%	1.7%	2.0%
Siemens	44	88	92	0.9%	1.2%	1.1%
TMS	NA	NA	13	NA	NA	0.2%
<b>Asia/Pacific Companies</b>	39	54	53	0.8%	0.8%	0.6%
ERSO	2	0	0	0	0	0
Goldstar	1	4	2	0	0.1%	0
Samsung	8	15	8	0.2%	0.2%	0.1%
United Microelectronics	28	35	43	0.5%	0.5%	0.5%

NA = Not available

<sup>1</sup>AT&T's 1989 revenue for microcomponents includes approximately \$100 million previously classified as MOS logic. Microperipheral products consumed internally account for the bulk of this revenue. AT&T's commercial microcomponents revenue was approximately \$21 million.

Source: Dataquest  
May 1990

Table 14

**Worldwide Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	6,309	8,152	8,461	100.0%	100.0%	100.0%
North American Companies	2,516	3,046	3,063	39.9%	37.4%	36.2%
Actel	NA	NA	7	NA	NA	0.1%
Advanced Micro Devices	81	92	119	1.3%	1.1%	1.4%
Altera	21	37	59	0.3%	0.5%	0.7%
Applied Micro Circuits Corp.	0	1	2	0	0	0
AT&T	225	317	257	3.6%	3.9%	3.0%
Atmel	NA	NA	26	NA	NA	0.3%
California Micro Devices	3	4	0	0	0	0
Cypress Semiconductor	19	34	36	0.3%	0.4%	0.4%
Exar	4	4	3	0.1%	0	0
General Electric	169	192	0	2.7%	2.4%	0
Gould AMI	77	86	76	1.2%	1.1%	0.9%
GTE Microcircuits	3	0	0	0	0	0
Harris	26	33	210	0.4%	0.4%	2.5%
Honeywell	72	74	2	1.1%	0.9%	0
Hughes	39	45	35	0.6%	0.6%	0.4%
IMI	13	14	15	0.2%	0.2%	0.2%
Integrated CMOS Systems	NA	NA	11	NA	NA	0.1%
Integrated Device Technology	8	21	32	0.1%	0.3%	0.4%
Intel	60	101	58	1.0%	1.2%	0.7%
International CMOS Technology	NA	NA	3	NA	NA	0
Int'l. Microelectronic Prod.	42	47	16	0.7%	0.6%	0.2%
ITT	125	135	150	2.0%	1.7%	1.8%
Lattice	9	20	31	0.1%	0.2%	0.4%
LSI Logic	262	357	445	4.2%	4.4%	5.3%
Microchip Technology	11	11	12	0.2%	0.1%	0.1%
Motorola	381	464	495	6.0%	5.7%	5.9%
National Semiconductor	195	200	222	3.1%	2.5%	2.6%
NCR	102	120	64	1.6%	1.5%	0.8%
Performance Semiconductor	NA	NA	3	NA	NA	0
Raytheon	1	2	0	0	0	0
Rockwell	126	123	0	2.0%	1.5%	0
SEEQ Technology	13	14	13	0.2%	0.2%	0.2%
Sierra Semiconductor	11	23	26	0.2%	0.3%	0.3%
Siliconix	7	3	0	0.1%	0	0

(Continued)

Table 14 (Continued)

Worldwide Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Sprague	14	16	16	0.2%	0.2%	0.2%
Standard Microsystems	5	7	8	0.1%	0.1%	0.1%
Teledyne	2	0	0	0	0	0
Texas Instruments	170	203	256	2.7%	2.5%	3.0%
TRW	7	5	0	0.1%	0.1%	0
Universal	6	6	9	0.1%	0.1%	0.1%
VLSI Technology	131	151	169	2.1%	1.9%	2.0%
VTC Inc.	17	19	17	0.3%	0.2%	0.2%
WaferScale Integration	8	10	5	0.1%	0.1%	0.1%
Xilinx	11	27	44	0.2%	0.3%	0.5%
ZyMOS	22	10	7	0.3%	0.1%	0.1%
Other North American Companies	18	18	104	0.3%	0.2%	1.2%
<b>Japanese Companies</b>						
Fuji Electric	14	31	31	0.2%	0.4%	0.4%
Fujitsu	234	347	482	3.7%	4.3%	5.7%
Hitachi	195	246	319	3.1%	3.0%	3.8%
Matsushita	302	415	267	4.8%	5.1%	3.2%
Mitsubishi	53	106	80	0.8%	1.3%	0.9%
NEC	602	843	928	9.5%	10.3%	11.0%
New JRC	13	27	34	0.2%	0.3%	0.4%
Oki Semiconductor	272	354	406	4.3%	4.3%	4.8%
Ricoh	33	40	38	0.5%	0.5%	0.4%
Rohm	10	30	40	0.2%	0.4%	0.5%
Sanyo	70	142	178	1.1%	1.7%	2.1%
Seiko-Epson	154	190	201	2.4%	2.3%	2.4%
Sharp	148	284	249	2.3%	3.5%	2.9%
Sony	67	95	96	1.1%	1.2%	1.1%
Toshiba	631	777	775	10.0%	9.5%	9.2%
Yamaha	116	151	130	1.8%	1.9%	1.5%
Other Japanese Companies	2	2	4	0	0	0
<b>European Companies</b>						
ABB-HAFO	26	28	23	0.4%	0.3%	0.3%
Austria Mikro Systeme	27	36	47	0.4%	0.4%	0.6%
Ericsson	11	6	7	0.2%	0.1%	0.1%

(Continued)

Table 14 (Continued)

Worldwide Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>European Companies (Continued)</b>						
European Silicon Structures	7	13	18	0.1%	0.2%	0.2%
Eurosil	22	27	28	0.3%	0.3%	0.3%
Matra MHS	11	22	26	0.2%	0.3%	0.3%
MEDL	21	23	25	0.3%	0.3%	0.3%
Mietec	32	42	52	0.5%	0.5%	0.6%
Philips	224	253	231	3.6%	3.1%	2.7%
Plessey	51	76	77	0.8%	0.9%	0.9%
SGS-Thomson	154	158	189	2.4%	1.9%	2.2%
Siemens	75	89	133	1.2%	1.1%	1.6%
STC	6	8	8	0.1%	0.1%	0.1%
Telefunken Electronic	23	20	20	0.4%	0.2%	0.2%
TMS	NA	NA	13	NA	NA	0.2%
Other European Companies	15	18	19	0.2%	0.2%	0.2%
	172	207	224	2.7%	2.5%	2.6%
<b>Asia/Pacific Companies</b>						
Daewoo	0	2	0	0	0	0
ERSO	22	0	0	0.3%	0	0
Goldstar	19	32	22	0.3%	0.4%	0.3%
Samsung	64	100	123	1.0%	1.2%	1.5%
United Microelectronics	57	59	65	0.9%	0.7%	0.8%
Other Asia/Pacific Companies	10	14	14	0.2%	0.2%	0.2%

NA = Not available

Source: Dataquest  
May 1990

Table 15

Worldwide Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
Total Market	7,654	8,880	9,390	100.0%	100.0%	100.0%
North American Companies	3,027	3,475	3,902	39.5%	39.1%	41.6%
Advanced Micro Devices	72	66	77	0.9%	0.7%	0.8%
Analog Devices	280	340	337	3.7%	3.8%	3.6%
AT&T	216	247	249	2.8%	2.8%	2.7%
Atmel	NA	NA	13	NA	NA	0.1%
Brooktree	NA	NA	52	NA	NA	0.6%
Burr-Brown	120	144	141	1.6%	1.6%	1.5%
California Micro Devices	20	23	22	0.3%	0.3%	0.2%
Cherry Semiconductor	29	33	32	0.4%	0.4%	0.3%
Comlinear	NA	NA	10	NA	NA	0.1%
Crystal	NA	NA	12	NA	NA	0.1%
Elantec	NA	NA	12	NA	NA	0.1%
Exar	38	40	46	0.5%	0.5%	0.5%
General Electric	125	120	0	1.6%	1.4%	0
Gennum	NA	NA	20	NA	NA	0.2%
Gould AMI	0	0	16	0	0	0.2%
GTE Microcircuits	20	0	0	0.3%	0	0
Harris	139	146	280	1.8%	1.6%	3.0%
Holt	9	9	9	0.1%	0.1%	0.1%
Honeywell	26	27	21	0.3%	0.3%	0.2%
IC Sensors	NA	NA	7	NA	NA	0.1%
Integrated Device Technology	0	0	1	0	0	0
Int'l. Microelectronic Prod.	0	0	20	0	0	0.2%
International Rectifier	0	0	3	0	0	0
ITT	51	64	50	0.7%	0.7%	0.5%
Kulite	NA	NA	25	NA	NA	0.3%
Linear Technology	43	59	70	0.6%	0.7%	0.7%
Maxim	22	35	43	0.3%	0.4%	0.5%
Micro Linear	12	24	28	0.2%	0.3%	0.3%
Micro Power Systems	23	26	21	0.3%	0.3%	0.2%
Mitel	39	43	54	0.5%	0.5%	0.6%
Motorola	339	425	445	4.4%	4.8%	4.7%
National Semiconductor	495	540	558	6.5%	6.1%	5.9%
NCR	0	0	26	0	0	0.3%
Precision Monolithics	78	85	88	1.0%	1.0%	0.9%

(Continued)



Table 15 (Continued)

**Worldwide Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Raytheon	25	27	27	0.3%	0.3%	0.3%
Rockwell	0	0	123	0	0	1.3%
Sierra Semiconductor	12	23	28	0.2%	0.3%	0.3%
Silicon General	25	35	36	0.3%	0.4%	0.4%
Silicon Systems	88	125	112	1.1%	1.4%	1.2%
Siliconix	63	67	54	0.8%	0.8%	0.6%
Sipex	NA	NA	22	NA	NA	0.2%
Solitron	13	13	10	0.2%	0.1%	0.1%
Sprague	78	86	98	1.0%	1.0%	1.0%
Supertex	10	11	15	0.1%	0.1%	0.2%
Teledyne	30	33	20	0.4%	0.4%	0.2%
Texas Instruments	386	426	417	5.0%	4.8%	4.4%
TRW	18	20	15	0.2%	0.2%	0.2%
Unitrode	23	51	50	0.3%	0.6%	0.5%
Universal	2	4	4	0	0	0
VTC Inc.	27	27	27	0.4%	0.3%	0.3%
Xicor	3	3	3	0	0	0
Other North American Companies	28	28	53	0.4%	0.3%	0.6%
<b>Japanese Companies</b>						
Fuji Electric	28	33	43	0.4%	0.4%	0.5%
Fujitsu	151	151	163	2.0%	1.7%	1.7%
Hitachi	310	343	332	4.1%	3.9%	3.5%
Matsushita	376	423	376	4.9%	4.8%	4.0%
Mitsubishi	305	395	384	4.0%	4.4%	4.1%
NEC	542	469	415	7.1%	5.3%	4.4%
New JRC	95	118	119	1.2%	1.3%	1.3%
Oki Semiconductor	21	23	35	0.3%	0.3%	0.4%
Rohm	235	271	277	3.1%	3.1%	2.9%
Sanken	119	157	156	1.6%	1.8%	1.7%
Sanyo	377	471	530	4.9%	5.3%	5.6%
Seiko-Epson	14	15	14	0.2%	0.2%	0.1%
Sharp	55	69	65	0.7%	0.8%	0.7%
Sony	217	386	361	2.8%	4.3%	3.8%
Toshiba	476	569	572	6.2%	6.4%	6.1%
Yamaha	0	0	13	0	0	0.1%
Other Japanese Companies	199	197	184	2.6%	2.2%	2.0%

(Continued)

Table 15 (Continued)

**Worldwide Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>European Companies</b>	1,001	1,147	1,278	13.1%	12.9%	13.6%
Austria Mikro Systeme	3	4	9	0	0	0.1%
Ericsson	16	46	47	0.2%	0.5%	0.5%
Matra MHS	2	0	0	0	0	0
MEDL	0	0	4	0	0	0
Philips	439	466	522	5.7%	5.2%	5.6%
Plessey	64	67	35	0.8%	0.8%	0.4%
SGS-Thomson	282	352	393	3.7%	4.0%	4.2%
Siemens	120	120	152	1.6%	1.4%	1.6%
STC	0	4	5	0	0	0.1%
Telefunken Electronic	72	85	101	0.9%	1.0%	1.1%
TMS	NA	NA	7	NA	NA	0.1%
Other European Companies	3	3	3	0	0	0
	106	168	171	1.4%	1.9%	1.8%
<b>Asia/Pacific Companies</b>						
Daewoo	1	5	10	0	0.1%	0.1%
ERSO	1	0	0	0	0	0
Goldstar	26	41	9	0.3%	0.5%	0.1%
Korean Electronic Co.	20	25	24	0.3%	0.3%	0.3%
Samsung	49	85	116	0.6%	1.0%	1.2%
Other Asia/Pacific Companies	9	12	12	0.1%	0.1%	0.1%

NA - Not available

Source: Dataquest  
May 1990

Table 16

**Worldwide Semiconductor Market  
Total Discrete Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	6,655	7,612	7,662	100.0%	100.0%	100.0%
<b>North American Companies</b>	2,051	2,171	2,120	30.8%	28.5%	27.7%
Acrian	15	21	26	0.2%	0.3%	0.3%
AT&T	200	161	147	3.0%	2.1%	1.9%
General Electric	146	145	0	2.2%	1.9%	0
General Instrument	132	164	170	2.0%	2.2%	2.2%
Harris	0	0	120	0	0	1.6%
Hewlett-Packard	57	57	56	0.9%	0.7%	0.7%
Honeywell	10	10	0	0.2%	0.1%	0
International Rectifier	151	192	187	2.3%	2.5%	2.4%
ITT	160	146	155	2.4%	1.9%	2.0%
Micro Quality Semiconductor	0	0	2	0	0	0
Motorola	652	752	775	9.8%	9.9%	10.1%
National Semiconductor	75	75	70	1.1%	1.0%	0.9%
Powerex	106	115	105	1.6%	1.5%	1.4%
Raytheon	12	15	14	0.2%	0.2%	0.2%
Siliconix	45	61	67	0.7%	0.8%	0.9%
Solitron	34	33	27	0.5%	0.4%	0.4%
Sprague	17	18	23	0.3%	0.2%	0.3%
Supertex	9	10	8	0.1%	0.1%	0.1%
Texas Instruments	64	63	60	1.0%	0.8%	0.8%
TRW	49	0	0	0.7%	0	0
Unitrode	46	62	59	0.7%	0.8%	0.8%
VQSI	21	21	0	0.3%	0.3%	0
Other North American Companies	50	50	49	0.8%	0.7%	0.6%
<b>Japanese Companies</b>	3,376	4,056	4,091	50.7%	53.3%	53.4%
Fuji Electric	206	279	287	3.1%	3.7%	3.7%
Fujitsu	70	82	109	1.1%	1.1%	1.4%
Hitachi	625	707	690	9.4%	9.3%	9.0%
Matsushita	318	377	332	4.8%	5.0%	4.3%
Mitsubishi	227	310	364	3.4%	4.1%	4.8%
NEC	518	571	574	7.8%	7.5%	7.5%
New JRC	10	8	4	0.2%	0.1%	0.1%
Oki Semiconductor	7	9	10	0.1%	0.1%	0.1%
Rohm	200	287	301	3.0%	3.8%	3.9%

(Continued)

Table 16 (Continued)

**Worldwide Semiconductor Market  
Total Discrete Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Sanken	162	207	213	2.4%	2.7%	2.8%
Sanyo	210	210	230	3.2%	2.8%	3.0%
Sony	72	112	96	1.1%	1.5%	1.3%
Toshiba	703	864	848	10.6%	11.4%	11.1%
Other Japanese Companies	48	33	33	0.7%	0.4%	0.4%
<b>European Companies</b>						
ABB-HAFO	69	76	5	1.0%	1.0%	0.1%
ABB-IXYS	0	0	50	0	0	0.7%
Fagor	NA	27	29	NA	0.4%	0.4%
MEDL	20	22	21	0.3%	0.3%	0.3%
Philips	390	432	442	5.9%	5.7%	5.8%
Plessey	22	25	0	0.3%	0.3%	0
Semikron	79	91	95	1.2%	1.2%	1.2%
SGS-Thomson	213	254	282	3.2%	3.3%	3.7%
Siemens	218	201	232	3.3%	2.6%	3.0%
STC	0	1	2	0	0	0
TAG	21	23	22	0.3%	0.3%	0.3%
Telefunken Electronic	86	91	95	1.3%	1.2%	1.2%
TMS	NA	NA	2	NA	NA	0
Other European Companies	7	7	7	0.1%	0.1%	0.1%
<b>Asia/Pacific Companies</b>						
Goldstar	1	1	1	0	0	0
Korean Electronic Co.	55	65	74	0.8%	0.9%	1.0%
Samsung	37	55	78	0.6%	0.7%	1.0%
Other Asia/Pacific Companies	10	14	14	0.2%	0.2%	0.2%

NA = Not available

Source: Dataquest  
May 1990

Table 17

**Worldwide Semiconductor Market  
Total Optoelectronic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>1,709</b>	<b>2,179</b>	<b>2,627</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>North American Companies</b>	<b>383</b>	<b>425</b>	<b>458</b>	<b>22.4%</b>	<b>19.5%</b>	<b>17.4%</b>
AT&T	7	10	10	0.4%	0.5%	0.4%
General Electric	16	21	0	0.9%	1.0%	0
General Instrument	28	0	0	1.6%	0	0
Harris	0	0	18	0	0	0.7%
Hewlett-Packard	186	213	213	10.9%	9.8%	8.1%
Honeywell	30	30	31	1.8%	1.4%	1.2%
Motorola	24	24	25	1.4%	1.1%	1.0%
Optek	NA	NA	77	NA	NA	2.9%
Quality Technologies	NA	40	38	NA	1.8%	1.4%
Texas Instruments	39	41	36	2.3%	1.9%	1.4%
TRW	43	36	0	2.5%	1.7%	0
Other North American Companies	10	10	10	0.6%	0.5%	0.4%
<b>Japanese Companies</b>	<b>1,093</b>	<b>1,511</b>	<b>1,918</b>	<b>64.0%</b>	<b>69.3%</b>	<b>73.0%</b>
Fuji Electric	4	3	1	0.2%	0.1%	0
Fujitsu	71	105	116	4.2%	4.8%	4.4%
Hitachi	47	70	66	2.8%	3.2%	2.5%
Matsushita	145	178	306	8.5%	8.2%	11.6%
Mitsubishi	26	27	30	1.5%	1.2%	1.1%
NEC	55	88	120	3.2%	4.0%	4.6%
New JRC	11	15	13	0.6%	0.7%	0.5%
Oki Semiconductor	25	36	33	1.5%	1.7%	1.3%
Rohm	70	109	96	4.1%	5.0%	3.7%
Sanken	13	19	18	0.8%	0.9%	0.7%
Sanyo	85	62	160	5.0%	2.8%	6.1%
Sharp	223	285	328	13.0%	13.1%	12.5%
Sony	138	217	249	8.1%	10.0%	9.5%
Toshiba	132	215	308	7.7%	9.9%	11.7%
Other Japanese Companies	48	82	74	2.8%	3.8%	2.8%
<b>European Companies</b>	<b>230</b>	<b>238</b>	<b>244</b>	<b>13.5%</b>	<b>10.9%</b>	<b>9.3%</b>
ABB-HAFO	8	9	9	0.5%	0.4%	0.3%
Ericsson	2	0	0	0.1%	0	0
Philips	26	25	24	1.5%	1.1%	0.9%
Plessey	17	22	0	1.0%	1.0%	0

(Continued)

Table 17 (Continued)

**Worldwide Semiconductor Market  
Total Optoelectronic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>European Companies (Continued)</b>						
Siemens	85	100	115	5.0%	4.6%	4.4%
Telefunken Electronic	77	74	78	4.5%	3.4%	3.0%
TMS	NA	NA	10	NA	NA	0.4%
Other European Companies	15	8	8	0.9%	0.4%	0.3%
	3	5	7	0.2%	0.2%	0.3%
<b>Asia/Pacific Companies</b>						
Korean Electronic Co.	3	5	7	0.2%	0.2%	0.3%

NA = Not available

Source: Dataquest  
May 1990

## Chapter 2

# *Final Worldwide Semiconductor Market Share Rankings*

These market share rankings provide our final estimates for 1989. The tables rank the top 20 companies in 12 semiconductor categories for 1988 and 1989.

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Table 1

**Final Estimated 1989  
Worldwide Semiconductor Market Share Rankings  
Total Semiconductor  
(Millions of Dollars)**

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	NEC	4,543	5,015	10%	8.8%
2	2	Toshiba	4,395	4,930	12%	8.6%
3	3	Hitachi	3,506	3,974	13%	6.9%
4	4	Motorola	3,035	3,319	9%	5.8%
5	6	Fujitsu	2,607	2,963	14%	5.2%
6	5	Texas Instruments	2,741	2,787	2%	4.9%
7	8	Mitsubishi	2,312	2,579	12%	4.5%
8	7	Intel	2,350	2,430	3%	4.2%
9	9	Matsushita	1,883	1,882	0	3.3%
10	10	Philips	1,738	1,716	(1%)	3.0%
11	11	National Semiconductor	1,650	1,618	(2%)	2.8%
12	14	Sanyo <sup>1</sup>	1,083	1,365	NM	2.4%
13	12	SGS-Thomson	1,087	1,301	20%	2.3%
14	18	Samsung	905	1,260	39%	2.2%
15	15	Sharp	1,036	1,230	19%	2.1%
16	20	Siemens	784	1,194	52%	2.1%
17	17	Oki Semiconductor	947	1,154	22%	2.0%
18	13	Advanced Micro Devices	1,084	1,100	1%	1.9%
19	16	Sony	950	1,077	13%	1.9%
20	19	AT&T	859	873	2%	1.5%
		All Others	11,364	13,446	18%	23.5%
		North American Companies	18,586	19,978	7%	34.9%
		Japanese Companies	25,942	29,809	15%	52.1
		European Companies	4,917	5,443	11%	9.5
		Asia/Pacific Companies	1,414	1,983	40%	3.5
		<b>Total Market</b>	<b>50,859</b>	<b>57,213</b>	<b>12%</b>	<b>100.0%</b>

<sup>1</sup>Prior to 1989, Sanyo revenue was understated.  
NM = Not meaningful

Source: Dataquest  
May 1990



Table 2

Final Estimated 1989  
Worldwide Semiconductor Market Share Rankings  
Total Integrated Circuit  
(Millions of Dollars)

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	NEC	3,884	4,321	11%	9.2%
2	2	Toshiba	3,316	3,774	14%	8.0%
3	3	Hitachi	2,729	3,218	18%	6.9%
4	5	Fujitsu	2,420	2,738	13%	5.8%
5	4	Texas Instruments	2,637	2,691	2%	5.7%
6	7	Motorola	2,259	2,519	12%	5.4%
7	6	Intel	2,350	2,430	3%	5.2%
8	8	Mitsubishi	1,975	2,185	11%	4.7%
9	9	National Semiconductor	1,575	1,548	(2%)	3.3%
10	11	Philips	1,281	1,250	(2%)	2.7%
11	10	Matsushita	1,328	1,244	(6%)	2.7%
12	14	Samsung	850	1,182	39%	2.5%
13	13	Oki Semiconductor	902	1,111	23%	2.4%
14	12	Advanced Micro Devices	1,084	1,100	1%	2.3%
15	15	SGS-Thomson	833	1,019	22%	2.2%
16	16	Sanyo	811	975	20%	2.1%
17	17	Sharp	751	902	20%	1.9%
18	20	Siemens	483	847	75%	1.8%
19	19	Sony	621	732	18%	1.6%
20	18	AT&T	688	716	4%	1.5%
		All Others	8,291	10,422	26%	22.2%
		North American Companies	15,990	17,400	9%	37.1%
		Japanese Companies	20,375	23,800	17%	50.7
		European Companies	3,429	3,915	14%	8.3
		Asia/Pacific Companies	1,274	1,809	42%	3.9
		Total Market	41,068	46,924	14%	100.0%

Source: Dataquest  
May 1990

Table 3

**Final Estimated 1989  
Worldwide Semiconductor Market Share Rankings  
Bipolar Digital  
(Millions of Dollars)**

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	Texas Instruments	940	671	(29%)	14.9%
2	2	Fujitsu	653	617	(6%)	13.7%
3	5	Hitachi	501	479	(4%)	10.6%
4	4	Advanced Micro Devices	536	474	(12%)	10.5%
5	3	National Semiconductor	550	458	(17%)	10.2%
6	6	Motorola	435	369	(15%)	8.2%
7	7	Philips	413	306	(26%)	6.8%
8	8	NEC	292	302	3%	6.7%
9	9	Mitsubishi	127	125	(2%)	2.8%
10	11	Plessey	94	122	30%	2.7%
11	10	Toshiba	108	102	(6%)	2.3%
12	15	Sanyo	41	67	63%	1.5%
13	13	AT&T	61	56	(8%)	1.2%
14	14	Raytheon	55	55	0	1.2%
15	17	Siemens	36	54	50%	1.2%
16	12	Harris	62	50	(19%)	1.1%
17	16	Oki Semiconductor	38	48	26%	1.1%
18	18	Goldstar	32	32	0	0.7%
19	20	Chips & Technologies	30	24	(20%)	0.5%
20	22	Applied Micro Circuits Corp.	27	20	(26%)	0.4%
		All Others	169	79	(53%)	1.8%
		North American Companies	2,761	2,221	(20%)	49.2%
		Japanese Companies	1,791	1,755	(2%)	38.9
		European Companies	598	502	(16%)	11.1
		Asia/Pacific Companies	50	32	(36%)	0.7
		<b>Total Market</b>	<b>5,200</b>	<b>4,510</b>	<b>(13%)</b>	<b>100.0%</b>

Note: Columns may not add to totals shown because of rounding.

Source: Dataquest  
May 1990

Table 4

**Final Estimated 1989  
Worldwide Semiconductor Market Share Rankings  
Bipolar Digital Memory  
(Millions of Dollars)**

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	Fujitsu	254	190	(25%)	35.2%
2	2	Hitachi	119	111	(7%)	20.6%
3	3	Advanced Micro Devices	104	85	(18%)	15.7%
4	7	National Semiconductor	35	56	60%	10.4%
5	4	Philips	58	47	(19%)	8.7%
6	6	NEC	44	25	(43%)	4.6%
7	8	Raytheon	14	12	(14%)	2.2%
8	5	Texas Instruments	50	10	(80%)	1.9%
9	9	Motorola	7	4	(43%)	0.7%
NM	10	Harris	3	0	NM	0
		All Others	1	0	(100%)	0
		North American Companies	213	167	(22%)	30.9%
		Japanese Companies	417	326	(22%)	60.4
		European Companies	59	47	(20%)	8.7
		Asia/Pacific Companies	0	0	NM	0
		<b>Total Market</b>	<b>689</b>	<b>540</b>	<b>(22%)</b>	<b>100.0%</b>

NM = Not meaningful

Source: Dataquest  
May 1990

Table 5

Final Estimated 1989  
Worldwide Semiconductor Market Share Rankings  
Bipolar Digital Logic  
(Millions of Dollars)

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	Texas Instruments	890	661	(26%)	16.6%
2	5	Fujitsu	399	427	7%	10.8%
3	2	National Semiconductor	515	402	(22%)	10.1%
4	3	Advanced Micro Devices	432	389	(10%)	9.8%
5	6	Hitachi	382	368	(4%)	9.3%
6	4	Motorola	428	365	(15%)	9.2%
7	8	NEC	248	277	12%	7.0%
8	7	Philips	355	259	(27%)	6.5%
9	9	Mitsubishi	127	125	(2%)	3.1%
10	11	Plessey	94	122	30%	3.1%
11	10	Toshiba	108	102	(6%)	2.6%
12	14	Sanyo	41	67	63%	1.7%
13	12	AT&T	61	56	(8%)	1.4%
14	17	Siemens	36	54	50%	1.4%
15	13	Harris	59	50	(15%)	1.3%
16	16	Oki Semiconductor	38	48	26%	1.2%
17	15	Raytheon	41	43	5%	1.1%
18	18	Goldstar	32	32	0	0.8%
19	20	Chips & Technologies	30	24	(20%)	0.6%
20	22	Applied Micro Circuits Corp.	27	20	(26%)	0.5%
		All Others	168	79	(53%)	2.0%
		North American Companies	2,548	2,054	(19%)	51.7%
		Japanese Companies	1,374	1,429	4%	36.0
		European Companies	539	455	(16%)	11.5
		Asia/Pacific Companies	50	32	(36%)	0.8
		<b>Total Market</b>	<b>4,511</b>	<b>3,970</b>	<b>(12%)</b>	<b>100.0%</b>

Source: Dataquest  
May 1990

**Table 6**  
**Final Estimated 1989**  
**Worldwide Semiconductor Market Share Rankings**  
**MOS Digital**  
**(Millions of Dollars)**

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	NEC	3,123	3,604	15%	10.9%
2	2	Toshiba	2,639	3,100	17%	9.4%
3	3	Intel	2,328	2,420	4%	7.3%
4	4	Hitachi	1,885	2,407	28%	7.3%
5	5	Fujitsu	1,616	1,958	21%	5.9%
6	7	Motorola	1,399	1,705	22%	5.2%
7	6	Mitsubishi	1,453	1,676	15%	5.1%
8	8	Texas Instruments	1,271	1,603	26%	4.9%
9	11	Samsung	765	1,066	39%	3.2%
10	10	Oki Semiconductor	841	1,028	22%	3.1%
11	9	Matsushita	875	854	(2%)	2.6%
12	12	Sharp	682	837	23%	2.5%
13	20	Siemens	327	641	96%	1.9%
14	15	SGS-Thomson	461	619	34%	1.9%
15	14	Advanced Micro Devices	482	549	14%	1.7%
16	13	National Semiconductor	485	532	10%	1.6%
17	18	LSI Logic	375	512	37%	1.6%
18	16	Philips	402	422	5%	1.3%
19	17	AT&T	380	411	8%	1.2%
20	19	Micron Technology	331	395	19%	1.2%
		All Others	4,868	6,685	37%	20.2%
		North American Companies	9,754	11,277	16%	34.1%
		Japanese Companies	14,494	18,006	24%	54.5
		European Companies	1,684	2,135	27%	6.5
		Asia/Pacific Companies	1,056	1,606	52%	4.9
		<b>Total Market</b>	<b>26,988</b>	<b>33,024</b>	<b>22%</b>	<b>100.0%</b>

Source: Dataquest  
May 1990

Table 7

**Final Estimated 1989  
Worldwide Semiconductor Market Share Rankings  
MOS Memory  
(Millions of Dollars)**

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	Toshiba	1,516	1,918	27%	11.7%
2	2	NEC	1,490	1,739	17%	10.6%
3	3	Hitachi	1,114	1,534	38%	9.4%
4	4	Fujitsu	1,067	1,265	19%	7.7%
5	5	Mitsubishi	966	1,161	20%	7.1%
6	6	Texas Instruments	834	1,095	31%	6.7%
7	7	Samsung	650	935	44%	5.7%
8	10	Sharp	344	476	38%	2.9%
9	9	Oki Semiconductor	353	473	34%	2.9%
10	8	Intel	392	433	10%	2.6%
11	17	Siemens	150	416	177%	2.5%
12	12	Motorola	236	407	72%	2.5%
13	11	Micron Technology	331	395	19%	2.4%
14	13	Matsushita	230	370	61%	2.3%
15	16	SGS-Thomson	185	269	45%	1.6%
16	14	Advanced Micro Devices	207	258	25%	1.6%
17	15	NMB Semiconductor	199	247	24%	1.5%
18	21	Sony	103	228	121%	1.4%
19	20	Hyundai	106	210	98%	1.3%
20	19	Integrated Device Technology	135	158	17%	1.0%
		All Others <sup>1</sup>	1,084	2,374	119%	14.5%
		North American Companies	2,836	3,688	30%	22.5%
		Japanese Companies	7,597	10,558	39%	64.5
		European Companies	464	786	69%	4.8
		Asia/Pacific Companies	795	1,329	67%	8.1
		<b>Total Market</b>	<b>11,692</b>	<b>16,361</b>	<b>40%</b>	<b>100.0%</b>

<sup>1</sup>In 1989, All Others includes additional revenue not counted in 1988.  
Note: Columns may not add to totals shown because of rounding.

Source: Dataquest  
May 1990

Table 8  
 Final Estimated 1989  
 Worldwide Semiconductor Market Share Rankings  
 MOS Microcomponents  
 (Millions of Dollars)

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	Intel	1,835	1,929	5%	23.5%
2	2	NEC	790	937	19%	11.4%
3	3	Motorola	699	803	15%	9.8%
4	4	Hitachi	525	554	6%	6.8%
5	5	Mitsubishi	381	435	14%	5.3%
6	6	Toshiba	346	407	18%	5.0%
7	7	Texas Instruments	234	252	8%	3.1%
8	8	Matsushita	230	217	(6%)	2.6%
9	13	Chips & Technologies	130	216	66%	2.6%
10	9	Fujitsu	202	211	4%	2.6%
11	10	Advanced Micro Devices	183	172	(6%)	2.1%
11	11	National Semiconductor	150	172	15%	2.1%
13	14	SGS-Thomson	118	161	36%	2.0%
14	12	Oki Semiconductor	134	149	11%	1.8%
15	26	AT&T <sup>1</sup>	39	141	262%	1.7%
16	16	Western Digital	100	135	35%	1.6%
17	15	Philips	114	131	15%	1.6%
18	20	Harris <sup>2</sup>	62	115	85%	1.4%
19	23	Sharp	54	112	107%	1.4%
20	17	Zilog	90	99	10%	1.2%
		All Others	728	854	17%	10.4%
		North American Companies	3,872	4,526	17%	55.2%
		Japanese Companies	2,817	3,190	13%	38.9
		European Companies	401	433	8%	5.3
		Asia/Pacific Companies	54	53	(2%)	0.6
		<b>Total Market</b>	<b>7,144</b>	<b>8,202</b>	<b>15%</b>	<b>100.0%</b>

<sup>1</sup>In 1989, AT&T revenue previously classified as MOS logic has been reclassified as microcomponent.

<sup>2</sup>In 1989, Harris revenue includes GE Solid State revenue.

Source: Dataquest  
May 1990

Table 9  
Final Estimated 1989  
Worldwide Semiconductor Market Share Rankings  
MOS Logic  
(Millions of Dollars)

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	NEC	843	928	10%	11.0%
2	2	Toshiba	777	775	0	9.2%
3	3	Motorola	464	495	7%	5.9%
4	7	Fujitsu	347	482	39%	5.7%
5	5	LSI Logic	357	445	25%	5.3%
6	6	Oki Semiconductor	354	406	15%	4.8%
7	11	Hitachi	246	319	30%	3.8%
8	4	Matsushita	415	267	(36%)	3.2%
9	8	AT&T <sup>1</sup>	317	257	(19%)	3.0%
10	12	Texas Instruments	203	256	26%	3.0%
11	9	Sharp	284	249	(12%)	2.9%
12	10	Philips	253	231	(9%)	2.7%
13	13	National Semiconductor	200	222	11%	2.6%
14	40	Harris <sup>2</sup>	33	210	536%	2.5%
15	15	Seiko Epson	190	201	6%	2.4%
16	16	SGS-Thomson	158	189	20%	2.2%
17	19	Sanyo	142	178	25%	2.1%
18	18	VLSI Technology	151	169	12%	2.0%
19	20	ITT	135	150	11%	1.8%
20	28	Siemens	89	133	49%	1.6%
		All Others	2,194	1,899	(13%)	22.4%
		North American Companies	3,046	3,063	1%	36.2%
		Japanese Companies	4,080	4,258	4%	50.3
		European Companies	819	916	12%	10.8
		Asia-Pacific Companies	207	224	8%	2.6
		<b>Total Market</b>	<b>8,152</b>	<b>8,461</b>	<b>4%</b>	<b>100.0%</b>

<sup>1</sup>In 1989, AT&T revenue previously classified as MOS logic has been reclassified as microcomponent.

<sup>2</sup>In 1989, Harris revenue includes GE Solid State revenue.

Note: Columns may not add to totals shown because of rounding.

Source: Dataquest  
May 1990



**Table 10**  
**Final Estimated 1989**  
**Worldwide Semiconductor Market Share Rankings**  
**Analog**  
**(Millions of Dollars)**

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	Toshiba	569	572	1%	6.1%
2	2	National Semiconductor	540	558	3%	5.9%
3	3	Sanyo	471	530	13%	5.6%
4	5	Philips	466	522	12%	5.6%
5	7	Motorola	425	445	5%	4.7%
6	6	Texas Instruments	426	417	(2%)	4.4%
7	4	NEC	469	415	(12%)	4.4%
8	11	SGS-Thomson	352	393	12%	4.2%
9	9	Mitsubishi	395	384	(3%)	4.1%
10	8	Matsushita	423	376	(11%)	4.0%
11	10	Sony	386	361	(6%)	3.8%
12	13	Analog Devices	340	337	(1%)	3.6%
13	12	Hitachi	343	332	(3%)	3.5%
14	18	Harris <sup>1</sup>	146	280	92%	3.0%
15	14	Rohm	271	277	2%	2.9%
16	15	AT&T	247	249	1%	2.7%
17	17	Fujitsu	151	163	8%	1.7%
18	16	Sanken	157	156	(1%)	1.7%
19	21	Siemens	120	152	27%	1.6%
20	19	Burr-Brown	144	141	(2%)	1.5%
		All Others	2,039	2,330	14%	24.8%
		North American Companies	3,475	3,902	12%	41.6%
		Japanese Companies	4,090	4,039	(1%)	43.0
		European Companies	1,147	1,278	11%	13.6
		Asia/Pacific Companies	168	171	2%	1.8
		<b>Total Market</b>	<b>8,880</b>	<b>9,390</b>	<b>6%</b>	<b>100.0%</b>

<sup>1</sup>In 1989, Harris revenue includes GE Solid State revenue.

Source: Dataquest  
May 1990

Table 11  
 Final Estimated 1989  
 Worldwide Semiconductor Market Share Rankings  
 Total Discrete  
 (Millions of Dollars)

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	Toshiba	864	848	(2%)	11.1%
2	2	Motorola	752	775	3%	10.1%
3	3	Hitachi	707	690	(2%)	9.0%
4	4	NEC	571	574	1%	7.5%
5	5	Philips	432	442	2%	5.8%
6	7	Mitsubishi	310	364	17%	4.8%
7	6	Matsushita	377	332	(12%)	4.3%
8	8	Rohm	287	301	5%	3.9%
9	9	Fuji Electric	279	287	3%	3.7%
10	10	SGS-Thomson	254	282	11%	3.7%
11	13	Siemens	201	232	15%	3.0%
12	11	Sanyo	210	230	10%	3.0%
13	12	Sanken	207	213	3%	2.8%
14	14	International Rectifier	192	187	(3%)	2.4%
15	15	General Instrument	164	170	4%	2.2%
16	17	ITT	146	155	6%	2.0%
17	16	AT&T	161	147	(9%)	1.9%
18	NM	Harris <sup>1</sup>	0	120	NM	1.6%
19	23	Fujitsu	82	109	33%	1.4%
20	19	Powerex	115	105	(9%)	1.4%
		All Others	1,301	1,099	(16%)	14.3%
		North American Companies	2,171	2,120	(2%)	27.7%
		Japanese Companies	4,056	4,091	1%	53.4
		European Companies	1,250	1,284	3%	16.8
		Asia/Pacific Companies	135	167	24%	2.2
		<b>Total Market</b>	<b>7,612</b>	<b>7,662</b>	<b>1%</b>	<b>100.0%</b>

<sup>1</sup>In 1989, Harris revenue includes GE Solid State revenue.

NM = Not meaningful

Note: Columns may not add to totals shown because of rounding.

Source: Dataquest  
May 1990

**Table 12**  
**Final Estimated 1989**  
**Worldwide Semiconductor Market Share Rankings**  
**Total Optoelectronic**  
**(Millions of Dollars)**

1989 Rank	1988 Rank		1988 Revenue	1989 Revenue	Percent Change	1989 Market Share
1	1	Sharp	285	328	15%	12.5%
2	3	Toshiba	215	308	43%	11.7%
3	5	Matsushita	178	306	72%	11.6%
4	2	Sony	217	249	15%	9.5%
5	4	Hewlett-Packard	213	213	0%	8.1%
6	12	Sanyo <sup>1</sup>	62	160	NM <sup>1</sup>	6.1%
7	9	NEC	88	120	36%	4.6%
8	7	Fujitsu	105	116	10%	4.4%
9	8	Siemens	100	115	15%	4.4%
10	6	Rohm	109	96	(12%)	3.7%
11	10	Telefunken Electronic	74	78	5%	3.0%
12	NM	Optek	0	77	NM	2.9%
13	11	Hitachi	70	66	(6%)	2.5%
14	14	Quality Technologies	40	38	(5%)	1.4%
15	13	Texas Instruments	41	36	(12%)	1.4%
16	16	Oki Semiconductor	36	33	(8%)	1.3%
17	17	Honeywell	30	31	3%	1.2%
18	18	Mitsubishi	27	30	11%	1.1%
19	20	Motorola	24	25	4%	1.0%
20	19	Philips	25	24	(4%)	0.9%
		All Others	240	178	(26%)	6.8%
		North American Companies	425	458	8%	17.4%
		Japanese Companies	1,511	1,918	27%	73.0
		European Companies	238	244	3%	9.3
		Asia/Pacific Companies	5	7	40%	0.3
		<b>Total Market</b>	<b>2,179</b>	<b>2,627</b>	<b>21%</b>	<b>100.0%</b>

<sup>1</sup>Prior to 1989, Sanyo revenue was understated.  
 NM = Not meaningful

Source: Dataquest  
 May 1990

# Dataquest

**DB** a company of  
The Dun & Bradstreet Corporation

## Dataquest Research and Sales Offices:

### Dataquest Incorporated

1290 Ridder Park Drive  
San Jose, California 95131-2398  
Phone: (408) 437-8000  
Telex: 171973  
Fax: (408) 437-0292

### Technology Products Group

Phone: (800) 624-3280

### Dataquest Incorporated

#### Invitational Computer Conferences Division

3151 Airway Avenue, C-2  
Costa Mesa, California 92626  
Phone: (714) 957-0171  
Telex: 5101002189 ICCDQ  
Fax: (714) 957-0903

### Dataquest Incorporated

#### Ledgeway Group

430 Bedford Street  
Suite 340  
Lexington, MA 02173  
Phone: (617) 862-8500  
Fax: (617) 862-8207

### Dataquest Australia

Suite 1, Century Plaza  
80 Berry Street  
North Sydney, NSW 2060  
Australia  
Phone: (02) 959 4544  
Telex: 25468  
Fax: (02) 929 0635

### Dataquest Boston

1740 Massachusetts Ave.  
Boxborough, MA 01719-2209  
Phone: (508) 264-4373  
Telex: 171973  
Fax: (508) 635-0183

### Dataquest Europe GmbH

Rosenkavalierplatz 17  
D-8000 Munich 81  
West Germany  
Phone: (089) 91 1064  
Telex: 5218070  
Fax: (089) 91 2189

### Dataquest Europe Limited

Roussel House, Broadwater Park  
Denham, Uxbridge, Middx UB9 5HP  
England  
Phone: 0895-835050  
Telex: 266195  
Fax: 0895 835260/1/2

### Dataquest Europe SA

Tour Gallieni 2  
36, avenue Gallieni  
93175 Bagnolet Cedex  
France  
Phone: (1) 48 97 31 00  
Telex: 233 263  
Fax: (1) 48 97 34 00

### Dataquest Hong Kong

Rm. 401, Connaught Comm. Bldg.  
185 Wanchai Rd.  
Wanchai, Hong Kong  
Phone: 8387336  
Telex: 80587  
Fax: 5722375

### Dataquest Israel

59 Mishmar Ha'yarden Street  
Tel Aviv, Israel 69865  
or  
P.O. Box 18198  
Tel Aviv, Israel  
Phone: 52 913937  
Telex: 341118  
Fax: 52 32865

### Dataquest Japan Limited

Shinkawa Sanko Building  
1-3-17 Shinkawa, Chuo-ku  
Tokyo 104 Japan  
Phone: (03) 5566-0411  
Fax: (03) 5566-0425

### Dataquest Korea

Daeheung Bldg., Room 505  
648-23 Yeoksam-dong  
Kangnam-gu  
Seoul, Korea 135  
Phone: (02) 552-2332  
Fax: (02) 552-2661

### Dataquest Singapore

4012 Ang Mo Kio Industrial Park 1  
Ave. 10, #03-10 to #03-12  
Singapore 2056  
Phone: 4597181  
Telex: 38257  
Fax: 4563129

### Dataquest Taiwan

Room 801/8th Floor  
Ever Spring Building  
147, Sect. 2, Chien Kuo N. Rd.  
Taipei, Taiwan R.O.C. 104  
Phone: (02) 501-7960  
Telex: 27459  
Fax: (02) 505-4265

### Dataquest West Germany

In der Schneithohl 17  
6242 Kronberg 2  
West Germany  
Phone: 06173/61685  
Telex: 418089  
Fax: 06173/67901

**Final Worldwide Semiconductor  
Market Share Estimates  
1990**

Source:  
Dataquest

**Semiconductors** *Worldwide*

Dataquest

**Final Worldwide Semiconductor  
Market Share Estimates  
1990**

**Source:  
Dataquest**

*Published by Dataquest Incorporated*

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# *Final Worldwide Semiconductor Market Share Estimates*

These market share estimates provide our final estimates of 1990. The tables cover history for the period 1988 to 1990 for the major categories of semiconductors.

## **Background**

An integral part of Dataquest's Semiconductor industry service database is analyzing the semiconductor markets by estimating each manufacturer's market share. These analyses provide insights into semiconductor markets and reinforce estimates of consumption, production, and company revenue that were made using other data. An index of all tables is included for easy reference. Information on further product detail may be requested through the client inquiry privilege.

The semiconductor market is divided among North American companies, Japanese companies, European companies, and Asia/Pacific companies, based on the location of their main offices. All of the major companies are included in this database.

The totals given for each company reflect worldwide production. For example, although Texas Instruments manufactures semiconductors in many parts of the world, its entire production is included under the North American companies market share section. In contrast, some, but not all, foreign-owned subsidiaries are included in the North American totals and not in the total of the parent company location. For example, Exar, a subsidiary of the Japanese company Rohm, is included as a North American company. On the other hand, revenue for Signetics is included under Philips, a European company. The total for North American companies, therefore, is not the same as for North American semiconductor production.

## **Merchant versus Captive Consumption**

Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling

to the merchant market. The data exclude totally captive suppliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

## **Hybrid Circuits**

Hybrid integrated circuits, while primarily a special packaging arrangement, are included in Table 15, under Analog ICs. Only those hybrids are included that are made in the division or other organization whose primary product is semiconductors. Several major manufacturers also manufacture hybrids in other divisions; where we have identified these manufacturers, they are excluded. A split between monolithics and hybrid analog circuits is available through the client inquiry service.

## **Exchange Rate Conventions**

Estimates of Japanese consumption or factory shipments use the exchange rate (dollar/yen) for the given year. Refer to Table 0 for the exchange rates used. In viewing the year-to-year Japanese market growth rate, one must consider the different exchange rates in effect during the year. For the European market, the value of shipments is estimated directly in dollars.

## **Data Sources**

In both the United States and Europe, there is no official body—government organization, industry association, or trade publication—that maintains complete or even near-complete statistics on the semiconductor industry. In Japan, some statistics are kept by MITI. We believe that the estimates presented here are the most accurate and meaningful generally available today. The sources of the data presented in the tables are as follows:

- Revenue published by major industry participants



- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data such as those from WSTS, MITI, and EIA
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant projected world economic data

### Need for Careful Interpretation

Construction of the tables involves combining data from many countries, each of which has different and changing exchange rates. Dataquest uses average exchange rates for each

year and, as far as possible, the estimates are prepared in terms of local currencies before conversion to U.S. dollars or yen.

Despite the care taken in gathering and analyzing the available data and in attempting to categorize those data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in these tables. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between these data and those provided by others.

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**Table 0**  
**Yen per U.S. Dollar Exchange Rates**

Year	Exchange Rate
1988	130
1989	138
1990	144

Source: International Monetary Fund, Far Eastern Economic Review, Dataquest (May 1991)

#### Notes to Market Share Tables

1. ABB-HAFO was formerly known as ASEA Brown Boveri.
2. ABB-DKYS was formerly the West German-based power semiconductor division of ASEA Brown Boveri.
3. Allegro MicroSystems was formerly known as Sprague Technologies.
4. Appian Technology was formerly known as ZymOS.
5. Ericsson was known as Rifa prior to March 1, 1988.
6. GEC Plessey revenue includes MEDL and Plessey revenue from 1990 onward.
7. Harris revenue includes GE Solid State revenue from 1989 onward.
8. Inmos revenue is included in SGS-Thomson revenue from 1989 onward.
9. Matra MHS was formerly known as Matra-Harris Semiconducteurs.
10. Philips revenue includes Signetics revenue.
11. Plessey revenue includes Ferranti revenue from 1987 onward.
12. SGS-Thomson revenue includes Inmos revenue from 1989 onward.
13. Thomson Composants Militaires et Spatiaux (TMS) revenue was formerly included in SGS-Thomson (30 percent) and the Other European Companies category (70 percent).
14. Vertex was formerly known as Integrated CMOS Systems.
15. VQSI was formerly known as Varo.
16. Micro Quality Semiconductor was formerly known as VQSI.
17. In 1989, AT&T revenue previously classified as MOS logic was reclassified as microcomponent.
18. In 1989, Rockwell revenue previously classified as MOS logic was reclassified as analog.
19. Prior to 1989, Sanyo revenue was understated.
20. Collection of BiCMOS revenue data began in 1987.

**Table 1**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company:	Each			Total Semiconductor		
	Product:			Worldwide		
Region of Consumption:	Worldwide			Distribution Channel:		
Distribution Channel:	NM			Application:		
Application:	All			Specification:		
Specification:	All					
	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Total Market</b>	50,859	57,213	58,225	100.0	100.0	100.0
<b>North American Companies</b>	18,586	19,978	21,537	36.5	34.9	37.0
Acrian	21	26	0	.0	.0	.0
Actel	NA	7	21	NA	.0	.0
Advanced Micro Devices	1,084	1,100	1,053	2.1	1.9	1.8
Allegro MicroSystems	120	137	116	.2	.2	.2
Altera	37	59	78	.1	.1	.1
Anadigics	NA	NA	5	NA	NA	.0
Analog Devices	360	357	381	.7	.6	.7
Appian Technology	27	37	50	.1	.1	.1
Applied Micro Circuits Corp.	28	22	28	.1	.0	.0
AT&T	859	873	861	1.7	1.5	1.5
Atmel	NA	94	123	NA	.2	.2
Bipolar Integrated Technology	6	1	1	.0	.0	.0
Brooktree	NA	52	70	NA	.1	.1
Burr-Brown	144	141	145	.3	.2	.2
California Micro Devices	28	30	27	.1	.1	.0
Catalyst	5	31	36	.0	.1	.1
Cherry Semiconductor	33	32	36	.1	.1	.1
Chips & Technologies	160	240	265	.3	.4	.5
Cirrus Logic	NA	29	130	NA	.1	.2
CID Technologies	NA	NA	4	NA	NA	.0
Comlinear	NA	10	13	NA	.0	.0
Crystal	NA	12	15	NA	.0	.0
Cypress Semiconductor	135	196	223	.3	.3	.4
Dallas Semiconductor	NA	13	17	NA	.0	.0
Dalsa Inc.	NA	NA	3	NA	NA	.0
Eastman Kodak	NA	NA	3	NA	NA	.0
Elantec	NA	12	13	NA	.0	.0
Exar	47	49	75	.1	.1	.1
Exel	0	1	0	.0	.0	.0
Fairchild-Loral	NA	NA	1	NA	NA	.0
Ford Aerospace-Loral	NA	NA	1	NA	NA	.0
General Electric	555	0	0	1.1	.0	.0
General Instrument	164	170	214	.3	.3	.4

(Continued)

Table 1 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
North American Companies (Continued)						
Gennum	NA	20	18	NA	.0	.0
Gould AMI	101	117	90	.2	.2	.2
Harris	329	830	800	.6	1.5	1.4
Hewlett-Packard	270	269	509	.5	.5	.9
Holt	9	9	10	.0	.0	.0
Honeywell	182	56	49	.4	.1	.1
Hughes	47	37	44	.1	.1	.1
IC Sensors	NA	7	6	NA	.0	.0
IMI	15	15	15	.0	.0	.0
Inova	NA	21	10	NA	.0	.0
Integrated Device Technology	171	204	199	.3	.4	.3
Intel	2,350	2,430	3,171	4.6	4.2	5.4
International CMOS Technology	NA	9	14	NA	.0	.0
Int'l. Microelectronic Prod.	47	53	56	.1	.1	.1
International Rectifier	192	190	225	.4	.3	.4
ITT	360	390	371	.7	.7	.6
Kulite	NA	25	28	NA	.0	.0
Lattice	22	31	62	.0	.1	.1
Linear Technology	59	70	83	.1	.1	.1
LSI Logic	375	512	598	.7	.9	1.0
Macronix	NA	31	7	NA	.1	.0
Maxim	35	43	65	.1	.1	.1
MCE	NA	NA	4	NA	NA	.0
Micrel	NA	NA	5	NA	NA	.0
Micro Linear	24	28	45	.0	.0	.1
Micro Power Systems	26	21	24	.1	.0	.0
Micro Quality Semiconductor	0	2	0	.0	.0	.0
Microchip Technology	111	124	85	.2	.2	.1
Micron Technology	331	395	286	.7	.7	.5
Microsemi	NA	NA	50	NA	NA	.1
Mitel	43	54	47	.1	.1	.1
MOSel	12	20	31	.0	.0	.1
Motorola	3,035	3,319	3,694	6.0	5.8	6.3
National Semiconductor	1,650	1,618	1,719	3.2	2.8	3.0
NCR	132	120	145	.3	.2	.2
Novasensor Inc.	NA	NA	12	NA	NA	.0
Optek	NA	77	66	NA	.1	.1
Pacific Monolithics	NA	NA	7	NA	NA	.0
Performance Semiconductor	NA	32	51	NA	.1	.1
Plus Logic	0	0	1	.0	.0	.0
Powerex	115	105	112	.2	.2	.2
Precision Monolithics	85	88	91	.2	.2	.2
Quality Technologies	40	38	34	.1	.1	.1
Raytheon	99	96	84	.2	.2	.1

(Continued)

Table 1 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
North American Companies (Continued)						
Rockwell	174	165	200	.3	.3	.3
Saratoga Semiconductor	10	10	0	.0	.0	.0
Seagate Micro-Electronics	NA	NA	9	NA	NA	.0
SEEQ Technology	60	53	45	.1	.1	.1
Semtech	NA	NA	18	NA	NA	.0
Sensym	NA	NA	6	NA	NA	.0
Sierra Semiconductor	47	55	61	.1	.1	.1
Signal Processing Technology	NA	NA	5	NA	NA	.0
Silicon General	35	36	36	.1	.1	.1
Silicon Systems	125	112	165	.2	.2	.3
Siliconix	131	121	116	.3	.2	.2
Sipex	NA	22	21	NA	.0	.0
Solitron	46	37	33	.1	.1	.1
Standard Microsystems	41	42	49	.1	.1	.1
Supertex	21	23	27	.0	.0	.0
Tektronix	NA	NA	40	NA	NA	.1
Teledyne	35	23	25	.1	.0	.0
Texas Instruments	2,741	2,787	2,574	5.4	4.9	4.4
TRW	61	27	28	.1	.0	.0
Unitrode	113	109	104	.2	.2	.2
Universal	10	13	14	.0	.0	.0
Vertex	NA	11	8	.0	.0	.0
Vitellic	40	66	64	.1	.1	.1
VLSI Technology	221	286	324	.4	.5	.6
VQSI	21	0	0	.0	.0	.0
VTC Inc.	46	44	40	.1	.1	.1
WaferScale Integration	35	35	33	.1	.1	.1
Weitek	35	49	58	.1	.1	.1
Western Digital	100	135	148	.2	.2	.3
Xicor	90	90	71	.2	.2	.1
Xilinx	27	44	84	.1	.1	.1
Zilog	90	99	100	.2	.2	.2
Other North American Companies	151	247	0	.3	.4	.0
Japanese Companies						
Fuji Electric	346	362	385	.7	.6	.7
Fujitsu	2,607	2,963	2,880	5.1	5.2	4.9
Hitachi	3,506	3,974	3,893	6.9	6.9	6.7
Matsushita	1,883	1,882	1,942	3.7	3.3	3.3
Mitsubishi	2,312	2,579	2,319	4.5	4.5	4.0
NEC	4,543	5,015	4,898	8.9	8.8	8.4
New JRC	169	171	178	.3	.3	.3
NMB Semiconductor	199	247	201	.4	.4	.3
Oki	947	1,154	1,074	1.9	2.0	1.8

(Continued)

Table 1 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Japanese Companies (Continued)						
Ricoh	85	91	96	.2	.2	.2
Rohm	721	740	774	1.4	1.3	1.3
Sanken	383	387	407	.8	.7	.7
Sanyo	1,083	1,365	1,381	2.1	2.4	2.4
Seiko Epson	311	368	213	.6	.6	.4
Sharp	1,036	1,230	1,325	2.0	2.1	2.3
Shindengen Electric	NA	NA	209	NA	NA	.4
Sony	950	1,077	1,146	1.9	1.9	2.0
Toko	NA	NA	60	NA	NA	.1
Toshiba	4,395	4,930	4,843	8.6	8.6	8.3
Yamaha	151	143	153	.3	.2	.3
Other Japanese Companies	315	1,131	0	.6	2.0	.0
European Companies						
ABB-HAFO	113	37	42	.2	.1	.1
ABB-IXYS	0	50	58	.0	.1	.1
Austria Mikro Systeme	44	56	59	.1	.1	.1
Ericsson	52	54	56	.1	.1	.1
Eupec	0	0	96	.0	.0	.2
European Silicon Structures	13	18	27	.0	.0	.0
Eurosil	29	30	39	.1	.1	.1
Fagor	27	29	30	.1	.1	.1
GEC Plessey	0	0	390	.0	.0	.7
Inmos	110	0	0	.2	.0	.0
Matra MES	71	85	100	.1	.1	.2
MEDL	51	60	0	.1	.1	.0
Mietec	42	52	92	.1	.1	.2
Philips	1,738	1,716	2,011	3.4	3.0	3.5
Plessey	284	240	0	.6	.4	.0
Semikron	91	95	106	.2	.2	.2
SGS-Thomson	1,087	1,301	1,463	2.1	2.3	2.5
Siemens	784	1,194	1,224	1.5	2.1	2.1
STC	22	19	24	.0	.0	.0
TAG	23	22	25	.0	.0	.0
Telefunken Electronic	289	299	295	.6	.5	.5
TMS	0	45	45	.0	.1	.1
Zetex	0	0	24	.0	.0	.0
Other European Companies	47	41	0	.1	.1	.0
Asia/Pacific Companies						
AMPi	NA	NA	7	NA	NA	.0
Daewoo	7	10	12	.0	.0	.0
ERSO	NA	NA	1	NA	NA	.0
Goldstar	137	148	163	.3	.3	.3

(Continued)

Table 1 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Asia/Pacific Companies (Continued)						
Hi-Sincerity	NA	NA	5	NA	NA	.0
Hualon Microelectronics Corp.	NA	NA	50	NA	NA	.1
Hyundai	106	210	115	.2	.4	.2
Korean Electronic Co.	95	105	114	.2	.2	.2
Kingbright	NA	NA	7	NA	NA	.0
Ledtech Electronics	NA	NA	7	NA	NA	.0
Liteon	NA	NA	6	NA	NA	.0
MOSpec	NA	NA	11	NA	NA	.0
Samsung	905	1,260	1,315	1.8	2.2	2.3
United Microelectronics	106	210	150	.2	.4	.3
Winbond	NA	NA	50	NA	NA	.1
Other Asia/Pacific Companies	58	40	58	.1	.1	.1

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 2**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company: Each  
 Product: Total Integrated Circuit  
 Region of Consumption: Worldwide  
 Distribution Channel: NM  
 Application: All  
 Specification: All

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Total Market	41,068	46,924	47,303	100.0	100.0	100.0
North American Companies	15,990	17,400	18,877	38.9	37.1	39.9
Actel	NA	7	21	NA	.0	.0
Advanced Micro Devices	1,084	1,100	1,053	2.6	2.3	2.2
Allegro MicroSystems	102	114	98	.2	.2	.2
Altera	37	59	78	.1	.1	.2
Anadigics	NA	NA	5	NA	NA	.0
Analog Devices	360	357	380	.9	.8	.8
Appian Technology	27	37	50	.1	.1	.1
Applied Micro Circuits Corp.	28	22	28	.1	.0	.1
AT&T	688	716	717	1.7	1.5	1.5
Atmel	NA	94	123	NA	.2	.3
Bipolar Integrated Technology	6	1	1	.0	.0	.0
Brooktree	NA	52	70	NA	.1	.1
Burr-Brown	144	141	145	.4	.3	.3
California Micro Devices	28	30	27	.1	.1	.1
Catalyst	5	31	36	.0	.1	.1
Cherry Semiconductor	33	32	36	.1	.1	.1
Chips & Technologies	160	240	265	.4	.5	.6
Cirrus Logic	NA	29	130	NA	.1	.3
Comlinear	NA	10	13	NA	.0	.0
Crystal	NA	12	15	NA	.0	.0
Cypress Semiconductor	135	196	223	.3	.4	.5
Dallas Semiconductor	NA	13	17	NA	.0	.0
Elantec	NA	12	13	NA	.0	.0
Exar	47	49	75	.1	.1	.2
Exel	0	1	0	.0	.0	.0
General Electric	389	0	0	.9	.0	.0
Gennum	NA	20	18	NA	.0	.0
Gould AMI	101	117	90	.2	.2	.2
Harris	329	692	655	.8	1.5	1.4
Hewlett-Packard	0	0	230	.0	.0	.5
Holt	9	9	10	.0	.0	.0
Honeywell	142	25	24	.3	.1	.1
Hughes	47	37	42	.1	.1	.1

(Continued)



Table 2 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
North American Companies (Continued)						
IC Sensors	NA	7	6	NA	.0	.0
IMI	15	15	15	.0	.0	.0
Inova	NA	21	10	NA	.0	.0
Integrated Device Technology	171	204	199	.4	.4	.4
Intel	2,350	2,430	3,171	5.7	5.2	6.7
International CMOS Technology	NA	9	14	NA	.0	.0
Int'l. Microelectronic Prod.	47	53	56	.1	.1	.1
International Rectifier	0	3	1	.0	.0	.0
ITT	214	235	210	.5	.5	.4
Kulite	NA	25	28	NA	.1	.1
Lattice	22	31	62	.1	.1	.1
Linear Technology	59	70	83	.1	.1	.2
LSI Logic	375	512	598	.9	1.1	1.3
Macronix	NA	31	7	NA	.1	.0
Maxim	35	43	65	.1	.1	.1
MCE	NA	NA	4	NA	NA	.0
Micrel	NA	NA	5	NA	NA	.0
Micro Linear	24	28	45	.1	.1	.1
Micro Power Systems	26	21	24	.1	.0	.1
Microchip Technology	111	124	85	.3	.3	.2
Micron Technology	331	395	286	.8	.8	.6
Mitel	43	54	47	.1	.1	.1
MOSel	12	20	31	.0	.0	.1
Motorola	2,259	2,519	2,860	5.5	5.4	6.0
National Semiconductor	1,575	1,548	1,649	3.8	3.3	3.5
NCR	132	120	145	.3	.3	.3
Novasensor Inc.	NA	NA	12	NA	NA	.0
Pacific Monolithics	NA	NA	7	NA	NA	.0
Performance Semiconductor	NA	32	51	NA	.1	.1
Plus Logic	0	0	1	.0	.0	.0
Precision Monolithics	85	88	91	.2	.2	.2
Raytheon	84	82	74	.2	.2	.2
Rockwell	174	165	200	.4	.4	.4
Saratoga Semiconductor	10	10	0	.0	.0	.0
Seagate Micro-Electronics	NA	NA	9	NA	NA	.0
SEEQ Technology	60	53	45	.1	.1	.1
Semtech	NA	NA	2	NA	NA	.0
Sensym	NA	NA	6	NA	NA	.0
Sierra Semiconductor	47	55	61	.1	.1	.1
Signal Processing Technology	NA	NA	5	NA	NA	.0
Silicon General	35	36	36	.1	.1	.1
Silicon Systems	125	112	165	.3	.2	.3
Siliconix	70	54	54	.2	.1	.1
Sipex	NA	22	21	NA	.0	.0

(Continued)

Table 2 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
North American Companies (Continued)						
Solitron	13	10	9	.0	.0	.0
Standard Microsystems	41	42	49	.1	.1	.1
Supertex	11	15	19	.0	.0	.0
Tektronix	NA	NA	35	NA	NA	.1
Teledyne	35	23	22	.1	.0	.0
Texas Instruments	2,637	2,691	2,488	6.4	5.7	5.3
TRW	25	27	28	.1	.1	.1
Unitrode	51	50	50	.1	.1	.1
Universal	10	13	14	.0	.0	.0
Vertex	NA	11	8	.0	.0	.0
Vitellic	40	66	64	.1	.1	.1
VLSI Technology	221	286	324	.5	.6	.7
VTC Inc.	46	44	40	.1	.1	.1
WaferScale Integration	35	35	33	.1	.1	.1
Weitek	35	49	57	.1	.1	.1
Western Digital	100	135	148	.2	.3	.3
Xicor	90	90	71	.2	.2	.2
Xilinx	27	44	84	.1	.1	.2
Zilog	90	99	100	.2	.2	.2
Other North American Companies	91	188	0	.2	.4	.0
Japanese Companies						
Fuji Electric	20,375	23,800	22,129	49.6	50.7	46.8
Fujitsu	64	74	80	.2	.2	.2
Fujitsu	2,420	2,738	2,639	5.9	5.8	5.6
Hitachi	2,729	3,218	3,182	6.6	6.9	6.7
Matsushita	1,328	1,244	1,243	3.2	2.7	2.6
Mitsubishi	1,975	2,185	1,940	4.8	4.7	4.1
NEC	3,884	4,321	4,207	9.5	9.2	8.9
New JRC	146	154	161	.4	.3	.3
NMB Semiconductor	199	247	201	.5	.5	.4
Oki	902	1,111	1,031	2.2	2.4	2.2
Ricoh	85	91	96	.2	.2	.2
Rohm	325	343	348	.8	.7	.7
Sanken	157	156	164	.4	.3	.3
Sanyo	811	975	979	2.0	2.1	2.1
Seiko Epson	311	368	213	.8	.8	.5
Sharp	751	902	986	1.8	1.9	2.1
Shindengen Electric	NA	NA	33	NA	NA	.1
Sony	621	732	791	1.5	1.6	1.7
Toko	NA	NA	54	NA	NA	.1
Toshiba	3,316	3,774	3,628	8.1	8.0	7.7
Yamaha	151	143	153	.4	.3	.3
Other Japanese Companies	200	1,024	0	.5	2.2	.0

(Continued)

Table 2 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
European Companies	3,429	3,915	4,398	8.3	8.3	9.3
ABB-HAFO	28	23	24	.1	.0	.1
Austria Mikro Systeme	44	56	59	.1	.1	.1
Ericsson	52	54	56	.1	.1	.1
European Silicon Structures	13	18	27	.0	.0	.1
Eurosil	29	30	39	.1	.1	.1
GEC Plessey	0	0	354	.0	.0	.7
Inmos	110	0	0	.3	.0	.0
Matra MHS	71	85	100	.2	.2	.2
MEDL	29	39	0	.1	.1	.0
Mietec	42	52	92	.1	.1	.2
Philips	1,281	1,250	1,473	3.1	2.7	3.1
Plessey	237	240	0	.6	.5	.0
SGS-Thomson	833	1,019	1,148	2.0	2.2	2.4
Siemens	483	847	835	1.2	1.8	1.8
STC	21	17	22	.1	.0	.0
Telefunken Electronic	124	126	141	.3	.3	.3
TMS	0	33	28	.0	.1	.1
Other European Companies	32	26	0	.1	.1	.0
Asia/Pacific Companies	1,274	1,809	1,899	3.1	3.9	4.0
Daewoo	7	10	12	.0	.0	.0
ERSO	NA	NA	1	NA	NA	.0
Goldstar	136	147	163	.3	.3	.3
Hualon Microelectronics Corp.	NA	NA	50	NA	NA	.1
Hyundai	106	210	115	.3	.4	.2
Korean Electronic Co.	25	24	28	.1	.1	.1
Samsung	850	1,182	1,238	2.1	2.5	2.6
United Microelectronics	106	210	150	.3	.4	.3
Winbond	NA	NA	50	NA	NA	.1
Other Asia/Pacific Companies	44	26	58	.1	.1	.1

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 3**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Company:	Each					
Product:	Bipolar Digital					
Region of Consumption:	Worldwide					
Distribution Channel:	NM					
Application:	All					
Specification:	All					
<b>Total Market</b>	<b>5,200</b>	<b>4,510</b>	<b>4,440</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>2,761</b>	<b>2,221</b>	<b>2,152</b>	<b>53.1</b>	<b>49.2</b>	<b>48.5</b>
Advanced Micro Devices	536	474	407	10.3	10.5	9.2
Applied Micro Circuits Corp.	27	20	24	.5	.4	.5
AT&T	61	56	59	1.2	1.2	1.3
Atmel	NA	8	14	NA	.2	.3
Bipolar Integrated Technology	6	1	1	.1	.0	.0
Chips & Technologies	30	24	25	.6	.5	.6
Harris	62	50	60	1.2	1.1	1.4
Honeywell	27	0	0	.5	.0	.0
Intel	22	10	5	.4	.2	.1
Motorola	435	369	406	8.4	8.2	9.1
National Semiconductor	550	458	423	10.6	10.2	9.5
Raytheon	55	55	54	1.1	1.2	1.2
Teledyne	2	3	3	.0	.1	.1
Texas Instruments	940	671	663	18.1	14.9	14.9
TRW	0	7	8	.0	.2	.2
Other North American Companies	8	15	0	.2	.3	.0
<b>Japanese Companies</b>	<b>1,791</b>	<b>1,755</b>	<b>1,843</b>	<b>34.4</b>	<b>38.9</b>	<b>41.5</b>
Fujitsu	653	617	690	12.6	13.7	15.5
Ritachi	501	479	510	9.6	10.6	11.5
Matsushita	30	14	14	.6	.3	.3
Mitsubishi	127	125	105	2.4	2.8	2.4
NEC	292	302	295	5.6	6.7	6.6
New JRC	1	1	1	.0	.0	.0
Oki	38	48	47	.7	1.1	1.1
Rohm	0	0	1	.0	.0	.0
Sanyo	41	67	67	.8	1.5	1.5
Toshiba	108	102	113	2.1	2.3	2.5
<b>European Companies</b>	<b>598</b>	<b>502</b>	<b>419</b>	<b>11.5</b>	<b>11.1</b>	<b>9.4</b>
GEC Plessey	0	0	66	.0	.0	1.5
Philips	413	306	280	7.9	6.8	6.3
Plessey	94	122	0	1.8	2.7	.0

(Continued)

**Table 3 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>European Companies (Continued)</b>						
SGS-Thomson	20	7	10	.4	.2	.2
Siemens	36	54	45	.7	1.2	1.0
STC	7	4	11	.1	.1	.2
Telefunken Electronic	19	5	7	.4	.1	.2
Other European Companies	9	4	0	.2	.1	.0
<b>Asia/Pacific Companies</b>	<b>50</b>	<b>32</b>	<b>26</b>	<b>1.0</b>	<b>.7</b>	<b>.6</b>
Goldstar	32	32	26	.6	.7	.6
Other Asia/Pacific Companies	18	0	0	.3	.0	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

Table 4  
Worldwide Semiconductor Market Share Estimates  
(Factory Revenue in Millions of U.S. Dollars)

Company:	Each			Market Share (%)		
	Product:	TTL/Other		1988	1989	1990
Region of Consumption:	Worldwide					
Distribution Channel:	NM					
Application:	All					
Specification:	All					
	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Total Market</b>	<b>4,071</b>	<b>3,402</b>	<b>3,168</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>2,359</b>	<b>1,791</b>	<b>1,667</b>	<b>57.9</b>	<b>52.6</b>	<b>52.6</b>
Advanced Micro Devices	524	401	306	12.9	11.8	9.7
AT&T	48	44	46	1.2	1.3	1.5
Chips & Technologies	30	24	25	.7	.7	.8
Harris	62	50	60	1.5	1.5	1.9
Intel	22	10	5	.5	.3	.2
Motorola	233	184	174	5.7	5.4	5.5
National Semiconductor	450	357	333	11.1	10.5	10.5
Raytheon	48	47	52	1.2	1.4	1.6
Teledyne	2	3	3	.0	.1	.1
Texas Instruments	940	671	663	23.1	19.7	20.9
<b>Japanese Companies</b>	<b>1,208</b>	<b>1,176</b>	<b>1,159</b>	<b>29.7</b>	<b>34.6</b>	<b>36.6</b>
Fujitsu	317	294	298	7.8	8.6	9.4
Hitachi	376	357	364	9.2	10.5	11.5
Matsushita	21	10	9	.5	.3	.3
Mitsubishi	127	125	105	3.1	3.7	3.3
NEC	184	195	193	4.5	5.7	6.1
New JRC	1	1	1	.0	.0	.0
NMB Semiconductor	1	0	0	.0	.0	.0
Oki	35	43	42	.9	1.3	1.3
Rohm	0	0	1	.0	.0	.0
Sanyo	41	67	67	1.0	2.0	2.1
Toshiba	105	84	79	2.6	2.5	2.5
<b>European Companies</b>	<b>454</b>	<b>403</b>	<b>316</b>	<b>11.2</b>	<b>11.8</b>	<b>10.0</b>
GEC Plessey	0	0	20	.0	.0	.6
Philips	393	290	266	9.7	8.5	8.4
Plessey	8	82	0	.2	2.4	.0
SGS-Thomson	20	7	10	.5	.2	.3
Siemens	8	16	13	.2	.5	.4
Telefunken Electronic	19	5	7	.5	.1	.2
Other European Companies	6	3	0	.1	.1	.0

(Continued)

**Table 4 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Asia/Pacific Companies	50	32	26	1.2	.9	.8
Goldstar	32	32	26	.8	.9	.8
Other Asia/Pacific Companies	18	0	0	.4	.0	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 5**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company: Each  
 Product: ECL  
 Region of Consumption: Worldwide  
 Distribution Channel: NM  
 Application: All  
 Specification: All

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Total Market</b>	<b>1,130</b>	<b>1,108</b>	<b>1,272</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>402</b>	<b>430</b>	<b>485</b>	<b>35.6</b>	<b>38.8</b>	<b>38.1</b>
Advanced Micro Devices	12	73	101	1.1	6.6	7.9
Applied Micro Circuits Corp.	27	20	24	2.4	1.8	1.9
AT&T	13	12	13	1.2	1.1	1.0
Atmel	NA	8	14	NA	.7	1.1
Bipolar Integrated Technology	6	1	1	.5	.1	.1
Honeywell	27	0	0	2.4	.0	.0
Motorola	202	185	232	17.9	16.7	18.2
National Semiconductor	100	101	90	8.8	9.1	7.1
Raytheon	7	8	2	.6	.7	.2
TRW	0	7	8	.0	.6	.6
Other North American Companies	8	15	0	.7	1.4	.0
<b>Japanese Companies</b>	<b>584</b>	<b>579</b>	<b>684</b>	<b>51.7</b>	<b>52.3</b>	<b>53.8</b>
Fujitsu	336	323	392	29.7	29.2	30.8
Hitachi	125	122	146	11.1	11.0	11.5
Matsushita	9	4	5	.8	.4	.4
NEC	108	107	102	9.6	9.7	8.0
Oki	3	5	5	.3	.5	.4
Toshiba	3	18	34	.3	1.6	2.7
<b>European Companies</b>	<b>144</b>	<b>99</b>	<b>103</b>	<b>12.7</b>	<b>8.9</b>	<b>8.1</b>
GEC Plessey	0	0	46	.0	.0	3.6
Philips	20	16	14	1.8	1.4	1.1
Plessey	86	40	0	7.6	3.6	.0
Siemens	28	38	32	2.5	3.4	2.5
STC	7	4	11	.6	.4	.9
Other European Companies	3	1	0	.3	.1	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)



**Table 6**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company: Each  
 Product: Bipolar Digital Memory  
 Region of Consumption: Worldwide  
 Distribution Channel: NM  
 Application: All  
 Specification: All

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Total Market</b>	689	540	459	100.0	100.0	100.0
<b>North American Companies</b>	213	167	130	30.9	30.9	28.3
Advanced Micro Devices	104	85	65	15.1	15.7	14.2
Harris	3	0	5	.4	.0	1.1
Motorola	7	4	3	1.0	.7	.7
National Semiconductor	35	56	29	5.1	10.4	6.3
Raytheon	14	12	18	2.0	2.2	3.9
Texas Instruments	50	10	10	7.3	1.9	2.2
<b>Japanese Companies</b>	417	326	284	60.5	60.4	61.9
Fujitsu	254	190	158	36.9	35.2	34.4
Hitachi	119	111	104	17.3	20.6	22.7
NEC	44	25	22	6.4	4.6	4.8
<b>European Companies</b>	59	47	45	8.6	8.7	9.8
Philips	58	47	45	8.4	8.7	9.8
Other European Companies	1	0	0	.1	.0	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 7**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Company:	Each					
Product:	Bipolar Logic and Microcomponents					
Region of Consumption:	Worldwide					
Distribution Channel:	NM					
Application:	All					
Specification:	All					
<b>Total Market</b>	<b>4,511</b>	<b>3,970</b>	<b>3,981</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>2,548</b>	<b>2,054</b>	<b>2,022</b>	<b>56.5</b>	<b>51.7</b>	<b>50.8</b>
Advanced Micro Devices	432	389	342	9.6	9.8	8.6
Applied Micro Circuits Corp.	27	20	24	.6	.5	.6
AT&T	61	56	59	1.4	1.4	1.5
Atmel	NA	8	14	NA	.2	.4
Bipolar Integrated Technology	6	1	1	.1	.0	.0
Chips & Technologies	30	24	25	.7	.6	.6
Harris	59	50	55	1.3	1.3	1.4
Honeywell	27	0	0	.6	.0	.0
Intel	22	10	5	.5	.3	.1
Motorola	428	365	403	9.5	9.2	10.1
National Semiconductor	515	402	394	11.4	10.1	9.9
Raytheon	41	43	36	.9	1.1	.9
Teledyne	2	3	3	.0	.1	.1
Texas Instruments	890	661	653	19.7	16.6	16.4
TRW	0	7	8	.0	.2	.2
Other North American Companies	8	15	0	.2	.4	.0
<b>Japanese Companies</b>	<b>1,374</b>	<b>1,429</b>	<b>1,559</b>	<b>30.5</b>	<b>36.0</b>	<b>39.2</b>
Fujitsu	399	427	532	8.8	10.8	13.4
Hitachi	382	368	406	8.5	9.3	10.2
Matsushita	30	14	14	.7	.4	.4
Mitsubishi	127	125	105	2.8	3.1	2.6
NEC	248	277	273	5.5	7.0	6.9
New JRC	1	1	1	.0	.0	.0
Oki	38	48	47	.8	1.2	1.2
Rohm	0	0	1	.0	.0	.0
Sanyo	41	67	67	.9	1.7	1.7
Toshiba	108	102	113	2.4	2.6	2.8
<b>European Companies</b>	<b>539</b>	<b>455</b>	<b>374</b>	<b>11.9</b>	<b>11.5</b>	<b>9.4</b>
GEC Plessey	0	0	66	.0	.0	1.7
Philips	355	259	235	7.9	6.5	5.9
Plessey	94	122	0	2.1	3.1	.0

(Continued)

**Table 7 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>European Companies (Continued)</b>						
SGS-Thomson	20	7	10	.4	.2	.3
Siemens	36	54	45	.8	1.4	1.1
STC	7	4	11	.2	.1	.3
Telefunken Electronic	19	5	7	.4	.1	.2
Other European Companies	8	4	0	.2	.1	.0
<b>Asia/Pacific Companies</b>						
Goldstar	50	32	26	1.1	.8	.7
Other Asia/Pacific Companies	32	32	26	.7	.8	.7
	18	0	0	.4	.0	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 8**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company: Each  
 Product: MOS Digital  
 Region of Consumption: Worldwide  
 Distribution Channel: NM  
 Application: All  
 Specification: All

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Total Market</b>	<b>26,988</b>	<b>33,024</b>	<b>32,292</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>9,754</b>	<b>11,277</b>	<b>12,388</b>	<b>36.1</b>	<b>34.1</b>	<b>38.4</b>
Actel	NA	7	21	NA	.0	.1
Advanced Micro Devices	482	549	570	1.8	1.7	1.8
Allegro MicroSystems	16	16	2	.1	.0	.0
Altera	37	59	78	.1	.2	.2
Analog Devices	20	20	20	.1	.1	.1
Appian Technology	27	37	50	.1	.1	.2
Applied Micro Circuits Corp.	1	2	4	.0	.0	.0
AT&T	380	411	461	1.4	1.2	1.4
Atmel	NA	73	98	NA	.2	.3
California Micro Devices	5	8	8	.0	.0	.0
Catalyst	5	31	35	.0	.1	.1
Chips & Technologies	130	216	240	.5	.7	.7
Cirrus Logic	NA	29	129	NA	.1	.4
Cypress Semiconductor	135	196	223	.5	.6	.7
Dallas Semiconductor	NA	10	14	NA	.0	.0
Exar	7	3	0	.0	.0	.0
Exel	0	1	0	.0	.0	.0
General Electric	269	0	0	1.0	.0	.0
Gould AMI	101	101	67	.4	.3	.2
Harris	121	362	335	.4	1.1	1.0
Hewlett-Packard	0	0	230	.0	.0	.7
Holt	0	0	3	.0	.0	.0
Honeywell	88	4	4	.3	.0	.0
Hughes	47	37	34	.2	.1	.1
IMI	15	15	14	.1	.0	.0
Inova	NA	21	10	NA	.1	.0
Integrated Device Technology	171	203	196	.6	.6	.6
Intel	2,328	2,420	3,157	8.6	7.3	9.8
International CMOS Technology	NA	9	14	NA	.0	.0
Int'l. Microelectronic Prod.	47	33	38	.2	.1	.1
ITT	150	185	107	.6	.6	.3
Lattice	22	31	62	.1	.1	.2
LSI Logic	375	512	596	1.4	1.6	1.8

(Continued)

**Table 8 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>North American Companies (Continued)</b>						
Macronix	NA	31	7	NA	.1	.0
Microchip Technology	111	124	85	.4	.4	.3
Micron Technology	331	395	286	1.2	1.2	.9
MOSel	12	20	31	.0	.1	.1
Motorola	1,399	1,705	1,963	5.2	5.2	6.1
National Semiconductor	485	532	607	1.8	1.6	1.9
NCR	132	94	115	.5	.3	.4
Performance Semiconductor	NA	32	51	NA	.1	.2
Plus Logic	0	0	1	.0	.0	.0
Raytheon	2	0	0	.0	.0	.0
Rockwell	174	42	40	.6	.1	.1
Saratoga Semiconductor	10	10	0	.0	.0	.0
SEEQ Technology	60	53	45	.2	.2	.1
Sierra Semiconductor	24	27	6	.1	.1	.0
Siliconix	3	0	0	.0	.0	.0
Standard Microsystems	41	42	49	.2	.1	.2
Supertex	0	0	6	.0	.0	.0
Texas Instruments	1,271	1,603	1,367	4.7	4.9	4.2
TRW	5	5	6	.0	.0	.0
Universal	6	9	10	.0	.0	.0
Vertex	NA	11	8	.0	.0	.0
Vitellic	40	66	64	.1	.2	.2
VLSI Technology	221	286	324	.8	.9	1.0
VTC Inc.	19	17	7	.1	.1	.0
WaferScale Integration	35	35	33	.1	.1	.1
Weitek	35	49	57	.1	.1	.2
Western Digital	100	135	148	.4	.4	.5
Xicor	87	87	68	.3	.3	.2
Xilinx	27	44	84	.1	.1	.3
Zilog	90	99	100	.3	.3	.3
Other North American Companies	55	123	0	.2	.4	.0
<b>Japanese Companies</b>						
Fuji Electric	31	31	29	.1	.1	.1
Fujitsu	1,616	1,958	1,785	6.0	5.9	5.5
Hitachi	1,885	2,407	2,325	7.0	7.3	7.2
Matsushita	875	854	819	3.2	2.6	2.5
Mitsubishi	1,453	1,676	1,394	5.4	5.1	4.3
NEC	3,123	3,604	3,495	11.6	10.9	10.8
New JRC	27	34	38	.1	.1	.1
NMB Semiconductor	199	247	201	.7	.7	.6
Okii	841	1,028	949	3.1	3.1	2.9
Ricoh	85	91	96	.3	.3	.3
Rohm	54	66	65	.2	.2	.2

(Continued)

Table 8 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Japanese Companies (Continued)</b>						
Sanyo	299	378	371	1.1	1.1	1.1
Seiko Epson	296	354	201	1.1	1.1	.6
Sharp	682	837	913	2.5	2.5	2.8
Sony	235	371	392	.9	1.1	1.2
Toshiba	2,639	3,100	2,905	9.8	9.4	9.0
Yamaha	151	130	145	.6	.4	.4
Other Japanese Companies	3	840	0	.0	2.5	.0
<b>European Companies</b>						
ABB-HAFO	28	23	24	.1	.1	.1
Austria Mikro Systeme	40	47	37	.1	.1	.1
Ericsson	6	7	8	.0	.0	.0
European Silicon Structures	13	18	27	.0	.1	.1
Eurosil	29	30	39	.1	.1	.1
GEC Plessey	0	0	115	.0	.0	.4
Inmos	110	0	0	.4	.0	.0
Matra MES	71	85	96	.3	.3	.3
MEDL	29	35	0	.1	.1	.0
Mietec	42	52	20	.2	.2	.1
Philips	402	422	540	1.5	1.3	1.7
Plessey	76	83	0	.3	.3	.0
SGS-Thomson	461	619	584	1.7	1.9	1.8
Siemens	327	641	600	1.2	1.9	1.9
STC	10	8	5	.0	.0	.0
Telefunken Electronic	20	20	23	.1	.1	.1
TMS	0	26	19	.0	.1	.1
Other European Companies	20	19	0	.1	.1	.0
<b>Asia/Pacific Companies</b>						
Daewoo	2	0	1	.0	.0	.0
Goldstar	63	106	117	.2	.3	.4
Hualon Microelectronics Corp.	NA	NA	49	NA	NA	.2
Hyundai	106	210	115	.4	.6	.4
Samsung	765	1,066	1,146	2.8	3.2	3.5
United Microelectronics	106	210	150	.4	.6	.5
Winbond	NA	NA	32	NA	NA	.1
Other Asia/Pacific Companies	14	14	0	.1	.0	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 9**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company:	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Product:	Each			N/PMOS		
Region of Consumption:	Worldwide					
Distribution Channel:	NM					
Application:	All					
Specification:	All					
<b>Total Market</b>	<b>10,196</b>	<b>10,843</b>	<b>7,007</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>3,997</b>	<b>3,766</b>	<b>2,272</b>	<b>39.2</b>	<b>34.7</b>	<b>32.4</b>
Advanced Micro Devices	407	327	252	4.0	3.0	3.6
Allegro MicroSystems	7	4	0	.1	.0	.0
AT&T	52	56	67	.5	.5	1.0
Gould AMI	25	101	12	.2	.9	.2
Harris	2	13	2	.0	.1	.0
Hughes	1	1	1	.0	.0	.0
Intel	1,251	1,276	1,104	12.3	11.8	15.8
Int'l. Microelectronic Prod.	4	5	6	.0	.0	.1
ITT	80	80	43	.8	.7	.6
Macronix	NA	31	7	NA	.3	.1
Microchip Technology	68	55	24	.7	.5	.3
Micron Technology	253	298	71	2.5	2.7	1.0
Motorola	450	212	70	4.4	2.0	1.0
National Semiconductor	126	55	70	1.2	.5	1.0
NCR	57	14	9	.6	.1	.1
Rockwell	136	42	40	1.3	.4	.6
SEEQ Technology	34	11	5	.3	.1	.1
Standard Microsystems	34	10	9	.3	.1	.1
Texas Instruments	845	1,048	371	8.3	9.7	5.3
VLSI Technology	15	0	0	.1	.0	.0
Xicor	77	68	53	.8	.6	.8
Zilog	68	55	56	.7	.5	.8
Other North American Companies	5	4	0	.0	.0	.0
<b>Japanese Companies</b>	<b>5,120</b>	<b>5,886</b>	<b>4,031</b>	<b>50.2</b>	<b>54.3</b>	<b>57.5</b>
Fujitsu	535	606	404	5.2	5.6	5.8
Hitachi	721	800	453	7.1	7.4	6.5
Matsushita	371	333	293	3.6	3.1	4.2
Mitsubishi	808	908	677	7.9	8.4	9.7
NEC	1,140	1,202	946	11.2	11.1	13.5
Okai	304	341	234	3.0	3.1	3.3
Ricoh	40	37	35	.4	.3	.5
Rohm	1	1	2	.0	.0	.0

(Continued)

Table 9 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Japanese Companies (Continued)</b>						
Sanyo	63	26	21	.6	.2	.3
Sharp	187	212	243	1.8	2.0	3.5
Sony	42	52	51	.4	.5	.7
Toshiba	875	926	672	8.6	8.5	9.6
Yamaha	31	43	0	.3	.4	.0
Other Japanese Companies	2	399	0	.0	3.7	.0
<b>European Companies</b>						
Austria Mikro Systeme	8	11	11	.1	.1	.2
GEC Plessey	0	0	15	.0	.0	.2
Inmos	5	0	0	.0	.0	.0
Matra MHS	4	0	0	.0	.0	.0
Mietec	7	7	7	.1	.1	.1
Philips	175	105	101	1.7	1.0	1.4
Plessey	13	12	0	.1	.1	.0
SGS-Thomson	239	237	210	2.3	2.2	3.0
Siemens	228	260	235	2.2	2.4	3.4
STC	2	2	0	.0	.0	.0
Telefunken Electronic	20	20	23	.2	.2	.3
TMS	0	5	4	.0	.0	.1
Other European Companies	7	7	0	.1	.1	.0
<b>Asia/Pacific Companies</b>						
Goldstar	7	32	6	.1	.3	.1
Hyundai	33	1	0	.3	.0	.0
Samsung	301	422	42	3.0	3.9	.6
United Microelectronics	30	70	50	.3	.6	.7

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)



**Table 10**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Company:</b>	<b>Each</b>					
<b>Product:</b>	<b>CMOS</b>					
<b>Region of Consumption:</b>	<b>Worldwide</b>					
<b>Distribution Channel:</b>	<b>NM</b>					
<b>Application:</b>	<b>All</b>					
<b>Specification:</b>	<b>All</b>					
<b>Total Market</b>	<b>16,584</b>	<b>21,449</b>	<b>24,824</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>5,595</b>	<b>7,326</b>	<b>9,996</b>	<b>33.7</b>	<b>34.2</b>	<b>40.3</b>
Actel	NA	7	21	NA	.0	.1
Advanced Micro Devices	75	222	318	.5	1.0	1.3
Allegro MicroSystems	9	4	2	.1	.0	.0
Altera	37	59	78	.2	.3	.3
Analog Devices	20	20	20	.1	.1	.1
Appian Technology	27	37	50	.2	.2	.2
AT&T	328	355	394	2.0	1.7	1.6
Atmel	NA	73	98	NA	.3	.4
California Micro Devices	5	8	8	.0	.0	.0
Catalyst	5	31	35	.0	.1	.1
Chips & Technologies	130	216	240	.8	1.0	1.0
Cirrus Logic	NA	29	129	NA	.1	.5
Cypress Semiconductor	135	195	222	.8	.9	.9
Exar	7	3	0	.0	.0	.0
Exel	0	1	0	.0	.0	.0
General Electric	262	0	0	1.6	.0	.0
Gould AMI	76	0	55	.5	.0	.2
Harris	119	340	318	.7	1.6	1.3
Hewlett-Packard	0	0	230	.0	.0	.9
Holt	0	0	3	.0	.0	.0
Honeywell	88	4	4	.5	.0	.0
Hughes	46	36	33	.3	.2	.1
IMI	15	15	14	.1	.1	.1
Inova	NA	0	10	NA	.0	.0
Integrated Device Technology	171	202	191	1.0	.9	.8
Intel	1,077	1,144	2,053	6.5	5.3	8.3
International CMOS Technology	NA	9	14	NA	.0	.1
Int'l. Microelectronic Prod.	43	28	32	.3	.1	.1
ITT	70	105	64	.4	.5	.3
Lattice	22	31	62	.1	.1	.2
LSI Logic	374	507	591	2.3	2.4	2.4
Microchip Technology	3	3	61	.0	.0	.2
Micron Technology	0	97	215	.0	.5	.9

(Continued)

Table 10 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
North American Companies (Continued)						
MOSel	12	20	31	.1	.1	.1
Motorola	949	1,490	1,868	5.7	6.9	7.5
National Semiconductor	350	447	502	2.1	2.1	2.0
NCR	75	80	106	.5	.4	.4
Performance Semiconductor	NA	32	51	NA	.1	.2
Plus Logic	0	0	1	.0	.0	.0
Raytheon	2	0	0	.0	.0	.0
Rockwell	38	0	0	.2	.0	.0
SEEQ Technology	26	42	40	.2	.2	.2
Sierra Semiconductor	24	27	6	.1	.1	.0
Siliconix	3	0	0	.0	.0	.0
Standard Microsystems	7	32	40	.0	.1	.2
Supertex	0	0	6	.0	.0	.0
Texas Instruments	415	539	980	2.5	2.5	3.9
TRW	5	5	6	.0	.0	.0
Universal	6	9	10	.0	.0	.0
Vertex	NA	11	8	.0	.1	.0
Vitellic	40	66	64	.2	.3	.3
VLSI Technology	206	286	324	1.2	1.3	1.3
VTC Inc.	19	17	7	.1	.1	.0
WaferScale Integration	35	35	33	.2	.2	.1
Weitek	35	49	57	.2	.2	.2
Western Digital	100	135	148	.6	.6	.6
Xicor	10	19	15	.1	.1	.1
Xilinx	27	44	84	.2	.2	.3
Zilog	22	44	44	.1	.2	.2
Other North American Companies	45	116	0	.3	.5	.0
Japanese Companies						
Fuji Electric	30	25	27	.2	.1	.1
Fujitsu	1,081	1,241	1,279	6.5	5.8	5.2
Hitachi	1,157	1,454	1,767	7.0	6.8	7.1
Matsushita	504	521	526	3.0	2.4	2.1
Mitsubishi	645	768	717	3.9	3.6	2.9
NEC	1,965	2,314	2,461	11.8	10.8	9.9
New JRC	27	34	38	.2	.2	.2
NMB Semiconductor	199	247	201	1.2	1.2	.8
Oki	537	623	689	3.2	2.9	2.8
Ricoh	45	53	60	.3	.2	.2
Rohm	53	65	63	.3	.3	.3
Sanyo	236	352	350	1.4	1.6	1.4
Seiko Epson	296	354	201	1.8	1.7	.8
Sharp	495	625	670	3.0	2.9	2.7
Sony	193	319	341	1.2	1.5	1.4

(Continued)

Table 10 (Continued)  
Worldwide Semiconductor Market Share Estimates  
(Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Japanese Companies (Continued)</b>						
Toshiba	1,764	2,100	2,233	10.6	9.8	9.0
Yamaha	120	87	145	.7	.4	.6
Other Japanese Companies	1	441	0	.0	2.1	.0
<b>European Companies</b>						
ABB-HAFO	28	23	24	.2	.1	.1
Austria Mikro Systeme	32	36	26	.2	.2	.1
Ericsson	6	7	8	.0	.0	.0
European Silicon Structures	13	18	27	.1	.1	.1
Eurosil	29	30	39	.2	.1	.2
GEC Plessey	0	0	100	.0	.0	.4
Inmos	105	0	0	.6	.0	.0
Matra MBS	67	85	96	.4	.4	.4
MEDL	29	35	0	.2	.2	.0
Mietec	17	22	13	.1	.1	.1
Philips	227	317	439	1.4	1.5	1.8
Plessey	63	71	0	.4	.3	.0
SGS-Thomson	222	372	362	1.3	1.7	1.5
Siemens	99	381	365	.6	1.8	1.5
STC	6	3	0	.0	.0	.0
TMS	0	21	15	.0	.1	.1
Other European Companies	13	12	0	.1	.1	.0
<b>Asia/Pacific Companies</b>						
Daewoo	2	0	1	.0	.0	.0
Goldstar	56	74	111	.3	.3	.4
Hualon Microelectronics Corp.	NA	NA	49	NA	NA	.2
Hyundai	73	209	115	.4	1.0	.5
Samsung	464	644	1,104	2.8	3.0	4.4
United Microelectronics	76	140	100	.5	.7	.4
Winbond	NA	NA	32	NA	NA	.1
Other Asia/Pacific Companies	14	0	0	.1	.0	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 11**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company: Each  
 Product: BiCMOS  
 Region of Consumption: Worldwide  
 Distribution Channel: NM  
 Application: All  
 Specification: All

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Total Market</b>	208	732	461	100.0	100.0	100.0
<b>North American Companies</b>	162	185	120	77.9	25.3	26.0
Allegro MicroSystems	0	8	0	.0	1.1	.0
Applied Micro Circuits Corp.	1	2	4	.5	.3	.9
Cypress Semiconductor	0	1	1	.0	.1	.2
Dallas Semiconductor	NA	10	14	NA	1.4	3.0
General Electric	7	0	0	3.4	.0	.0
Harris	0	9	15	.0	1.2	3.3
Inova	NA	21	0	NA	2.9	.0
Integrated Device Technology	0	1	5	.0	.1	1.1
LSI Logic	1	5	5	.5	.7	1.1
Microchip Technology	40	66	0	19.2	9.0	.0
Micron Technology	78	0	0	37.5	.0	.0
Motorola	0	3	25	.0	.4	5.4
National Semiconductor	9	30	35	4.3	4.1	7.6
Saratoga Semiconductor	10	10	0	4.8	1.4	.0
Texas Instruments	11	16	16	5.3	2.2	3.5
Other North American Companies	5	3	0	2.4	.4	.0
<b>Japanese Companies</b>	26	497	324	12.5	67.9	70.3
Fuji Electric	1	6	2	.5	.8	.4
Fujitsu	0	111	102	.0	15.2	22.1
Hitachi	7	153	105	3.4	20.9	22.8
NEC	18	88	88	8.7	12.0	19.1
Oki	0	64	26	.0	8.7	5.6
Ricoh	0	1	1	.0	.1	.2
Toshiba	0	74	0	.0	10.1	.0
<b>European Companies</b>	20	36	17	9.6	4.9	3.7
Mitetec	18	23	0	8.7	3.1	.0
SGS-Thomson	0	10	12	.0	1.4	2.6
STC	2	3	5	1.0	.4	1.1

(Continued)

**Table 11 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Asia/Pacific Companies	0	14	0	.0	1.9	.0
Other Asia/Pacific Companies	0	14	0	.0	1.9	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 12**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company:	Each			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Product:	MOS Memory					
Region of Consumption:	Worldwide					
Distribution Channel:	NM					
Application:	All					
Specification:	All					
	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Total Market</b>	<b>11,692</b>	<b>16,361</b>	<b>13,091</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>2,836</b>	<b>3,688</b>	<b>2,990</b>	<b>24.3</b>	<b>22.5</b>	<b>22.8</b>
Advanced Micro Devices	207	258	253	1.8	1.6	1.9
AT&T	24	13	13	.2	.1	.1
Atmel	NA	47	54	NA	.3	.4
Catalyst	5	31	35	.0	.2	.3
Cypress Semiconductor	94	149	166	.8	.9	1.3
Dallas Semiconductor	NA	10	14	NA	.1	.1
Exar	3	0	0	.0	.0	.0
General Electric	29	0	0	.2	.0	.0
Gould AMI	15	25	14	.1	.2	.1
Harris	26	37	24	.2	.2	.2
Honeywell	14	2	2	.1	.0	.0
Inova	NA	21	10	NA	.1	.1
Integrated Device Technology	135	158	132	1.2	1.0	1.0
Intel	392	433	371	3.4	2.6	2.8
International CMOS Technology	NA	6	8	NA	.0	.1
Int'l. Microelectronic Prod.	0	17	8	.0	.1	.1
ITT	0	10	0	.0	.1	.0
Lattice	2	0	0	.0	.0	.0
Macronix	NA	31	7	NA	.2	.1
Microchip Technology	82	94	60	.7	.6	.5
Micron Technology	331	395	286	2.8	2.4	2.2
MOSel	12	20	31	.1	.1	.2
Motorola	236	407	395	2.0	2.5	3.0
National Semiconductor	135	138	143	1.2	.8	1.1
NCR	6	8	4	.1	.0	.0
Performance Semiconductor	NA	16	19	NA	.1	.1
Saratoga Semiconductor	10	10	0	.1	.1	.0
SEEQ Technology	46	40	33	.4	.2	.3
Texas Instruments	834	1,095	741	7.1	6.7	5.7
Vitellic	40	66	64	.3	.4	.5
VLSI Technology	16	23	8	.1	.1	.1
WaferScale Integration	25	28	27	.2	.2	.2
Xicor	87	87	68	.7	.5	.5
Other North American Companies	30	13	0	.3	.1	.0

(Continued)

**Table 12 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Japanese Companies</b>	7,597	10,558	8,023	65.0	64.5	61.3
Fujitsu	1,067	1,265	1,006	9.1	7.7	7.7
Hitachi	1,114	1,534	1,366	9.5	9.4	10.4
Matsushita	230	370	284	2.0	2.3	2.2
Mitsubishi	966	1,161	853	8.3	7.1	6.5
NEC	1,490	1,739	1,376	12.7	10.6	10.5
NMB Semiconductor	199	247	201	1.7	1.5	1.5
Oki	353	473	392	3.0	2.9	3.0
Ricoh	26	31	29	.2	.2	.2
Rohm	8	10	7	.1	.1	.1
Sanyo	87	130	97	.7	.8	.7
Seiko Epson	94	141	62	.8	.9	.5
Sharp	344	476	497	2.9	2.9	3.8
Sony	103	228	227	.9	1.4	1.7
Toshiba	1,516	1,918	1,626	13.0	11.7	12.4
Other Japanese Companies	0	835	0	.0	5.1	.0
<b>European Companies</b>	464	786	760	4.0	4.8	5.8
Austria Mikro Systeme	4	0	0	.0	.0	.0
GEC Plessey	0	0	8	.0	.0	.1
Inmos	53	0	0	.5	.0	.0
Matra MHS	28	31	37	.2	.2	.3
MEDL	5	7	0	.0	.0	.0
Philips	35	60	96	.3	.4	.7
Plessey	0	3	0	.0	.0	.0
SGS-Thomson	185	269	299	1.6	1.6	2.3
Siemens	150	416	320	1.3	2.5	2.4
STC	2	0	0	.0	.0	.0
Other European Companies	2	0	0	.0	.0	.0
<b>Asia/Pacific Companies</b>	795	1,329	1,318	6.8	8.1	10.1
Goldstar	27	82	96	.2	.5	.7
Hualon Microelectronics Corp.	NA	NA	39	NA	NA	.3
Hyundai	106	210	115	.9	1.3	.9
Samsung	650	935	971	5.6	5.7	7.4
United Microelectronics	12	102	66	.1	.6	.5
Winbond	NA	NA	14	NA	NA	.1

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

Table 13  
Worldwide Semiconductor Market Share Estimates  
(Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Company:	Each					
Product:	MOS Microcomponents					
Region of Consumption:	Worldwide					
Distribution Channel:	NM					
Application:	All					
Specification:	All					
<b>Total Market</b>	<b>7,144</b>	<b>8,202</b>	<b>10,068</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>3,872</b>	<b>4,526</b>	<b>5,912</b>	<b>54.2</b>	<b>55.2</b>	<b>58.7</b>
Advanced Micro Devices	183	172	178	2.6	2.1	1.8
Analog Devices	20	20	20	.3	.2	.2
Appian Technology	17	30	38	.2	.4	.4
AT&T	39	141	145	.5	1.7	1.4
California Micro Devices	1	8	8	.0	.1	.1
Chips & Technologies	130	216	240	1.8	2.6	2.4
Cirrus Logic	NA	29	129	NA	.4	1.3
Cypress Semiconductor	7	11	15	.1	.1	.1
General Electric	48	0	0	.7	.0	.0
Harris	62	115	110	.9	1.4	1.1
Holt	0	0	1	.0	.0	.0
Hughes	2	2	2	.0	.0	.0
IMI	1	0	0	.0	.0	.0
Integrated Device Technology	15	13	20	.2	.2	.2
Intel	1,835	1,929	2,726	25.7	23.5	27.1
ITT	15	25	28	.2	.3	.3
LSI Logic	18	67	93	.3	.8	.9
Microchip Technology	18	18	16	.3	.2	.2
Motorola	699	803	1,009	9.8	9.8	10.0
National Semiconductor	150	172	248	2.1	2.1	2.5
NCR	6	22	31	.1	.3	.3
Performance Semiconductor	NA	13	24	NA	.2	.2
Rockwell	51	42	40	.7	.5	.4
SEEQ Technology	0	0	12	.0	.0	.1
Sierra Semiconductor	1	1	1	.0	.0	.0
Standard Microsystems	34	34	40	.5	.4	.4
Texas Instruments	234	252	320	3.3	3.1	3.2
TRW	0	5	6	.0	.1	.1
VLSI Technology	54	94	105	.8	1.1	1.0
WaferScale Integration	0	2	2	.0	.0	.0
Weitek	35	49	57	.5	.6	.6
Western Digital	100	135	148	1.4	1.6	1.5
Zilog	90	99	100	1.3	1.2	1.0
Other North American Companies	7	7	0	.1	.1	.0

(Continued)



**Table 13 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Japanese Companies</b>	2,817	3,190	3,551	39.4	38.9	35.3
Fuji Electric	0	0	1	.0	.0	.0
Fujitsu	202	211	239	2.8	2.6	2.4
Hitachi	525	554	607	7.3	6.8	6.0
Matsushita	230	217	250	3.2	2.6	2.5
Mitsubishi	381	435	464	5.3	5.3	4.6
NEC	790	937	1,083	11.1	11.4	10.8
Oki	134	149	147	1.9	1.8	1.5
Ricoh	19	22	23	.3	.3	.2
Rohm	16	16	18	.2	.2	.2
Sanyo	70	70	80	1.0	.9	.8
Seiko Epson	12	12	11	.2	.1	.1
Sharp	54	112	138	.8	1.4	1.4
Sony	37	47	49	.5	.6	.5
Toshiba	346	407	441	4.8	5.0	4.4
Other Japanese Companies	1	1	0	.0	.0	.0
<b>European Companies</b>	401	433	538	5.6	5.3	5.3
Eurosil	2	2	4	.0	.0	.0
GEC Plessey	0	0	8	.0	.0	.1
Inmos	57	0	0	.8	.0	.0
Matra MHS	21	28	33	.3	.3	.3
MEDL	1	3	0	.0	.0	.0
Philips	114	131	192	1.6	1.6	1.9
Plessey	0	3	0	.0	.0	.0
SGS-Thomson	118	161	175	1.7	2.0	1.7
Siemens	88	92	116	1.2	1.1	1.2
TMS	0	13	10	.0	.2	.1
<b>Asia/Pacific Companies</b>	54	53	67	.8	.6	.7
Goldstar	4	2	3	.1	.0	.0
Samsung	15	8	22	.2	.1	.2
United Microelectronics	35	43	39	.5	.5	.4

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

Table 14  
Worldwide Semiconductor Market Share Estimates  
(Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Company:	Each					
Product:	MOS Logic					
Region of Consumption:	Worldwide					
Distribution Channel:	NM					
Application:	All					
Specification:	All					
<b>Total Market</b>	<b>8,152</b>	<b>8,461</b>	<b>9,133</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>3,046</b>	<b>3,063</b>	<b>3,486</b>	<b>37.4</b>	<b>36.2</b>	<b>38.2</b>
Actel	NA	7	21	NA	.1	.2
Advanced Micro Devices	92	119	139	1.1	1.4	1.5
Allegro MicroSystems	16	16	2	.2	.2	.0
Altera	37	59	78	.5	.7	.9
Appian Technology	10	7	12	.1	.1	.1
Applied Micro Circuits Corp.	1	2	4	.0	.0	.0
AT&T	317	257	303	3.9	3.0	3.3
Atmel	NA	26	44	NA	.3	.5
California Micro Devices	4	0	0	.0	.0	.0
Cypress Semiconductor	34	36	42	.4	.4	.5
Exar	4	3	0	.0	.0	.0
Exel	0	1	0	.0	.0	.0
General Electric	192	0	0	2.4	.0	.0
Gould AMI	86	76	53	1.1	.9	.6
Harris	33	210	201	.4	2.5	2.2
Hewlett-Packard	0	0	230	.0	.0	2.5
Holt	0	0	2	.0	.0	.0
Honeywell	74	2	2	.9	.0	.0
Hughes	45	35	32	.6	.4	.4
IMI	14	15	14	.2	.2	.2
Integrated Device Technology	21	32	44	.3	.4	.5
Intel	101	58	60	1.2	.7	.7
International CMOS Technology	NA	3	6	NA	.0	.1
Int'l. Microelectronic Prod.	47	16	30	.6	.2	.3
ITT	135	150	79	1.7	1.8	.9
Lattice	20	31	62	.2	.4	.7
LSI Logic	357	445	503	4.4	5.3	5.5
Microchip Technology	11	12	9	.1	.1	.1
Motorola	464	495	559	5.7	5.9	6.1
National Semiconductor	200	222	216	2.5	2.6	2.4
NCR	120	64	80	1.5	.8	.9
Performance Semiconductor	NA	3	8	NA	.0	.1
Plus Logic	0	0	1	.0	.0	.0

(Continued)

Table 14 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
North American Companies (Continued)						
Raytheon	2	0	0	.0	.0	.0
Rockwell	123	0	0	1.5	.0	.0
SEEQ Technology	14	13	0	.2	.2	.0
Sierra Semiconductor	23	26	5	.3	.3	.1
Siliconix	3	0	0	.0	.0	.0
Standard Microsystems	7	8	9	.1	.1	.1
Supertex	0	0	6	.0	.0	.1
Texas Instruments	203	256	306	2.5	3.0	3.4
TRW	5	0	0	.1	.0	.0
Universal	6	9	10	.1	.1	.1
Vertex	NA	11	8	.0	.1	.1
VLSI Technology	151	169	211	1.9	2.0	2.3
VTC Inc.	19	17	7	.2	.2	.1
WaferScale Integration	10	5	4	.1	.1	.0
Xilinx	27	44	84	.3	.5	.9
Other North American Companies	18	103	0	.2	1.2	.0
Japanese Companies						
Fuji Electric	31	31	28	.4	.4	.3
Fujitsu	347	482	540	4.3	5.7	5.9
Hitachi	246	319	352	3.0	3.8	3.9
Matsushita	415	267	285	5.1	3.2	3.1
Mitsubishi	106	80	77	1.3	.9	.8
NEC	843	928	1,036	10.3	11.0	11.3
New JRC	27	34	38	.3	.4	.4
Oki	354	406	410	4.3	4.8	4.5
Ricoh	40	38	44	.5	.4	.5
Rohm	30	40	40	.4	.5	.4
Sanyo	142	178	194	1.7	2.1	2.1
Seiko Epson	190	201	128	2.3	2.4	1.4
Sharp	284	249	278	3.5	2.9	3.0
Sony	95	96	116	1.2	1.1	1.3
Toshiba	777	775	838	9.5	9.2	9.2
Yamaha	151	130	145	1.9	1.5	1.6
Other Japanese Companies	2	4	0	.0	.0	.0
European Companies						
ABB-HAFO	28	23	24	.3	.3	.3
Austria Mikro Systeme	36	47	37	.4	.6	.4
Ericsson	6	7	8	.1	.1	.1
European Silicon Structures	13	18	27	.2	.2	.3
Eurosil	27	28	35	.3	.3	.4
GEC Plessey	0	0	99	.0	.0	1.1
Matra MHS	22	26	26	.3	.3	.3

(Continued)

**Table 14 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>European Companies (Continued)</b>						
MEDL	23	25	0	.3	.3	.0
Mietec	42	52	20	.5	.6	.2
Philips	253	231	252	3.1	2.7	2.8
Plessey	76	77	0	.9	.9	.0
SGS-Thomson	158	189	110	1.9	2.2	1.2
Siemens	89	133	164	1.1	1.6	1.8
STC	8	8	5	.1	.1	.1
Telefunken Electronic	20	20	23	.2	.2	.3
TMS	0	13	9	.0	.2	.1
Other European Companies	18	19	0	.2	.2	.0
<b>Asia/Pacific Companies</b>						
Daewoo	2	0	1	.0	.0	.0
Goldstar	32	22	18	.4	.3	.2
Hualon Microelectronics Corp.	NA	NA	10	NA	NA	.1
Samsung	100	123	153	1.2	1.5	1.7
United Microelectronics	59	65	45	.7	.8	.5
Winbond	NA	NA	18	NA	NA	.2
Other Asia/Pacific Companies	14	14	0	.2	.2	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 15**  
**Worldwide Semiconductor Market Share Estimates**  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Company:</b>	<b>Each</b>					
<b>Product:</b>	<b>Analog</b>					
<b>Region of Consumption:</b>	<b>Worldwide</b>					
<b>Distribution Channel:</b>	<b>NM</b>					
<b>Application:</b>	<b>All</b>					
<b>Specification:</b>	<b>All</b>					
<b>Total Market</b>	<b>8,880</b>	<b>9,390</b>	<b>10,571</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>3,475</b>	<b>3,902</b>	<b>4,337</b>	<b>39.1</b>	<b>41.6</b>	<b>41.0</b>
Advanced Micro Devices	66	77	76	.7	.8	.7
Allegro MicroSystems	86	98	96	1.0	1.0	.9
Anadigics	NA	NA	5	NA	NA	.0
Analog Devices	340	337	360	3.8	3.6	3.4
AT&T	247	249	197	2.8	2.7	1.9
Atmel	NA	13	11	NA	.1	.1
Brooktree	NA	52	70	NA	.6	.7
Burr-Brown	144	141	145	1.6	1.5	1.4
California Micro Devices	23	22	19	.3	.2	.2
Catalyst	0	0	1	.0	.0	.0
Cherry Semiconductor	33	32	36	.4	.3	.3
Cirrus Logic	NA	0	1	NA	.0	.0
Comlinear	NA	10	13	NA	.1	.1
Crystal	NA	12	15	NA	.1	.1
Dallas Semiconductor	NA	3	3	NA	.0	.0
Elantec	NA	12	13	NA	.1	.1
Exar	40	46	75	.5	.5	.7
General Electric	120	0	0	1.4	.0	.0
Gennum	NA	20	18	NA	.2	.2
Gould AMI	0	16	23	.0	.2	.2
Harris	146	280	260	1.6	3.0	2.5
Holt	9	9	7	.1	.1	.1
Honeywell	27	21	20	.3	.2	.2
Hughes	0	0	8	.0	.0	.1
IC Sensors	NA	7	6	NA	.1	.1
IMI	0	0	1	.0	.0	.0
Integrated Device Technology	0	1	3	.0	.0	.0
Intel	0	0	9	.0	.0	.1
Int'l. Microelectronic Prod.	0	20	18	.0	.2	.2
International Rectifier	0	3	1	.0	.0	.0
ITT	64	50	103	.7	.5	1.0
Kulite	NA	25	28	NA	.3	.3
Linear Technology	59	70	83	.7	.7	.8

(Continued)

Table 15 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
North American Companies (Continued)						
LSI Logic	0	0	2	.0	.0	.0
Maxim	35	43	65	.4	.5	.6
MCE	NA	NA	4	NA	NA	.0
Micrel	NA	NA	5	NA	NA	.0
Micro Linear	24	28	45	.3	.3	.4
Micro Power Systems	26	21	24	.3	.2	.2
Mitel	43	54	47	.5	.6	.4
Motorola	425	445	491	4.8	4.7	4.6
National Semiconductor	540	558	619	6.1	5.9	5.9
NCR	0	26	30	.0	.3	.3
Novasensor Inc.	NA	NA	12	NA	NA	.1
Pacific Monolithics	NA	NA	7	NA	NA	.1
Precision Monolithics	85	88	91	1.0	.9	.9
Raytheon	27	27	20	.3	.3	.2
Rockwell	0	123	160	.0	1.3	1.5
Seagate Micro-Electronics	NA	NA	9	NA	NA	.1
Semtech	NA	NA	2	NA	NA	.0
Sensym	NA	NA	6	NA	NA	.1
Sierra Semiconductor	23	28	55	.3	.3	.5
Signal Processing Technology	NA	NA	5	NA	NA	.0
Silicon General	35	36	36	.4	.4	.3
Silicon Systems	125	112	165	1.4	1.2	1.6
Siliconix	67	54	54	.8	.6	.5
Sipex	NA	22	21	NA	.2	.2
Solitron	13	10	9	.1	.1	.1
Supertex	11	15	13	.1	.2	.1
Tektronix	NA	NA	35	NA	NA	.3
Teledyne	33	20	19	.4	.2	.2
Texas Instruments	426	417	458	4.8	4.4	4.3
TRW	20	15	14	.2	.2	.1
Unitrode	51	50	50	.6	.5	.5
Universal	4	4	4	.0	.0	.0
VTC Inc.	27	27	33	.3	.3	.3
Xicor	3	3	3	.0	.0	.0
Other North American Companies	28	50	0	.3	.5	.0
Japanese Companies						
Fuji Electric	33	43	51	.4	.5	.5
Fujitsu	151	163	164	1.7	1.7	1.6
Hitachi	343	332	347	3.9	3.5	3.3
Matsushita	423	376	410	4.8	4.0	3.9
Mitsubishi	395	384	441	4.4	4.1	4.2
NEC	469	415	417	5.3	4.4	3.9
New JRC	118	119	122	1.3	1.3	1.2

(Continued)

Table 15 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Japanese Companies (Continued)</b>						
Oki	23	35	35	.3	.4	.3
Rohm	271	277	282	3.1	2.9	2.7
Sanken	157	156	164	1.8	1.7	1.6
Sanyo	471	530	541	5.3	5.6	5.1
Seiko Epson	15	14	12	.2	.1	.1
Sharp	69	65	73	.8	.7	.7
Shindengen Electric	NA	NA	33	NA	NA	.3
Sony	386	361	399	4.3	3.8	3.8
Toko	NA	NA	54	NA	NA	.5
Toshiba	569	572	610	6.4	6.1	5.8
Yamaha	0	13	8	.0	.1	.1
Other Japanese Companies	197	184	0	2.2	2.0	.0
<b>European Companies</b>	<b>1,147</b>	<b>1,278</b>	<b>1,842</b>	<b>12.9</b>	<b>13.6</b>	<b>17.4</b>
Austria Mikro Systeme	4	9	22	.0	.1	.2
Ericsson	46	47	48	.5	.5	.5
GEC Plessey	0	0	173	.0	.0	1.6
Matra MBS	0	0	4	.0	.0	.0
MEDL	0	4	0	.0	.0	.0
Mietec	0	0	72	.0	.0	.7
Philips	466	522	653	5.2	5.6	6.2
Plessey	67	35	0	.8	.4	.0
SGS-Thomson	352	393	554	4.0	4.2	5.2
Siemens	120	152	190	1.4	1.6	1.8
STC	4	5	6	.0	.1	.1
Telefunken Electronic	85	101	111	1.0	1.1	1.1
TMS	0	7	9	.0	.1	.1
Other European Companies	3	3	0	.0	.0	.0
<b>Asia/Pacific Companies</b>	<b>168</b>	<b>171</b>	<b>229</b>	<b>1.9</b>	<b>1.8</b>	<b>2.2</b>
Daewoo	5	10	11	.1	.1	.1
ERSO	NA	NA	1	NA	NA	.0
Goldstar	41	9	20	.5	.1	.2
Hualon Microelectronics Corp.	NA	NA	1	NA	NA	.0
Korean Electronic Co.	25	24	28	.3	.3	.3
Samsung	85	116	92	1.0	1.2	.9
Winbond	NA	NA	18	NA	NA	.2
Other Asia/Pacific Companies	12	12	58	.1	.1	.5

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 16**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Company:	Each					
Product:	Total Discrete					
Region of Consumption:	Worldwide					
Distribution Channel:	NM					
Application:	All					
Specification:	All					
<b>Total Market</b>	<b>7,612</b>	<b>7,662</b>	<b>8,235</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>2,171</b>	<b>2,120</b>	<b>2,203</b>	<b>28.5</b>	<b>27.7</b>	<b>26.8</b>
Acrian	21	26	0	.3	.3	.0
Allegro MicroSystems	18	23	17	.2	.3	.2
Analog Devices	0	0	1	.0	.0	.0
AT&T	161	147	130	2.1	1.9	1.6
General Electric	145	0	0	1.9	.0	.0
General Instrument	164	170	214	2.2	2.2	2.6
Harris	0	120	130	.0	1.6	1.6
Hewlett-Packard	57	56	56	.7	.7	.7
Honeywell	10	0	0	.1	.0	.0
International Rectifier	192	187	224	2.5	2.4	2.7
ITT	146	155	161	1.9	2.0	2.0
Micro Quality Semiconductor	0	2	0	.0	.0	.0
Microsemi	NA	NA	50	NA	NA	.6
Motorola	752	775	808	9.9	10.1	9.8
National Semiconductor	75	70	70	1.0	.9	.9
Powerex	115	105	112	1.5	1.4	1.4
Raytheon	15	14	10	.2	.2	.1
Semtech	NA	NA	16	NA	NA	.2
Siliconix	61	67	62	.8	.9	.8
Solitron	33	27	24	.4	.4	.3
Supertex	10	8	8	.1	.1	.1
Teledyne	0	0	3	.0	.0	.0
Texas Instruments	63	60	53	.8	.8	.6
Unitrode	62	59	54	.8	.8	.7
VQSI	21	0	0	.3	.0	.0
Other North American Companies	50	49	0	.7	.6	.0
<b>Japanese Companies</b>	<b>4,056</b>	<b>4,091</b>	<b>4,313</b>	<b>53.3</b>	<b>53.4</b>	<b>52.4</b>
Fuji Electric	279	287	304	3.7	3.7	3.7
Fujitsu	82	109	117	1.1	1.4	1.4
Hitachi	707	690	641	9.3	9.0	7.8
Matsushita	377	332	374	5.0	4.3	4.5
Mitsubishi	310	364	348	4.1	4.8	4.2

(Continued)



Table 16 (Continued)  
 Worldwide Semiconductor Market Share Estimates  
 (Factory Revenue in Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
Japanese Companies (Continued)						
NEC	571	574	567	7.5	7.5	6.9
New JRC	8	4	4	.1	.1	.0
Oki	9	10	10	.1	.1	.1
Rohm	287	301	321	3.8	3.9	3.9
Sanken	207	213	224	2.7	2.8	2.7
Sanyo	210	230	232	2.8	3.0	2.8
Shindengen Electric	NA	NA	176	NA	NA	2.1
Sony	112	96	85	1.5	1.3	1.0
Toko	NA	NA	6	NA	NA	.1
Toshiba	864	848	904	11.4	11.1	11.0
Other Japanese Companies	33	33	0	.4	.4	.0
European Companies						
ABB-HAFO	76	5	8	1.0	.1	.1
ABB-IXYS	0	50	58	.0	.7	.7
Eupec	0	0	96	.0	.0	1.2
Fagor	27	29	30	.4	.4	.4
GEC Plessey	0	0	36	.0	.0	.4
MEDL	22	21	0	.3	.3	.0
Philips	432	442	507	5.7	5.8	6.2
Plessey	25	0	0	.3	.0	.0
Semikron	91	95	106	1.2	1.2	1.3
SGS-Thomson	254	282	315	3.3	3.7	3.8
Siemens	201	232	258	2.6	3.0	3.1
STC	1	2	2	.0	.0	.0
TAG	23	22	25	.3	.3	.3
Telefunken Electronic	91	95	76	1.2	1.2	.9
TMS	0	2	1	.0	.0	.0
Zetex	0	0	23	.0	.0	.3
Other European Companies	7	7	0	.1	.1	.0
Asia/Pacific Companies						
AMPi	NA	NA	6	NA	NA	.1
Goldstar	1	1	0	.0	.0	.0
Hi-Sincerity	NA	NA	5	NA	NA	.1
Korean Electronic Co.	65	74	79	.9	1.0	1.0
MOSpec	NA	NA	11	NA	NA	.1
Samsung	55	78	77	.7	1.0	.9
Other Asia/Pacific Companies	14	14	0	.2	.2	.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 17**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Company:</b>	<b>Each</b>					
<b>Product:</b>	<b>Total Optoelectronic</b>					
<b>Region of Consumption:</b>	<b>Worldwide</b>					
<b>Distribution Channel:</b>	<b>NM</b>					
<b>Application:</b>	<b>All</b>					
<b>Specification:</b>	<b>All</b>					
<b>Total Market</b>	<b>2,179</b>	<b>2,627</b>	<b>2,687</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>425</b>	<b>458</b>	<b>457</b>	<b>19.5</b>	<b>17.4</b>	<b>17.0</b>
Allegro MicroSystems	0	0	1	.0	.0	.0
AT&T	10	10	14	.5	.4	.5
CID Technologies	NA	NA	4	NA	NA	.1
Dalsa Inc.	NA	NA	3	NA	NA	.1
Eastman Kodak	NA	NA	3	NA	NA	.1
Fairchild-Loral	NA	NA	1	NA	NA	.0
Ford Aerospace-Loral	NA	NA	1	NA	NA	.0
General Electric	21	0	0	1.0	.0	.0
Harris	0	18	15	.0	.7	.6
Hewlett-Packard	213	213	223	9.8	8.1	8.3
Honeywell	30	31	25	1.4	1.2	.9
Hughes	0	0	2	.0	.0	.1
Motorola	24	25	26	1.1	1.0	1.0
Optek	NA	77	66	NA	2.9	2.5
Quality Technologies	40	38	34	1.8	1.4	1.3
Tektronix	NA	NA	5	NA	NA	.2
Texas Instruments	41	36	33	1.9	1.4	1.2
TRW	36	0	0	1.7	.0	.0
Weitek	0	0	1	.0	.0	.0
Other North American Companies	10	10	0	.5	.4	.0
<b>Japanese Companies</b>	<b>1,511</b>	<b>1,918</b>	<b>1,935</b>	<b>69.3</b>	<b>73.0</b>	<b>72.0</b>
Fuji Electric	3	1	1	.1	.0	.0
Fujitsu	105	116	124	4.8	4.4	4.6
Hitachi	70	66	70	3.2	2.5	2.6
Matsushita	178	306	325	8.2	11.6	12.1
Mitsubishi	27	30	31	1.2	1.1	1.2
NEC	88	120	124	4.0	4.6	4.6
New JRC	15	13	13	.7	.5	.5
Oki	36	33	33	1.7	1.3	1.2
Rohm	109	96	105	5.0	3.7	3.9
Sanken	19	18	19	.9	.7	.7
Sanyo	62	160	170	2.8	6.1	6.3

(Continued)

**Table 17 (Continued)**  
**Worldwide Semiconductor Market Share Estimates**  
**(Factory Revenue in Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1988	1989	1990	1988	1989	1990
<b>Japanese Companies (Continued)</b>						
Sharp	285	328	339	13.1	12.5	12.6
Sony	217	249	270	10.0	9.5	10.0
Toshiba	215	308	311	9.9	11.7	11.6
Other Japanese Companies	82	74	0	3.8	2.8	.0
<b>European Companies</b>						
ABB-HAFO	9	9	10	.4	.3	.4
Philips	25	24	31	1.1	.9	1.2
Plessey	22	0	0	1.0	.0	.0
Siemens	100	115	131	4.6	4.4	4.9
Telefunken Electronic	74	78	78	3.4	3.0	2.9
TMS	0	10	16	.0	.4	.6
Zetex	0	0	1	.0	.0	.0
Other European Companies	8	8	0	.4	.3	.0
<b>Asia/Pacific Companies</b>						
AMPi	NA	NA	1	NA	NA	.0
Korean Electronic Co.	5	7	7	.2	.3	.3
Kingbright	NA	NA	7	NA	NA	.3
Ledtech Electronics	NA	NA	7	NA	NA	.3
Liteon	NA	NA	6	NA	NA	.2

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

## Chapter 2

# *Final Worldwide Semiconductor Market Share Rankings*

These market share rankings provide our final estimates for 1990. The tables rank the major

companies in 12 semiconductor categories for 1989 and 1990.

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**Table 1**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

		Top 40 Total Semiconductor Worldwide NM All All				
1990 Rank	1989 Rank	Company	1989 Revenue	1990 Revenue	Percent Change	1990 Market Share (%)
1	1	NEC	5,015	4,898	-2	8.4
2	2	Toshiba	4,930	4,843	-2	8.3
3	3	Hitachi	3,974	3,893	-2	6.7
4	4	Motorola	3,319	3,694	11	6.3
5	8	Intel	2,430	3,171	30	5.4
6	5	Fujitsu	2,963	2,880	-3	4.9
7	6	Texas Instruments	2,787	2,574	-8	4.4
8	7	Mitsubishi	2,579	2,319	-10	4.0
9	10	Philips	1,716	2,011	17	3.5
10	9	Matsushita	1,882	1,942	3	3.3
11	11	National Semiconductor	1,618	1,719	6	3.0
12	13	SGS-Thomson	1,301	1,463	12	2.5
13	12	Sanyo	1,365	1,381	1	2.4
14	15	Sharp	1,230	1,325	8	2.3
15	14	Samsung	1,260	1,315	4	2.3
16	16	Siemens	1,194	1,224	3	2.1
17	19	Sony	1,077	1,146	6	2.0
18	17	Oki	1,154	1,074	-7	1.8
19	18	Advanced Micro Devices	1,100	1,053	-4	1.8
20	20	AT&T	873	861	-1	1.5
21	21	Harris	830	800	-4	1.4
22	22	Rohm	740	774	5	1.3
23	23	LSI Logic	512	598	17	1.0
24	32	Hewlett-Packard	269	509	89	.9
25	26	Sanken	387	407	5	.7
26	NM	GEC Plessey	0	390	NM	.7
27	28	Fuji Electric	362	385	6	.7
28	29	Analog Devices	357	381	7	.7
29	25	ITT	390	371	-5	.6
30	31	VLSI Technology	286	324	13	.6
31	30	Telefunken Electronic	299	295	-1	.5
32	24	Micron Technology	395	286	-28	.5
33	35	Chips & Technologies	240	265	10	.5
34	40	International Rectifier	190	225	18	.4
35	39	Cypress Semiconductor	196	223	14	.4
36	42	General Instrument	170	214	26	.4

(Continued)

Table 1 (Continued)  
 Estimated Market Share Ranking  
 (Factory Revenue in Millions of U.S. Dollars)

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change	1990 Market Share (%)
37	27	Seiko Epson	368	213	-42	.4
38	NA	Shindengen Electric	NA	209	NA	.4
39	33	NMB Semiconductor	247	201	-19	.3
40	43	Rockwell	165	200	21	.3
		All Others	7,043	6,169	-12	10.6
		North American Companies	19,978	21,537	8	37.0
		Japanese Companies	29,809	28,377	-5	48.7
		European Companies	5,443	6,206	14	10.7
		Asia/Pacific Companies	1,983	2,105	6	3.6
		Total Market	57,213	58,225	2	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 2**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank	Company:	Product:	Region of Consumption:	Distribution Channel:	Application:	Specification:	Top 40			1990 Market Share (%)
								Revenue	Revenue	Percent Change	
								Total Integrated Circuit			
								Worldwide			
								NM			
								All			
								All			
1	1	NEC						4,321	4,207	-3	8.9
2	2	Toshiba						3,774	3,628	-4	7.7
3	3	Hitachi						3,218	3,182	-1	6.7
4	7	Intel						2,430	3,171	30	6.7
5	6	Motorola						2,519	2,860	14	6.0
6	4	Fujitsu						2,738	2,639	-4	5.6
7	5	Texas Instruments						2,691	2,488	-8	5.3
8	8	Mitsubishi						2,185	1,940	-11	4.1
9	9	National Semiconductor						1,548	1,649	7	3.5
10	10	Philips						1,250	1,473	18	3.1
11	11	Matsushita						1,244	1,243	-0	2.6
12	12	Samsung						1,182	1,238	5	2.6
13	15	SGS-Thomson						1,019	1,148	13	2.4
14	14	Advanced Micro Devices						1,100	1,053	-4	2.2
15	13	Oki						1,111	1,031	-7	2.2
16	17	Sharp						902	986	9	2.1
17	16	Sanyo						975	979	0	2.1
18	18	Siemens						847	835	-1	1.8
19	19	Sony						732	791	8	1.7
20	20	AT&T						716	717	0	1.5
21	21	Harris						692	655	-5	1.4
22	22	LSI Logic						512	598	17	1.3
23	25	Analog Devices						357	380	6	.8
24	NM	GEC Plessey						0	354	NM	.7
25	26	Rohm						343	348	1	.7
26	27	VLSI Technology						286	324	13	.7
27	23	Micron Technology						395	286	-28	.6
28	30	Chips & Technologies						240	265	10	.6
29	NM	Hewlett-Packard						0	230	NM	.5
30	35	Cypress Semiconductor						196	223	14	.5
31	24	Seiko Epson						368	213	-42	.5
32	31	ITT						235	210	-11	.4
33	28	NMB Semiconductor						247	201	-19	.4
34	36	Rockwell						165	200	21	.4
35	34	Integrated Device Technology						204	199	-2	.4
36	48	Silicon Systems						112	165	47	.3

(Continued)

**Table 2 (Continued)**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change	1990 Market Share (%)
37	37	Sanken	156	164	5	.3
38	39	Goldstar	147	163	11	.3
39	38	New JRC	154	161	5	.3
40	40	Yamaha	143	153	7	.3
		All Others	5,470	4,553	-17	9.6
		North American Companies	17,400	18,877	8	39.9
		Japanese Companies	23,800	22,129	-7	46.8
		European Companies	3,915	4,398	12	9.3
		Asia/Pacific Companies	1,809	1,899	5	4.0
		Total Market	46,924	47,303	1	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)



**Table 3**  
**Estimated Market Share Ranking**  
 (Factory Revenue in Millions of U.S. Dollars)

		Top 20				
		Bipolar Digital				
		Worldwide				
		NM				
		All				
		All				
1990 Rank	1989 Rank	Company	1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
1	2	Fujitsu	617	690	12	15.5
2	1	Texas Instruments	671	663	-1	14.9
3	3	Hitachi	479	510	6	11.5
4	5	National Semiconductor	458	423	-8	9.5
5	4	Advanced Micro Devices	474	407	-14	9.2
6	6	Motorola	369	406	10	9.1
7	8	NEC	302	295	-2	6.6
8	7	Philips	306	280	-8	6.3
9	11	Toshiba	102	113	11	2.5
10	9	Mitsubishi	125	105	-16	2.4
11	12	Sanyo	67	67	0	1.5
12	NM	GEC Plessey	0	66	NM	1.5
13	16	Harris	50	60	20	1.4
14	13	AT&T	56	59	5	1.3
15	14	Raytheon	55	54	-2	1.2
16	17	Oki	48	47	-2	1.1
17	15	Siemens	54	45	-17	1.0
18	18	Goldstar	32	26	-19	.6
19	19	Chips & Technologies	24	25	4	.6
20	20	Applied Micro Circuits Corp.	20	24	20	.5
		All Others	201	75	-63	1.7
		North American Companies	2,221	2,152	-3	48.5
		Japanese Companies	1,755	1,843	5	41.5
		European Companies	502	419	-17	9.4
		Asia/Pacific Companies	32	26	-19	.6
		Total Market	4,510	4,440	-2	100.0

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 4**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company:	Top 10
Product:	Bipolar Digital Memory
Region of Consumption:	Worldwide
Distribution Channel:	NM
Application:	All
Specification:	All

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
1	1	Fujitsu	190	158	-17	34.4
2	2	Hitachi	111	104	-6	22.7
3	3	Advanced Micro Devices	85	65	-24	14.2
4	5	Philips	47	45	-4	9.8
5	4	National Semiconductor	56	29	-48	6.3
6	6	NEC	25	22	-12	4.8
7	7	Raytheon	12	18	50	3.9
8	8	Texas Instruments	10	10	0	2.2
9	NM	Harris	0	5	NM	1.1
10	9	Motorola	4	3	-25	.7
		All Others	0	0	NM	.0
		North American Companies	167	130	-22	28.3
		Japanese Companies	326	284	-13	61.9
		European Companies	47	45	-4	9.8
		Asia/Pacific Companies	0	0	NM	.0
		Total Market	540	459	-15	100.0

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 5**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

		Top 20				
Company:		Bipolar Logic & Microcomponent				
Product:		Worldwide				
Region of Consumption:		NM				
Distribution Channel:		All				
Application:		All				
Specification:		All				
1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
1	1	Texas Instruments	661	653	-1	16.4
2	2	Fujitsu	427	532	25	13.4
3	5	Hitachi	368	406	10	10.2
4	6	Motorola	365	403	10	10.1
5	3	National Semiconductor	402	394	-2	9.9
6	4	Advanced Micro Devices	389	342	-12	8.6
7	7	NEC	277	273	-1	6.9
8	8	Philips	259	235	-9	5.9
9	11	Toshiba	102	113	11	2.8
10	9	Mitsubishi	125	105	-16	2.6
11	12	Sanyo	67	67	0	1.7
12	NM	GEC Plessey	0	66	NM	1.7
13	13	AT&T	56	59	5	1.5
14	15	Harris	50	55	10	1.4
15	16	Oki	48	47	-2	1.2
16	14	Siemens	54	45	-17	1.1
17	17	Raytheon	43	36	-16	.9
18	18	Goldstar	32	26	-19	.7
19	19	Chips & Technologies	24	25	4	.6
20	20	Applied Micro Circuits Corp.	20	24	20	.6
		All Others	201	75	-63	1.9
		North American Companies	2,054	2,022	-2	50.8
		Japanese Companies	1,429	1,559	9	39.2
		European Companies	455	374	-18	9.4
		Asia/Pacific Companies	32	26	-19	.7
		Total Market	3,970	3,981	0	100.0

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 6**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

Company: Top 40  
 Product: MOS Digital  
 Region of Consumption: Worldwide  
 Distribution Channel: NM  
 Application: All  
 Specification: All

1990 Rank	1989 Rank	Company	1989 Revenue	1990 Revenue	Percent Change	1990 Market Share (%)
1	1	NEC	3,604	3,495	-3	10.8
2	3	Intel	2,420	3,157	30	9.8
3	2	Toshiba	3,100	2,905	-6	9.0
4	4	Hitachi	2,407	2,325	-3	7.2
5	6	Motorola	1,705	1,963	15	6.1
6	5	Fujitsu	1,958	1,785	-9	5.5
7	7	Mitsubishi	1,676	1,394	-17	4.3
8	8	Texas Instruments	1,603	1,367	-15	4.2
9	9	Samsung	1,066	1,146	8	3.5
10	10	Oki	1,028	949	-8	2.9
11	12	Sharp	837	913	9	2.8
12	11	Matsushita	854	819	-4	2.5
13	16	National Semiconductor	532	607	14	1.9
14	13	Siemens	641	600	-6	1.9
15	17	LSI Logic	512	596	16	1.8
16	14	SGS-Thomson	619	584	-6	1.8
17	15	Advanced Micro Devices	549	570	4	1.8
18	18	Philips	422	540	28	1.7
19	19	AT&T	411	461	12	1.4
20	22	Sony	371	392	6	1.2
21	21	Sanyo	378	371	-2	1.1
22	23	Harris	362	335	-7	1.0
23	25	VLSI Technology	286	324	13	1.0
24	20	Micron Technology	395	286	-28	.9
25	27	Chips & Technologies	216	240	11	.7
26	NM	Hewlett-Packard	0	230	NM	.7
27	31	Cypress Semiconductor	196	223	14	.7
28	24	Seiko Epson	354	201	-43	.6
29	26	NMB Semiconductor	247	201	-19	.6
30	30	Integrated Device Technology	203	196	-3	.6
31	28	United Microelectronics	210	150	-29	.5
32	33	Western Digital	135	148	10	.5
33	34	Yamaha	130	145	12	.4
34	67	Cirrus Logic	29	129	345	.4
35	36	Goldstar	106	117	10	.4
36	29	Hyundai	210	115	-45	.4

(Continued)

**Table 6 (Continued)**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change	1990 Market Share (%)
36	39	NCR	94	115	22	.4
36	NM	GEC Plessey	0	115	NM	.4
39	32	ITT	185	107	-42	.3
40	38	Zilog	99	100	1	.3
		All Others	2,874	1,876	-35	5.8
		North American Companies	11,277	12,388	10	38.4
		Japanese Companies	18,006	16,123	-10	49.9
		European Companies	2,135	2,137	0	6.6
		Asia/Pacific Companies	1,606	1,644	2	5.1
		Total Market	33,024	32,292	-2	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 7**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank	Company:	Product:	Region of Consumption:	Distribution Channel:	Application:	Specification:	Top 40 MOS Memory Worldwide NM All All	1989		1990		Percent Change (%)	Market Share (%)
									Revenue	Revenue	Revenue	Revenue		
1	1	Toshiba						1,918	1,626	-15	12.4			
2	2	NEC						1,739	1,376	-21	10.5			
3	3	Hitachi						1,534	1,366	-11	10.4			
4	4	Fujitsu						1,265	1,006	-20	7.7			
5	7	Samsung						935	971	4	7.4			
6	5	Mitsubishi						1,161	853	-27	6.5			
7	6	Texas Instruments						1,095	741	-32	5.7			
8	8	Sharp						476	497	4	3.8			
9	12	Motorola						407	395	-3	3.0			
10	9	OKI						473	392	-17	3.0			
11	10	Intel						433	371	-14	2.8			
12	11	Siemens						416	320	-23	2.4			
13	15	SGS-Thomson						269	299	11	2.3			
14	13	Micron Technology						395	286	-28	2.2			
15	14	Matsushita						370	284	-23	2.2			
16	16	Advanced Micro Devices						258	253	-2	1.9			
17	18	Sony						228	227	-0	1.7			
18	17	NMB Semiconductor						247	201	-19	1.5			
19	21	Cypress Semiconductor						149	166	11	1.3			
20	23	National Semiconductor						138	143	4	1.1			
21	20	Integrated Device Technology						158	132	-16	1.0			
22	19	Hyundai						210	115	-45	.9			
23	24	Sanyo						130	97	-25	.7			
24	28	Goldstar						82	96	17	.7			
24	30	Philips						60	96	60	.7			
26	27	Xicor						87	68	-22	.5			
27	25	United Microelectronics						102	66	-35	.5			
28	29	Vitalic						66	64	-3	.5			
29	22	Saike Epson						141	62	-56	.5			
30	26	Microchip Technology						94	60	-36	.5			
31	31	Atmel						47	54	15	.4			
32	NA	Healon Microelectronic Corp.						NA	39	NA	.3			
33	35	Matra MHS						31	37	19	.3			
34	37	Catalyst						31	35	13	.3			
35	32	SEEG Technology						40	33	-18	.3			
36	42	MOSel						20	31	55	.2			

(Continued)

**Table 7 (Continued)**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
37	34	Ricoh	31	29	-6	.2
38	38	Waferscale Integration	28	27	-4	.2
39	33	Harris	37	24	-35	.2
40	44	Performance Semiconductor	16	19	19	.1
		All Others	1,044	134	-87	1.0
		North American Companies	3,688	2,990	-19	22.8
		Japanese Companies	10,558	8,023	-24	61.3
		European Companies	786	760	-3	5.8
		Asia/Pacific Companies	1,329	1,318	-1	10.1
		Total Market	16,361	13,091	-20	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 8**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank	Company	Region of Consumption:	Distribution Channel:	Application:	Specification:	Market Share		
							1989 Revenue	1990 Revenue	Percent Change (%)
			Top 40						
			MOS Microcomponents						
			Worldwide						
			NM						
			All						
			All						
1	1	Intel				1,929	2,726	41	27.1
2	2	NEC				937	1,083	16	10.8
3	3	Motorola				803	1,009	26	10.0
4	4	Hitachi				554	607	10	6.0
5	5	Mitsubishi				435	464	7	4.6
6	6	Toshiba				407	441	8	4.4
7	7	Texas Instruments				252	320	27	3.2
8	8	Matsushita				217	250	15	2.5
9	11	National Semiconductor				172	248	44	2.5
10	9	Chips & Technologies				216	240	11	2.4
11	10	Fujitsu				211	239	13	2.4
12	17	Philips				131	192	47	1.9
13	12	Advanced Micro Devices				172	178	3	1.8
14	13	SGS-Thomson				161	175	9	1.7
15	16	Western Digital				135	148	10	1.5
16	14	OKI				149	147	-1	1.5
17	15	AT&T				141	145	3	1.4
18	19	Sharp				112	138	23	1.4
19	31	Cirrus Logic				29	129	345	1.3
20	22	Siemens				92	116	26	1.2
21	18	Harris				115	110	-4	1.1
22	21	VLSI Technology				94	105	12	1.0
23	20	Zilog				99	100	1	1.0
24	24	LSI Logic				67	93	39	.9
25	23	Sanyo				70	80	14	.8
26	25	Weitek				49	57	16	.6
27	26	Sony				47	49	4	.5
28	28	Rockwell				42	40	-5	.4
28	29	Standard Microsystems				34	40	18	.4
30	27	United Microelectronics				43	39	-9	.4
31	30	Appian Technology				30	38	27	.4
32	32	Matra MBS				28	33	18	.3
33	35	NCR				22	31	41	.3
34	33	ITT				25	28	12	.3
35	40	Performance Semiconductor				13	24	85	.2
36	34	Ricoh				22	23	5	.2

(Continued)



**Table 8 (Continued)**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
37	44	Samsung	8	22	175	.2
38	36	Analog Devices	20	20	0	.2
38	41	Integrated Device Technology	13	20	54	.2
40	38	Rohm	16	18	13	.2
		All Others	90	103	14	1.0
		North American Companies	4,526	5,912	31	58.7
		Japanese Companies	3,190	3,551	11	35.3
		European Companies	433	538	24	5.3
		Asia/Pacific Companies	53	67	26	.7
		<b>Total Market</b>	<b>8,202</b>	<b>10,068</b>	<b>23</b>	<b>100.0</b>

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 9**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

		Top 40				
		MOS Logic				
		Worldwide				
		NM				
		All				
		All				
1990 Rank	1989 Rank	Company	1989 Revenue	1990 Revenue	Percent Change	1990 Market Share (%)
1	1	NEC	928	1,036	12	11.3
2	2	Toshiba	775	838	8	9.2
3	3	Motorola	495	559	13	6.1
4	4	Fujitsu	482	540	12	5.9
5	5	LSI Logic	445	503	13	5.5
6	6	Oki	406	410	1	4.5
7	7	Hitachi	319	352	10	3.9
8	10	Texas Instruments	256	306	20	3.4
9	9	AT&T	257	303	18	3.3
10	8	Matsushita	267	285	7	3.1
11	11	Sharp	249	278	12	3.0
12	12	Philips	231	252	9	2.8
13	NM	Hewlett-Packard	0	230	NM	2.5
14	13	National Semiconductor	222	216	-3	2.4
15	18	VLSI Technology	169	211	25	2.3
16	14	Harris	210	201	-4	2.2
17	17	Sanyo	178	194	9	2.1
18	20	Siemens	133	164	23	1.8
19	22	Samsung	123	153	24	1.7
20	21	Yamaha	130	145	12	1.6
21	23	Advanced Micro Devices	119	139	17	1.5
22	15	Seiko Epson	201	128	-36	1.4
23	24	Sony	96	116	21	1.3
24	16	SGS-Thomson	189	110	-42	1.2
25	NM	GEC Plessey	0	99	NM	1.1
26	34	Xilinx	44	84	91	.9
27	29	NCR	64	80	25	.9
28	19	ITT	150	79	-47	.9
29	30	Altera	59	78	32	.9
30	25	Mitsubishi	80	77	-4	.8
31	41	Lattice	31	62	100	.7
32	31	Intel	58	60	3	.7
33	27	Gould AMI	76	53	-30	.6
34	28	United Microelectronics	65	45	-31	.5
35	36	Ricoh	38	44	16	.5
35	40	Integrated Device Technology	32	44	38	.5

(Continued)

**Table 9 (Continued)**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change	1990 Market Share (%)
35	46	Atmel	26	44	69	.5
38	37	Cypress Semiconductor	36	42	17	.5
39	35	Rohm	40	40	0	.4
40	39	New JRC	34	38	12	.4
		All Others	748	495	-34	5.4
		North American Companies	3,063	3,486	14	38.2
		Japanese Companies	4,258	4,549	7	49.8
		European Companies	916	839	-8	9.2
		Asia/Pacific Companies	224	259	16	2.8
		Total Market	8,461	9,133	8	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 10**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

		Company:	Top 40			
		Product:	Analog			
		Region of Consumption:	Worldwide			
		Distribution Channel:	NM			
		Application:	All			
		Specification:	All			
1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
1	4	Philips	522	653	25	6.2
2	2	National Semiconductor	558	619	11	5.9
3	1	Toshiba	572	610	7	5.8
4	8	SGS-Thomson	393	554	41	5.2
5	3	Sanyo	530	541	2	5.1
6	5	Motorola	445	491	10	4.6
7	6	Texas Instruments	417	458	10	4.3
8	9	Mitsubishi	384	441	15	4.2
9	7	NEC	415	417	0	3.9
10	10	Matsushita	376	410	9	3.9
11	11	Sony	361	399	11	3.8
12	12	Analog Devices	337	360	7	3.4
13	13	Hitachi	332	347	5	3.3
14	15	Rohm	277	282	2	2.7
15	14	Harris	280	260	-7	2.5
16	16	AT&T	249	197	-21	1.9
17	19	Siemens	152	190	25	1.8
18	NM	GEC Plessey	0	173	NM	1.6
19	24	Silicon Systems	112	165	47	1.6
20	17	Fujitsu	163	164	1	1.6
20	18	Sanken	156	164	5	1.6
22	21	Rockwell	123	160	30	1.5
23	20	Burr-Brown	141	145	3	1.4
24	22	New JRC	119	122	3	1.2
25	25	Telefunken Electronic	101	111	10	1.1
26	35	ITT	50	103	106	1.0
27	26	Allegro MicroSystems	98	96	-2	.9
28	23	Samsung	116	92	-21	.9
29	27	Precision Monolithics	88	91	3	.9
30	29	Linear Technology	70	83	19	.8
31	28	Advanced Micro Devices	77	76	-1	.7
32	37	Exar	46	75	63	.7
33	30	Sharp	65	73	12	.7
34	NM	Mietec	0	72	NM	.7
35	33	Brooktree	52	70	35	.7
36	38	Maxim	43	65	51	.6

(Continued)

**Table 10 (Continued)**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
37	44	Sierra Semiconductor	28	55	96	.5
38	31	Siliconix	54	54	0	.5
38	NA	Toko	NA	54	NA	.5
40	39	Fuji Electric	43	51	19	.5
		All Others	1,045	1,028	-2	9.7
		North American Companies	3,902	4,337	11	41.0
		Japanese Companies	4,039	4,163	3	39.4
		European Companies	1,278	1,842	44	17.4
		Asia/Pacific Companies	171	229	34	2.2
		Total Market	9,390	10,571	13	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

**Table 11**  
**Estimated Market Share Ranking**  
**(Factory Revenue in Millions of U.S. Dollars)**

		Top 40				
		Total Discrete				
		Worldwide				
		NM				
		All				
		All				
1990 Rank	1989 Rank	Company	1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
1	1	Toshiba	848	904	7	11.0
2	2	Motorola	775	808	4	9.8
3	3	Hitachi	690	641	-7	7.8
4	4	NEC	574	567	-1	6.9
5	5	Philips	442	507	15	6.2
6	7	Matsushita	332	374	13	4.5
7	6	Mitsubishi	364	348	-4	4.2
8	8	Rohm	301	321	7	3.9
9	10	SGS-Thomson	282	315	12	3.8
10	9	Fuji Electric	287	304	6	3.7
11	11	Siemens	232	258	11	3.1
12	12	Sanyo	230	232	1	2.8
13	13	Sanken	213	224	5	2.7
13	14	International Rectifier	187	224	20	2.7
15	15	General Instrument	170	214	26	2.6
16	NA	Shindengen Electric	NA	176	NA	2.1
17	16	ITT	155	161	4	2.0
18	17	AT&T	147	130	-12	1.6
18	18	Harris	120	130	8	1.6
20	19	Fujitsu	109	117	7	1.4
21	20	Powerex	105	112	7	1.4
22	23	Semikron	95	106	12	1.3
23	NM	Eupec	0	96	NM	1.2
24	21	Sony	96	85	-11	1.0
25	25	Korean Electronic Co.	74	79	7	1.0
26	24	Samsung	78	77	-1	.9
27	22	Telefunken Electronic	95	76	-20	.9
28	26	National Semiconductor	70	70	0	.9
29	27	Siliconix	67	62	-7	.8
30	31	ABB-IXYS	50	58	16	.7
31	30	Hewlett-Packard	56	56	0	.7
32	29	Unitrode	59	54	-8	.7
33	28	Texas Instruments	60	53	-12	.6
34	NA	Microsemi	NA	50	NA	.6
35	NM	GEC Plessey	0	36	NM	.4
36	32	Fagor	29	30	3	.4

(Continued)

Table 11 (Continued)  
 Estimated Market Share Ranking  
 (Factory Revenue in Millions of U.S. Dollars)

1990 Rank	1989 Rank		1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
37	36	TAG	22	25	14	.3
38	33	Solitron	27	24	-11	.3
39	NM	Zetex	0	23	NM	.3
40	35	Allegro MicroSystems	23	17	-26	.2
		All Others	198	91	-54	1.1
		North American Companies	2,120	2,203	4	26.8
		Japanese Companies	4,091	4,313	5	52.4
		European Companies	1,284	1,541	20	18.7
		Asia/Pacific Companies	167	178	7	2.2
		Total Market	7,662	8,235	7	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1991)

Table 12  
 Estimated Market Share Ranking  
 (Factory Revenue in Millions of U.S. Dollars)

		Top 20 Total Optoelectronic Worldwide NM All All				
1990 Rank	1989 Rank	Company	1989 Revenue	1990 Revenue	Percent Change (%)	1990 Market Share (%)
1	1	Sharp	328	339	3	12.6
2	3	Matsushita	306	325	6	12.1
3	2	Toshiba	308	311	1	11.6
4	4	Sony	249	270	8	10.0
5	5	Hewlett-Packard	213	223	5	8.3
6	6	Sanyo	160	170	6	6.3
7	9	Siemens	115	131	14	4.9
8	7	NEC	120	124	3	4.6
8	8	Fujitsu	116	124	7	4.6
10	10	Rohm	96	105	9	3.9
11	11	Telefunken Electronic	78	78	0	2.9
12	13	Hitachi	66	70	6	2.6
13	12	Optek	77	66	-14	2.5
14	14	Quality Technologies	38	34	-11	1.3
15	15	Texas Instruments	36	33	-8	1.2
15	16	Oki	33	33	0	1.2
17	18	Mitsubishi	30	31	3	1.2
17	20	Philips	24	31	29	1.2
19	19	Motorola	25	26	4	1.0
20	17	Honeywell	31	25	-19	.9
		All Others	178	138	-22	5.1
		North American Companies	458	457	-0	17.0
		Japanese Companies	1,918	1,935	1	72.0
		European Companies	244	267	9	9.9
		Asia/Pacific Companies	7	28	300	1.0
		Total Market	2,627	2,687	2	100.0

NM = Not meaningful

Source: Dataquest (May 1991)



# Dataquest

## *Dataquest Research and Sales Offices:*

**Dataquest Incorporated**  
1290 Ridder Park Drive  
San Jose, California 95131-2398  
Phone: (408) 437-8000  
Telex: 171973  
Fax: (408) 437-0292

**Technology Products Group**  
Phone: (800) 624-3280

**Dataquest Incorporated**  
**Ledgeway/Dataquest**  
The Corporate Center  
550 Cochituate Road  
Framingham, MA 01701  
Phone: (508) 370-5555  
Fax: (508) 370-6262

**Dataquest Incorporated**  
**Invitational Computer Conferences Division**  
3151 Airway Avenue, C-2  
Costa Mesa, California 92626  
Phone: (714) 957-0171  
Telex: 5101002189 ICCDQ  
Fax: (714) 957-0903

**Dataquest Australia**  
Suite 1, Century Plaza  
80 Berry Street  
North Sydney, NSW 2060  
Australia  
Phone: (02) 959 4544  
Telex: 25468  
Fax: (02) 929 0635

**Dataquest GmbH**  
Kronstadter Strasse 9  
8000 Munich 80  
West Germany  
Phone: 011 49 89 93 09 09 0  
Fax: 49 89 930 3277

**Dataquest Europe Limited**  
Roussel House, Broadwater Park  
Denham, Uxbridge, Middx UB9 5HP  
England  
Phone: 0895-835050  
Telex: 266195  
Fax: 0895 835260/1/2

**Dataquest Europe SA**  
Tour Gallieni 2  
36, avenue du Général-de-Gaulle  
93175 Bagnolet Cedex  
France  
Phone: (1) 48 97 31 00  
Telex: 233 263  
Fax: (1) 48 97 34 00

**Dataquest Hong Kong**  
Rm. 401, Connaught Comm. Bldg.  
185 Wanchai Rd.  
Wanchai, Hong Kong  
Phone: 8387336  
Telex: 80587  
Fax: 5722375

**Dataquest Israel**  
59 Mishmar Ha'yarden Street  
Tel Aviv, Israel 69865  
or  
P.O. Box 18198  
Tel Aviv, Israel  
Phone: 52 913937  
Telex: 341118  
Fax: 52 32865

**Dataquest Japan Limited**  
Shinkawa Sanko Building  
1-3-17 Shinkawa, Chuo-ku  
Tokyo 104 Japan  
Phone: (03) 5566-0411  
Fax: (03) 5566-0425

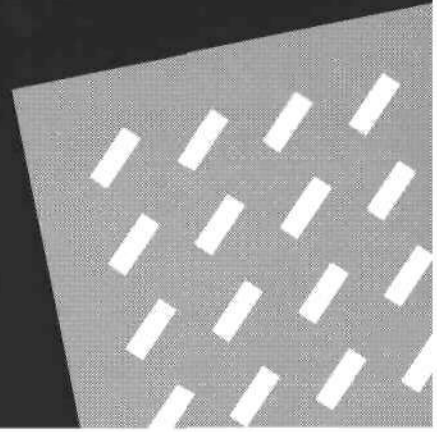
**Dataquest Korea**  
Dacheung Bldg. 1105  
648-23 Yeoksam-dong  
Kangnam-gu  
Seoul, Korea 135  
Phone: (02) 556-4166  
Fax: (02) 552-2661

**Dataquest Singapore**  
4012 Ang Mo Kio Industrial Park 1  
Ave. 10, #03-10 to #03-12  
Singapore 2056  
Phone: 4597181  
Telex: 38257  
Fax: 4563129

**Dataquest Taiwan**  
Room 801/8th Floor  
Ever Spring Building  
147, Sect. 2, Chien Kuo N. Rd.  
Taipei, Taiwan R.O.C. 104  
Phone: (02) 501-7960  
Telex: 27459  
Fax: (02) 505-4265

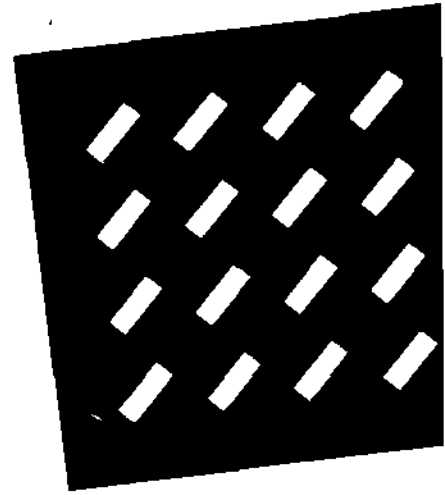
**Dataquest West Germany**  
In der Schneithohl 17  
6242 Kronberg 2  
West Germany  
Phone: 06173/61685  
Telex: 418089  
Fax: 06173/67901

# Chinese Semiconductor Share Estimates



# Final Japanese Semiconductor Market Share Estimates

*June 1990*



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**Dataquest**

**a company of  
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# *Final Japanese Semiconductor Market Share Estimates*

## **INTRODUCTION**

An integral part of Dataquest's Japanese Semiconductor Industry Service (JSIS) database is the analysis of semiconductor markets through estimation of market share by manufacturer. This analysis provides insights into semiconductor markets and reinforces estimates of consumption, shipments, and company revenue that were made using other data. The tables are grouped in two parts: the first part gives worldwide market shares for Japanese companies, and the second part shows the Japanese market shares for all major Japanese, US, European, and Rest of World semiconductor companies.

The totals given for the companies reflect worldwide production. For example, Texas Instruments, Inc., manufactures semiconductors in many parts of the world, but its entire production is included under the US companies' market share section. In contrast, some, but not all, foreign-owned subsidiaries are included in the US totals and not in the total of the parent company location. A US subsidiary to a foreign company is included in US companies if it maintains its own identity, i.e., carries its own name rather than that of its parent company. On the other hand, a US subsidiary of a foreign company that does not maintain its own identity is included in the total of the parent company.

## *Definitions and Conventions*

Dataquest uses a common manufacturer base for all data tables. This base includes all noncaptive suppliers to the semiconductor market. It excludes totally captive suppliers, such as IBM, that manufacture devices solely for the benefit of the parent company, but it includes companies that actively market their semiconductor devices to industry as well as to other divisions of their own companies. For these companies, both external shipments and internal consumption are included. Devices that are used internally are valued at current market prices.

All estimates given in these tables have been converted to US dollars to make the tables useful in comparing companies based in different countries. Each table is also presented in yen, in order to provide a more accurate presentation of actual growth rates for the Japanese companies.

Construction of the tables involves combining data from many countries, each of which has different and changing exchange rates. Dataquest uses average exchange rates for each year and, as far as possible, the estimates are prepared in terms of local currencies before conversion to US dollars or yen.

## *Need for Careful Interpretation*

Despite the care taken in gathering and analyzing the available data and in attempting to categorize those data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in these tables. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between these data and data provided by others.

## **FINAL ESTIMATED 1989 MARKET SHARE IN JAPAN**

Table 1 is provided as a summary of our market share estimates. Regional data given here refer to regional company bases, such that "Japanese Companies" represents the sum of all companies worldwide with Japanese origins. All tables are reported in millions of dollars and percentages of market share. For detail by company, please refer to the Worldwide and Japanese Market sections that follow.

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*Notes to Market Share Tables*

1. ABB-HAFO was formerly known as ASEA Brown Boveri.
2. ABB-IXYS was formerly the West German-based power semiconductor division of ASEA Brown Boveri.
3. Ericsson was known as Rifa prior to March 1, 1988.
4. Harris revenue includes GE Solid State revenue from 1989 onward.
5. Inmos revenue is included in SGS-Thomson revenue from 1989 onward.
6. Matra MHS was formerly known as Matra-Harris Semiconducteurs.
7. Philips revenue includes Signetics revenue.
8. Plessey revenue includes Ferranti revenue from 1987 onward.
9. SGS-Thomson revenue includes Inmos revenue from 1989 onward.
10. Thomson Composants Militaires et Spatiaux (TMS) revenue was formerly included in SGS-Thomson (30 percent) and the Other European Companies category (70 percent).
11. VQSI was formerly known as Varo.
12. Micro Quality Semiconductor was formerly known as VQSI.
13. In 1989, AT&T revenue previously classified as MOS logic has been reclassified as microcomponent.
14. In 1989, Rockwell revenue previously classified as MOS logic has been reclassified as analog.
15. Prior to 1989, Sanyo revenue was understated.
16. Collection of BiCMOS revenue data began in 1987.

Table 1

**Japanese Semiconductor Market**  
**Market Share Estimates by Manufacturer Base**  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Semiconductor</b>						
North American Companies	1,249	1,965	2,162	8.4	9.5	9.4
Japanese Companies	13,588	18,630	20,628	91.0	89.7	89.7
European Companies	70	115	130	0.5	0.6	0.6
Asia/Pacific Companies	20	62	77	0.1	0.3	0.3
<b>Total Market</b>	<b>14,927</b>	<b>20,772</b>	<b>22,997</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Total Integrated Circuit</b>						
North American Companies	1,172	1,868	2,082	10.4	11.6	11.6
Japanese Companies	10,021	14,096	15,686	89.0	87.4	87.4
European Companies	61	105	112	0.5	0.7	0.6
Asia/Pacific Companies	9	58	66	0.1	0.4	0.4
<b>Total Market</b>	<b>11,263</b>	<b>16,127</b>	<b>17,946</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Bipolar Digital</b>						
North American Companies	326	476	377	21.4	25.0	21.5
Japanese Companies	1,179	1,397	1,338	77.4	73.3	76.5
European Companies	18	32	34	1.2	1.7	1.9
Asia/Pacific Companies	0	1	1	0	0.1	0.1
<b>Total Market</b>	<b>1,523</b>	<b>1,906</b>	<b>1,750</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Bipolar Digital Memory</b>						
North American Companies	23	26	21	10.1	7.5	8.5
Japanese Companies	202	319	223	89.0	91.7	90.7
European Companies	2	3	2	0.9	0.9	0.8
Asia/Pacific Companies	0	0	0	0	0	0
<b>Total Market</b>	<b>227</b>	<b>348</b>	<b>246</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Bipolar Digital Logic</b>				0	0	0
North American Companies	303	450	356	23.4	28.9	23.7
Japanese Companies	977	1,078	1,115	75.4	69.2	74.1
European Companies	16	29	32	1.2	1.9	2.1
Asia/Pacific Companies	0	1	1	0	0.1	0.1
<b>Total Market</b>	<b>1,296</b>	<b>1,558</b>	<b>1,504</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>MOS Digital</b>				0	0	0
North American Companies	510	950	1,191	7.9	9.0	9.5
Japanese Companies	5,896	9,462	11,197	91.8	90.1	89.6
European Companies	14	38	53	0.2	0.4	0.4
Asia/Pacific Companies	4	51	56	0.1	0.5	0.4
<b>Total Market</b>	<b>6,424</b>	<b>10,501</b>	<b>12,497</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

(Continued)



Table 1 (Continued)

**Japanese Semiconductor Market**  
**Market Share Estimates by Manufacturer Base**  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
MOS Memory				0	0	0
North American Companies	107	222	429	4.7	5.0	7.2
Japanese Companies	2,156	4,147	5,494	95.1	93.7	91.7
European Companies	1	13	17	0	0.3	0.3
Asia/Pacific Companies	4	42	52	0.2	0.9	0.9
Total Market	2,268	4,424	5,992	100.0	100.0	100.0
MOS Microcomponents				0	0	0
North American Companies	262	444	496	13.8	17.3	17.5
Japanese Companies	1,630	2,116	2,309	85.7	82.2	81.6
European Companies	10	13	23	0.5	0.5	0.8
Asia/Pacific Companies	0	0	0	0	0	0
Total Market	1,902	2,573	2,828	100.0	100.0	100.0
MOS Logic				0	0	0
North American Companies	141	284	266	6.3	8.1	7.2
Japanese Companies	2,110	3,199	3,394	93.6	91.3	92.3
European Companies	3	12	13	0.1	0.3	0.4
Asia/Pacific Companies	0	9	4	0	0.3	0.1
Total Market	2,254	3,504	3,677	100.0	100.0	100.0
Analog				0	0	0
North American Companies	336	442	514	10.1	11.9	13.9
Japanese Companies	2,946	3,237	3,151	88.8	87.0	85.2
European Companies	29	35	25	0.9	0.9	0.7
Asia/Pacific Companies	5	6	9	0.2	0.2	0.2
Total Market	3,316	3,720	3,699	100.0	100.0	100.0
Total Discrete				0	0	0
North American Companies	56	72	57	2.1	2.2	1.7
Japanese Companies	2,621	3,199	3,242	97.3	97.5	97.6
European Companies	5	7	12	0.2	0.2	0.4
Asia/Pacific Companies	11	4	10	0.4	0.1	0.3
Total Market	2,693	3,282	3,321	100.0	100.0	100.0
Total Optoelectronic						
North American Companies	21	25	23	2.2	1.8	1.3
Japanese Companies	946	1,335	1,700	97.4	97.9	98.3
European Companies	4	3	6	0.4	0.2	0.3
Asia/Pacific Companies	0	0	1	0	0	0.1
Total Market	971	1,363	1,730	100.0	100.0	100.0

Source: Dataquest (May 1990)

Table 2

**Worldwide Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	38,251	50,859	57,213	100.0	100.0	100.0
<b>Japanese Companies</b>	18,450	25,942	29,809	48.2	51.0	52.1
Fuji Electric	252	346	362	0.7	0.7	0.6
Fujitsu	1,801	2,607	2,963	4.7	5.1	5.2
Hitachi	2,618	3,506	3,974	6.8	6.9	6.9
Matsushita	1,457	1,883	1,882	3.8	3.7	3.3
Mitsubishi	1,492	2,312	2,579	3.9	4.5	4.5
NEC	3,368	4,543	5,015	8.8	8.9	8.8
New JRC	130	169	171	0.3	0.3	0.3
NMB Semiconductor	104	199	247	0.3	0.4	0.4
Oki Semiconductor	651	947	1,154	1.7	1.9	2.0
Ricoh	65	85	91	0.2	0.2	0.2
Rohm	518	721	740	1.4	1.4	1.3
Sanken	294	383	387	0.8	0.8	0.7
Sanyo	851	1,083	1,365	2.2	2.1	2.4
Seiko-Epson	245	311	368	0.6	0.6	0.6
Sharp	590	1,036	1,230	1.5	2.0	2.1
Sony	571	950	1,077	1.5	1.9	1.9
Toshiba	3,029	4,395	4,930	7.9	8.6	8.6
Yamaha	116	151	143	0.3	0.3	0.2
Other Japanese Companies	298	315	1,131	0.8	0.6	2.0

Source: Dataquest (May 1990)

**Table 3**  
**Worldwide Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	5,508.1	6,611.7	7,895.4	100.0	100.0	100.0
<b>Japanese Companies</b>	2,656.7	3,372.7	4,113.7	48.2	51.0	52.1
Fuji Electric	36.3	45.0	50.0	0.7	0.7	0.6
Fujitsu	259.3	338.9	408.9	4.7	5.1	5.2
Hitachi	377.0	455.8	548.4	6.8	6.9	6.9
Matsushita	209.8	244.8	259.7	3.8	3.7	3.3
Mitsubishi	214.8	300.6	355.9	3.9	4.5	4.5
NEC	485.0	590.6	692.1	8.8	8.9	8.8
New JRC	18.7	22.0	23.6	0.3	0.3	0.3
NMB Semiconductor	15.0	25.9	34.1	0.3	0.4	0.4
Oki Semiconductor	93.7	123.1	159.3	1.7	1.9	2.0
Ricoh	9.4	11.1	12.6	0.2	0.2	0.2
Rohm	74.6	93.7	102.1	1.4	1.4	1.3
Sanken	42.3	49.8	53.4	0.8	0.8	0.7
Sanyo	122.5	140.8	188.4	2.2	2.1	2.4
Seiko-Epson	35.3	40.4	50.8	0.6	0.6	0.6
Sharp	85.0	134.7	169.7	1.5	2.0	2.1
Sony	82.2	123.5	148.6	1.5	1.9	1.9
Toshiba	436.2	571.4	680.3	7.9	8.6	8.6
Yamaha	16.7	19.6	19.7	0.3	0.3	0.2
Other Japanese Companies	42.9	41.0	156.1	0.8	0.6	2.0
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

Source: Dataquest (May 1990)

Table 4

**Worldwide Semiconductor Market  
Total Integrated Circuit Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	29,887	41,068	46,924	100.0	100.0	100.0
<b>Japanese Companies</b>	13,981	20,375	23,800	46.8	49.6	50.7
Fuji Electric	42	64	74	0.1	0.2	0.2
Fujitsu	1,660	2,420	2,738	5.6	5.9	5.8
Hitachi	1,946	2,729	3,218	6.5	6.6	6.9
Matsushita	994	1,328	1,244	3.3	3.2	2.7
Mitsubishi	1,239	1,975	2,185	4.1	4.8	4.7
NEC	2,795	3,884	4,321	9.4	9.5	9.2
New JRC	109	146	154	0.4	0.4	0.3
NMB Semiconductor	104	199	247	0.3	0.5	0.5
Oki Semiconductor	619	902	1,111	2.1	2.2	2.4
Ricoh	65	85	91	0.2	0.2	0.2
Rohm	248	325	343	0.8	0.8	0.7
Sanken	119	157	156	0.4	0.4	0.3
Sanyo	556	811	975	1.9	2.0	2.1
Seiko-Epson	245	311	368	0.8	0.8	0.8
Sharp	367	751	902	1.2	1.8	1.9
Sony	361	621	732	1.2	1.5	1.6
Toshiba	2,194	3,316	3,774	7.3	8.1	8.0
Yamaha	116	151	143	0.4	0.4	0.3
Other Japanese Companies	202	200	1,024	0.7	0.5	2.2

Source: Dataquest (May 1990)

**Table 5**  
**Worldwide Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	4,303.7	5,338.8	6,475.5	100.0	100.0	100.0
Japanese Companies	2,013.1	2,648.8	3,284.4	46.8	49.6	50.7
Fuji Electric	6.0	8.3	10.2	0.1	0.2	0.2
Fujitsu	239.0	314.6	377.8	5.6	5.9	5.8
Hitachi	280.2	354.8	444.1	6.5	6.6	6.9
Matsushita	143.1	172.6	171.7	3.3	3.2	2.7
Mitsubishi	178.4	256.8	301.5	4.1	4.8	4.7
NEC	402.5	504.9	596.3	9.4	9.5	9.2
New JRC	15.7	19.0	21.3	0.4	0.4	0.3
NMB Semiconductor	15.0	25.9	34.1	0.3	0.5	0.5
Oki Semiconductor	89.1	117.3	153.3	2.1	2.2	2.4
Ricoh	9.4	11.1	12.6	0.2	0.2	0.2
Rohm	35.7	42.3	47.3	0.8	0.8	0.7
Sanken	17.1	20.4	21.5	0.4	0.4	0.3
Sanyo	80.1	105.4	134.6	1.9	2.0	2.1
Seiko-Epson	35.3	40.4	50.8	0.8	0.8	0.8
Sharp	52.8	97.6	124.5	1.2	1.8	1.9
Sony	52.0	80.7	101.0	1.2	1.5	1.6
Toshiba	315.9	431.1	520.8	7.3	8.1	8.0
Yamaha	16.7	19.6	19.7	0.4	0.4	0.3
Other Japanese Companies	29.1	26.0	141.3	0.7	0.5	2.2
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 6

**Worldwide Semiconductor Market**  
**Bipolar Digital Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	4,760	5,200	4,510	100.0	100.0	100.0
Japanese Companies	1,540	1,791	1,755	32.4	34.4	38.9
Fujitsu	495	653	617	10.4	12.6	13.7
Hitachi	463	501	479	9.7	9.6	10.6
Matsushita	26	30	14	0.5	0.6	0.3
Mitsubishi	122	127	125	2.6	2.4	2.8
NEC	247	292	302	5.2	5.6	6.7
New JRC	1	1	1	0	0	0
Oki Semiconductor	32	38	48	0.7	0.7	1.1
Sanyo	29	41	67	0.6	0.8	1.5
Toshiba	125	108	102	2.6	2.1	2.3

Source: Dataquest (May 1990)

Table 7

**Worldwide Semiconductor Market**  
**Bipolar Digital Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	685.4	676.0	622.4	100.0	100.0	100.0
Japanese Companies	221.8	232.7	242.1	32.4	34.4	38.9
Fujitsu	71.3	84.9	85.1	10.4	12.6	13.7
Hitachi	66.7	65.1	66.1	9.7	9.6	10.6
Matsushita	3.7	3.9	1.9	0.5	0.6	0.3
Mitsubishi	17.6	16.5	17.3	2.6	2.4	2.8
NEC	35.6	38.0	41.7	5.2	5.6	6.7
New JRC	0.1	0.1	0.1	0	0	0
Oki Semiconductor	4.6	4.9	6.6	0.7	0.7	1.1
Sanyo	4.2	5.3	9.2	0.6	0.8	1.5
Toshiba	18.0	14.0	14.1	2.6	2.1	2.3
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 8

**Worldwide Semiconductor Market  
TTL/Other Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	3,791	4,071	3,402	100.0	100.0	100.0
<b>Japanese Companies</b>	1,075	1,208	1,176	28.4	29.7	34.6
Fujitsu	233	317	294	6.1	7.8	8.6
Hitachi	356	376	357	9.4	9.2	10.5
Matsushita	19	21	10	0.5	0.5	0.3
Mitsubishi	122	127	125	3.2	3.1	3.7
NEC	160	184	195	4.2	4.5	5.7
New JRC	1	1	1	0	0	0
NMB Semiconductor	1	1	0	0	0	0
Oki Semiconductor	29	35	43	0.8	0.9	1.3
Sanyo	29	41	67	0.8	1.0	2.0
Toshiba	125	105	84	3.3	2.6	2.5

Source: Dataquest (May 1990)

Table 9

**Worldwide Semiconductor Market  
TTL/Other Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	545.9	529.2	469.5	100.0	100.0	100.0
<b>Japanese Companies</b>	154.8	157.0	162.3	28.4	29.7	34.6
Fujitsu	33.6	41.2	40.6	6.2	7.8	8.6
Hitachi	51.3	48.9	49.3	9.4	9.2	10.5
Matsushita	2.7	2.7	1.4	0.5	0.5	0.3
Mitsubishi	17.6	16.5	17.3	3.2	3.1	3.7
NEC	23.0	23.9	26.9	4.2	4.5	5.7
New JRC	0.1	0.1	0.1	0	0	0
NMB Semiconductor	0.1	0.1	0	0	0	0
Oki Semiconductor	4.2	4.6	5.9	0.8	0.9	1.3
Sanyo	4.2	5.3	9.2	0.8	1.0	2.0
Toshiba	18.0	13.7	11.6	3.3	2.6	2.5
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

Source: Dataquest (May 1990)

Table 10

**Worldwide Semiconductor Market  
ECL Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	970	1,130	1,108	100.0	100.0	100.0
<b>Japanese Companies</b>	466	584	579	48.0	51.7	52.3
Fujitsu	262	336	323	27.0	29.7	29.2
Hitachi	107	125	122	11.0	11.1	11.0
Matsushita	7	9	4	0.7	0.8	0.4
NEC	87	108	107	9.0	9.6	9.7
Oki Semiconductor	3	3	5	0.3	0.3	0.5
Toshiba	0	3	18	0	0.3	1.6

Source: Dataquest (May 1990)

Table 11

**Worldwide Semiconductor Market  
ECL Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	139.7	146.9	152.9	100.0	100.0	100.0
<b>Japanese Companies</b>	67.0	76.0	80.0	48.0	51.7	52.3
Fujitsu	37.7	43.7	44.6	27.0	29.7	29.2
Hitachi	15.4	16.3	16.8	11.0	11.1	11.0
Matsushita	1.0	1.2	0.6	0.7	0.8	0.4
NEC	12.5	14.0	14.8	8.9	9.5	9.7
Oki Semiconductor	0.4	0.4	0.7	0.3	0.3	0.5
Toshiba	0	0.4	2.5	0	0.3	1.6
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

Source: Dataquest (May 1990)



Table 12

**Worldwide Semiconductor Market  
Bipolar Digital Memory Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	621	689	540	100.0	100.0	100.0
Japanese Companies	306	417	326	49.3	60.5	60.4
Fujitsu	178	254	190	28.7	36.9	35.2
Hitachi	95	119	111	15.3	17.3	20.6
NEC	33	44	25	5.3	6.4	4.6

Source: Dataquest (May 1990)

Table 13

**Worldwide Semiconductor Market  
Bipolar Digital Memory Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	89.4	89.6	74.5	100.0	100.0	100.0
Japanese Companies	44.1	54.2	45.0	49.3	60.5	60.4
Fujitsu	25.6	33.0	26.2	28.6	36.8	35.2
Hitachi	13.7	15.5	15.3	15.3	17.3	20.5
NEC	4.8	5.7	3.5	5.4	6.4	4.7
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 14

**Worldwide Semiconductor Market  
Bipolar Digital Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	4,139	4,511	3,970	100.0	100.0	100.0
Japanese Companies	1,234	1,374	1,429	29.8	30.5	36.0
Fujitsu	317	399	427	7.7	8.8	10.8
Hitachi	368	382	368	8.9	8.5	9.5
Matsushita	26	30	14	0.6	0.7	0.4
Mitsubishi	122	127	125	2.9	2.8	3.1
NEC	214	248	277	5.2	5.5	7.0
New JRC	1	1	1	0	0	0
Oki Semiconductor	32	38	48	0.8	0.8	1.2
Sanyo	29	41	67	0.7	0.9	1.7
Toshiba	125	108	102	3.0	2.4	2.6

Source: Dataquest (May 1990)

Table 15

**Worldwide Semiconductor Market  
Bipolar Digital Logic Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	596.0	586.4	547.9	100.0	100.0	100.0
Japanese Companies	177.6	178.5	197.1	29.8	30.4	36.0
Fujitsu	45.6	51.9	58.9	7.7	8.9	10.8
Hitachi	53.0	49.7	50.8	8.9	8.5	9.3
Matsushita	3.7	3.9	1.9	0.6	0.7	0.3
Mitsubishi	17.6	16.5	17.3	3.0	2.8	3.2
NEC	30.8	32.2	38.2	5.2	5.5	7.0
New JRC	0.1	0.1	0.1	0	0	0
Oki Semiconductor	4.6	4.9	6.6	0.8	0.8	1.2
Sanyo	4.2	5.3	9.2	0.7	0.9	1.7
Toshiba	18.0	14.0	14.1	3.0	2.4	2.6
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 16

**Worldwide Semiconductor Market  
MOS Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	17,473	26,988	33,024	100.0	100.0	100.0
<b>Japanese Companies</b>	8,921	14,494	18,006	51.1	53.7	54.5
Fuji Electric	14	31	31	0.1	0.1	0.1
Fujitsu	1,014	1,616	1,958	5.8	6.0	5.9
Hitachi	1,173	1,885	2,407	6.7	7.0	7.3
Matsushita	592	875	854	3.4	3.2	2.6
Mitsubishi	812	1,453	1,676	4.6	5.4	5.1
NEC	2,006	3,123	3,604	11.5	11.6	10.9
New JRC	13	27	34	0.1	0.1	0.1
NMB Semiconductor	104	199	247	0.6	0.7	0.7
Oki Semiconductor	566	841	1,028	3.2	3.1	3.1
Ricoh	65	85	91	0.4	0.3	0.3
Rohm	13	54	66	0.1	0.2	0.2
Sanyo	150	299	378	0.9	1.1	1.1
Seiko-Epson	231	296	354	1.3	1.1	1.1
Sharp	312	682	837	1.8	2.5	2.5
Sony	144	235	371	0.8	0.9	1.1
Toshiba	1,593	2,639	3,100	9.1	9.8	9.4
Yamaha	116	151	130	0.7	0.6	0.4
Other Japanese Companies	3	3	840	0	0	2.5

Source: Dataquest (May 1990)

Table 17

**Worldwide Semiconductor Market  
MOS Digital Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	2,516.1	3,508.4	4,557.3	100.0	100.0	100.0
Japanese Companies	1,284.6	1,884.5	2,485.1	51.1	53.7	54.5
Fuji Electric	2.0	4.0	4.3	0.1	0.1	0.1
Fujitsu	146.0	210.1	270.2	5.8	6.0	5.9
Hitachi	168.9	245.1	332.2	6.7	7.0	7.3
Matsushita	85.2	113.8	117.9	3.4	3.2	2.6
Mitsubishi	116.9	188.9	231.3	4.6	5.4	5.1
NEC	288.9	406.0	497.4	11.5	11.6	10.9
New JRC	1.9	3.5	4.7	0.1	0.1	0.1
NMB Semiconductor	15.0	25.9	34.1	0.6	0.7	0.7
Oki Semiconductor	81.5	109.3	141.9	3.2	3.1	3.1
Ricoh	9.4	11.1	12.6	0.4	0.3	0.3
Rohm	1.9	7.0	9.1	0.1	0.2	0.2
Sanyo	21.6	38.9	52.2	0.9	1.1	1.1
Seiko-Epson	33.3	38.5	48.9	1.3	1.1	1.1
Sharp	44.9	88.7	115.5	1.8	2.5	2.5
Sony	20.7	30.6	51.2	0.8	0.9	1.1
Toshiba	229.4	343.1	427.8	9.1	9.8	9.4
Yamaha	16.7	19.6	17.9	0.7	0.6	0.4
Other Japanese Companies	0.4	0.4	115.9	0	0	2.5
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 18

**Worldwide Semiconductor Market  
N/PMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	8,482	10,196	10,843	100.0	100.0	100.0
Japanese Companies	4,403	5,120	5,886	51.9	50.2	54.3
Fujitsu	735	535	606	8.7	5.2	5.6
Hitachi	471	721	800	5.6	7.1	7.4
Matsushita	312	371	333	3.7	3.6	3.1
Mitsubishi	613	808	908	7.2	7.9	8.4
NEC	1,327	1,140	1,202	15.6	11.2	11.1
Oki Semiconductor	199	304	341	2.3	3.0	3.1
Ricoh	39	40	37	0.5	0.4	0.3
Rohm	0	1	1	0	0	0
Sanyo	37	63	26	0.4	0.6	0.2
Sharp	93	187	212	1.1	1.8	2.0
Sony	30	42	52	0.4	0.4	0.5
Toshiba	522	875	926	6.2	8.6	8.5
Yamaha	23	31	43	0.3	0.3	0.4
Other Japanese Companies	2	2	399	0	0	3.7

Source: Dataquest (May 1990)

Table 19

**Worldwide Semiconductor Market  
N/PMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	1,221.4	1,325.5	1,496.3	100.0	100.0	100.0
<b>Japanese Companies</b>	634.0	665.6	812.4	51.9	50.2	54.3
Fujitsu	105.8	69.6	83.6	8.7	5.3	5.6
Hitachi	67.8	93.7	110.4	5.6	7.1	7.4
Matsushita	44.9	48.2	46.0	3.7	3.6	3.1
Mitsubishi	88.3	105.0	125.3	7.2	7.9	8.4
NEC	191.1	148.2	165.9	15.6	11.2	11.1
Oki Semiconductor	28.7	39.5	47.1	2.3	3.0	3.1
Ricoh	5.6	5.2	5.1	0.5	0.4	0.3
Rohm	0	0.1	0.1	0	0	0
Sanyo	5.3	8.2	3.6	0.4	0.6	0.2
Sharp	13.4	24.3	29.3	1.1	1.8	2.0
Sony	4.3	5.5	7.2	0.4	0.4	0.5
Toshiba	75.2	113.8	127.8	6.2	8.6	8.5
Yamaha	3.3	4.0	5.9	0.3	0.3	0.4
Other Japanese Companies	0.3	0.3	55.1	0	0	3.7
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

Source: Dataquest (May 1990)

Table 20

Worldwide Semiconductor Market  
CMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	8,938	16,584	21,449	100.0	100.0	100.0
<b>Japanese Companies</b>	4,514	9,348	11,623	50.5	56.4	54.2
Fuji Electric	13	30	25	0.1	0.2	0.1
Fujitsu	279	1,081	1,241	3.1	6.5	5.8
Hitachi	699	1,157	1,454	7.8	7.0	6.8
Matsushita	280	504	521	3.1	3.0	2.4
Mitsubishi	199	645	768	2.2	3.9	3.6
NEC	679	1,965	2,314	7.6	11.8	10.8
New JRC	13	27	34	0.1	0.2	0.2
NMB Semiconductor	104	199	247	1.2	1.2	1.2
Oki Semiconductor	367	537	623	4.1	3.2	2.9
Ricoh	26	45	53	0.3	0.3	0.2
Rohm	13	53	65	0.1	0.3	0.3
Sanyo	113	236	352	1.3	1.4	1.6
Seiko-Epson	231	296	354	2.6	1.8	1.7
Sharp	219	495	625	2.5	3.0	2.9
Sony	114	193	319	1.3	1.2	1.5
Toshiba	1,071	1,764	2,100	12.0	10.6	9.8
Yamaha	93	120	87	1.0	0.7	0.4
Other Japanese Companies	1	1	441	0	0	2.1

Source: Dataquest (May 1990)

Table 21  
 Worldwide Semiconductor Market  
 CMOS Market Share Estimates  
 Sales by Manufacturers  
 (Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	1,287.1	2,155.9	2,960.0	100.0	100.0	100.0
Japanese Companies	650.1	1,215.4	1,604.3	50.5	56.4	54.2
Fuji Electric	1.9	3.9	3.5	0.1	0.2	0.1
Fujitsu	40.2	140.5	171.3	3.1	6.5	5.8
Hitachi	100.7	150.4	200.7	7.8	7.0	6.8
Matsushita	40.3	65.5	71.9	3.1	3.0	2.4
Mitsubishi	28.7	83.9	106.0	2.2	3.9	3.6
NEC	97.8	255.5	319.3	7.6	11.9	10.8
New JRC	1.9	3.5	4.7	0.1	0.2	0.2
NMB Semiconductor	15.0	25.9	34.1	1.2	1.2	1.2
Oki Semiconductor	52.8	69.8	86.0	4.1	3.2	2.9
Ricoh	3.7	5.9	7.3	0.3	0.3	0.2
Rohm	1.9	6.9	9.0	0.1	0.3	0.3
Sanyo	16.3	30.7	48.6	1.3	1.4	1.6
Seiko-Epson	33.3	38.5	48.9	2.6	1.8	1.7
Sharp	31.5	64.4	86.3	2.4	3.0	2.9
Sony	16.4	25.1	44.0	1.3	1.2	1.5
Toshiba	154.2	229.3	289.8	12.0	10.6	9.8
Yamaha	13.4	15.6	12.0	1.0	0.7	0.4
Other Japanese Companies	0.1	0.1	60.9	0	0	2.1
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)



Table 22

**Worldwide Semiconductor Market  
BiCMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	53	208	732	100.0	100.0	100.0
Japanese Companies	4	26	497	7.5	12.5	67.9
Fuji Electric	1	1	6	1.9	0.5	0.8
Fujitsu	0	0	111	0	0	15.2
Hitachi	3	7	153	5.7	3.4	20.9
NEC	0	18	88	0	8.7	12.0
Oki Semiconductor	0	0	64	0	0	8.7
Ricoh	0	0	1	0	0	0.1
Toshiba	0	0	74	0	0	10.1

Source: Dataquest (May 1990)

Table 23

**Worldwide Semiconductor Market  
BiCMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	7.6	27.0	101.0	100.0	100.0	100.0
Japanese Companies	0.5	3.3	68.4	6.6	12.2	67.7
Fuji Electric	0.1	0.1	0.8	1.3	0.4	0.8
Fujitsu	0	0	15.3	0	0	15.1
Hitachi	0.4	0.9	21.1	5.3	3.3	20.9
NEC	0	2.3	12.1	0	8.5	12.0
Oki Semiconductor	0	0	8.8	0	0	8.7
Ricoh	0	0	0.1	0	0	0.1
Toshiba	0	0	10.2	0	0	10.1
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 24

**Worldwide Semiconductor Market  
MOS Memory Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	6,056	11,692	16,361	100.0	100.0	100.0
Japanese Companies	3,909	7,597	10,558	64.5	65.0	64.5
Fujitsu	634	1,067	1,265	10.5	9.1	7.7
Hitachi	576	1,114	1,534	9.5	9.5	9.4
Matsushita	91	230	370	1.5	2.0	2.3
Mitsubishi	492	966	1,161	8.1	8.3	7.1
NEC	838	1,490	1,739	13.8	12.7	10.6
NMB Semiconductor	104	199	247	1.7	1.7	1.5
Oki Semiconductor	193	353	473	3.2	3.0	2.9
Ricoh	18	26	31	0.3	0.2	0.2
Rohm	0	8	10	0	0.1	0.1
Sanyo	27	87	130	0.4	0.7	0.8
Seiko-Epson	71	94	141	1.2	0.8	0.9
Sharp	130	344	476	2.1	2.9	2.9
Sony	56	103	228	0.9	0.9	1.4
Toshiba	679	1,516	1,918	11.2	13.0	11.7
Other Japanese Companies	0	0	835	0	0	5.1

Source: Dataquest (May 1990)

Table 25

**Worldwide Semiconductor Market  
MOS Memory Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	872.1	1,520.0	2,257.8	100.0	100.0	100.0
Japanese Companies	562.9	987.6	1,457.2	64.5	65.0	64.5
Fujitsu	91.3	138.7	174.6	10.5	9.1	7.7
Hitachi	82.9	144.8	211.7	9.5	9.5	9.4
Matsushita	13.1	29.9	51.1	1.5	2.0	2.3
Mitsubishi	70.8	125.6	160.2	8.1	8.3	7.1
NEC	120.7	193.7	240.0	13.8	12.7	10.6
NMB Semiconductor	15.0	25.9	34.1	1.7	1.7	1.5
Oki Semiconductor	27.8	45.9	65.3	3.2	3.0	2.9
Ricoh	2.6	3.4	4.3	0.3	0.2	0.2
Rohm	0	1.0	1.4	0	0.1	0.1
Sanyo	3.9	11.3	17.9	0.4	0.7	0.8
Seiko-Epson	10.2	12.2	19.5	1.2	0.8	0.9
Sharp	18.7	44.7	65.7	2.1	2.9	2.9
Sony	8.1	13.4	31.5	0.9	0.9	1.4
Toshiba	97.8	197.1	264.7	11.2	13.0	11.7
Other Japanese Companies	0	0	115.2	0	0	5.1
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 26

**Worldwide Semiconductor Market  
MOS Microcomponents Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>5,108</b>	<b>7,144</b>	<b>8,202</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Japanese Companies</b>	<b>2,096</b>	<b>2,817</b>	<b>3,190</b>	<b>41.0</b>	<b>39.4</b>	<b>38.9</b>
Fujitsu	146	202	211	2.9	2.8	2.6
Hitachi	402	525	554	7.9	7.3	6.8
Matsushita	199	230	217	3.9	3.2	2.6
Mitsubishi	267	381	435	5.2	5.3	5.3
NEC	566	790	937	11.1	11.1	11.4
Oki Semiconductor	101	134	149	2.0	1.9	1.8
Ricoh	14	19	22	0.3	0.3	0.3
Rohm	3	16	16	0.1	0.2	0.2
Sanyo	53	70	70	1.0	1.0	0.9
Seiko-Epson	6	12	12	0.1	0.2	0.1
Sharp	34	54	112	0.7	0.8	1.4
Sony	21	37	47	0.4	0.5	0.6
Toshiba	283	346	407	5.5	4.8	5.0
<b>Other Japanese Companies</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>

Source: Dataquest (May 1990)

Table 27

**Worldwide Semiconductor Market  
MOS Microcomponents Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	735.6	928.7	1,131.9	100.0	100.0	100.0
Japanese Companies	301.7	366.3	440.3	41.0	39.4	38.9
Fujitsu	21.0	26.3	29.1	2.9	2.8	2.6
Hitachi	57.9	68.3	76.5	7.9	7.4	6.8
Matsushita	28.7	29.9	29.9	3.9	3.2	2.6
Mitsubishi	38.4	49.5	60.0	5.2	5.3	5.3
NEC	81.5	102.7	129.3	11.1	11.1	11.4
Oki Semiconductor	14.5	17.4	20.6	2.0	1.9	1.8
Ricoh	2.0	2.5	3.0	0.3	0.3	0.3
Rohm	0.4	2.1	2.2	0.1	0.2	0.2
Sanyo	7.6	9.1	9.7	1.0	1.0	0.9
Seiko-Epson	0.9	1.6	1.7	0.1	0.2	0.2
Sharp	4.9	7.0	15.5	0.7	0.8	1.4
Sony	3.0	4.8	6.5	0.4	0.5	0.6
Toshiba	40.8	45.0	56.2	5.5	4.8	5.0
Other Japanese Companies	0.1	0.1	0.1	0	0	0
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 28

**Worldwide Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	6,309	8,152	8,461	100.0	100.0	100.0
<b>Japanese Companies</b>	2,916	4,080	4,258	46.2	50.0	50.3
Fuji Electric	14	31	31	0.2	0.4	0.4
Fujitsu	234	347	482	3.7	4.3	5.7
Hitachi	195	246	319	3.1	3.0	3.8
Matsushita	302	415	267	4.8	5.1	3.2
Mitsubishi	53	106	80	0.8	1.3	0.9
NEC	602	843	928	9.5	10.3	11.0
New JRC	13	27	34	0.2	0.3	0.4
Oki Semiconductor	272	354	406	4.3	4.3	4.8
Ricoh	33	40	38	0.5	0.5	0.4
Rohm	10	30	40	0.2	0.4	0.5
Sanyo	70	142	178	1.1	1.7	2.1
Seiko-Epson	154	190	201	2.4	2.3	2.4
Sharp	148	284	249	2.3	3.5	2.9
Sony	67	95	96	1.1	1.2	1.1
Toshiba	631	777	775	10.0	9.5	9.2
Yamaha	116	151	130	1.8	1.9	1.5
<b>Other Japanese Companies</b>	2	2	4	0	0	0

Source: Dataquest (May 1990)

Table 29

Worldwide Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	908.5	1,059.8	1,167.6	100.0	100.0	100.0
Japanese Companies	420.0	530.5	587.5	46.2	50.1	50.3
Fuji Electric	2.0	4.0	4.3	0.2	0.4	0.4
Fujitsu	33.7	45.1	66.5	3.7	4.3	5.7
Hitachi	28.1	32.0	44.0	3.1	3.0	3.8
Matsushita	43.5	54.0	36.8	4.8	5.1	3.2
Mitsubishi	7.6	13.8	11.0	0.8	1.3	0.9
NEC	86.7	109.6	128.1	9.5	10.3	11.0
New JRC	1.9	3.5	4.7	0.2	0.3	0.4
Oki Semiconductor	39.2	46.0	56.0	4.3	4.3	4.8
Ricoh	4.8	5.2	5.2	0.5	0.5	0.4
Rohm	1.4	3.9	5.5	0.2	0.4	0.5
Sanyo	10.1	18.5	24.6	1.1	1.7	2.1
Seiko-Epson	22.2	24.7	27.7	2.4	2.3	2.4
Sharp	21.3	36.9	34.4	2.3	3.5	2.9
Sony	9.6	12.4	13.2	1.1	1.2	1.1
Toshiba	90.9	101.0	107.0	10.0	9.5	9.2
Yamaha	16.7	19.6	17.9	1.8	1.8	1.5
Other Japanese Companies	0.3	0.3	0.6	0	0	0.1
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 30

**Worldwide Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	7,654	8,880	9,390	100.0	100.0	100.0
Japanese Companies	3,520	4,090	4,039	46.0	46.1	43.0
Fuji Electric	28	33	43	0.4	0.4	0.5
Fujitsu	151	151	163	2.0	1.7	1.7
Hitachi	310	343	332	4.1	3.9	3.5
Matsushita	376	423	376	4.9	4.8	4.0
Mitsubishi	305	395	384	4.0	4.4	4.1
NEC	542	469	415	7.1	5.3	4.4
New JRC	95	118	119	1.2	1.3	1.3
Oki Semiconductor	21	23	35	0.3	0.3	0.4
Rohm	235	271	277	3.1	3.1	2.9
Sanken	119	157	156	1.6	1.8	1.7
Sanyo	377	471	530	4.9	5.3	5.6
Seiko-Epson	14	15	14	0.2	0.2	0.1
Sharp	55	69	65	0.7	0.8	0.7
Sony	217	386	361	2.8	4.3	3.8
Toshiba	476	569	572	6.2	6.4	6.1
Yamaha	0	0	13	0	0	0.1
Other Japanese Companies	199	197	184	2.6	2.2	2.0

Source: Dataquest (May 1990)



Table 31

**Worldwide Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>1,102.2</b>	<b>1,154.4</b>	<b>1,295.8</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Japanese Companies</b>	<b>506.5</b>	<b>531.8</b>	<b>557.2</b>	<b>46.0</b>	<b>46.1</b>	<b>43.0</b>
Fuji Electric	4.0	4.3	5.9	0.4	0.4	0.5
Fujitsu	21.7	19.6	22.5	2.0	1.7	1.7
Hitachi	44.6	44.6	45.8	4.0	3.9	3.5
Matsushita	54.1	55.0	51.9	4.9	4.8	4.0
Mitsubishi	43.9	51.4	53.0	4.0	4.5	4.1
NEC	78.0	61.0	57.3	7.1	5.3	4.4
New JRC	13.7	15.3	16.4	1.2	1.3	1.3
Oki Semiconductor	3.0	3.0	4.8	0.3	0.3	0.4
Rohm	33.8	35.2	38.2	3.1	3.0	2.9
Sanken	17.1	20.4	21.5	1.6	1.8	1.7
Sanyo	54.3	61.2	73.1	4.9	5.3	5.6
Seiko-Epson	2.0	2.0	1.9	0.2	0.2	0.1
Sharp	7.9	9.0	9.0	0.7	0.8	0.7
Sony	31.2	50.2	49.8	2.8	4.3	3.8
Toshiba	68.5	74.0	78.9	6.2	6.4	6.1
Yamaha	0	0	1.8	0	0	0.1
Other Japanese Companies	28.7	25.6	25.4	2.6	2.2	2.0
<b>Exchange Rate (¥/US\$1)</b>	<b>144</b>	<b>130</b>	<b>138</b>			

Source: Dataquest (May 1990)

Table 32

**Worldwide Semiconductor Market  
Total Discrete Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	6,655	7,612	7,662	100.0	100.0	100.0
<b>Japanese Companies</b>	3,376	4,056	4,091	50.7	53.3	53.4
Fuji Electric	206	279	287	3.1	3.7	3.7
Fujitsu	70	82	109	1.1	1.1	1.4
Hitachi	625	707	690	9.4	9.3	9.0
Matsushita	318	377	332	4.8	5.0	4.3
Mitsubishi	227	310	364	3.4	4.1	4.8
NEC	518	571	574	7.8	7.5	7.5
New JRC	10	8	4	0.2	0.1	0.1
Oki Semiconductor	7	9	10	0.1	0.1	0.1
Rohm	200	287	301	3.0	3.8	3.9
Sanken	162	207	213	2.4	2.7	2.8
Sanyo	210	210	230	3.2	2.8	3.0
Sony	72	112	96	1.1	1.5	1.3
Toshiba	703	864	848	10.6	11.4	11.1
<b>Other Japanese Companies</b>	48	33	33	0.7	0.4	0.4

Source: Dataquest (May 1990)

Table 33

**Worldwide Semiconductor Market  
Total Discrete Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>958.3</b>	<b>989.6</b>	<b>1,057.4</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Japanese Companies</b>	<b>486.1</b>	<b>527.3</b>	<b>564.4</b>	<b>50.7</b>	<b>53.3</b>	<b>53.4</b>
Fuji Electric	29.7	36.3	39.6	3.1	3.7	3.7
Fujitsu	10.1	10.7	15.0	1.1	1.1	1.4
Hitachi	90.0	91.9	95.2	9.4	9.3	9.0
Matsushita	45.8	49.0	45.8	4.8	5.0	4.3
Mitsubishi	32.7	40.3	50.2	3.4	4.1	4.7
NEC	74.6	74.2	79.2	7.8	7.5	7.5
New JRC	1.4	1.0	0.6	0.1	0.1	0.1
Oki Semiconductor	1.0	1.2	1.4	0.1	0.1	0.1
Rohm	28.8	37.3	41.5	3.0	3.8	3.9
Sanken	23.3	26.9	29.4	2.4	2.7	2.8
Sanyo	30.2	27.3	31.7	3.2	2.8	3.0
Sony	10.4	14.6	13.2	1.1	1.5	1.2
Toshiba	101.2	112.3	117.0	10.6	11.3	11.1
Other Japanese Companies	6.9	4.3	4.6	0.7	0.4	0.4
<b>Exchange Rate (¥/US\$1)</b>	<b>144</b>	<b>130</b>	<b>138</b>			

Source: Dataquest (May 1990)

Table 34

**Worldwide Semiconductor Market  
Transistor Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>3,393</b>	<b>3,916</b>	<b>4,071</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Japanese Companies</b>	<b>1,837</b>	<b>2,251</b>	<b>2,332</b>	<b>54.1</b>	<b>57.5</b>	<b>57.3</b>
Fuji Electric	57	98	114	1.7	2.5	2.8
Fujitsu	70	82	109	2.1	2.1	2.7
Hitachi	232	271	266	6.8	6.9	6.5
Matsushita	240	285	245	7.1	7.3	6.0
Mitsubishi	89	114	131	2.6	2.9	3.2
NEC	338	384	442	10.0	9.8	10.9
New JRC	10	8	0	0.3	0.2	0
Rohm	134	206	221	3.9	5.3	5.4
Sanken	48	61	63	1.4	1.6	1.5
Sanyo	151	170	180	4.5	4.3	4.4
Sony	19	35	30	0.6	0.9	0.7
Toshiba	415	512	506	12.2	13.1	12.4
<b>Other Japanese Companies</b>	<b>34</b>	<b>25</b>	<b>25</b>	<b>1.0</b>	<b>0.6</b>	<b>0.6</b>

Source: Dataquest (May 1990)

Table 35

**Worldwide Semiconductor Market  
Transistor Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	488.6	509.1	561.8	100.0	100.0	100.0
Japanese Companies	264.5	292.7	321.7	54.1	57.5	57.3
Fuji Electric	8.2	12.7	15.7	1.7	2.5	2.8
Fujitsu	10.1	10.7	15.0	2.1	2.1	2.7
Hitachi	33.4	35.2	36.7	6.8	6.9	6.5
Matsushita	34.6	37.1	33.8	7.1	7.3	6.0
Mitsubishi	12.8	14.8	18.1	2.6	2.9	3.2
NEC	48.7	49.9	61.0	10.0	9.8	10.9
New JRC	1.4	1.0	0	0.3	0.2	0
Rohm	19.3	26.8	30.5	4.0	5.3	5.4
Sanken	6.9	7.9	8.7	1.4	1.6	1.5
Sanyo	21.7	22.1	24.8	4.4	4.3	4.4
Sony	2.7	4.6	4.1	0.6	0.9	0.7
Toshiba	59.8	66.6	69.8	12.2	13.1	12.4
Other Japanese Companies	4.9	3.3	3.5	1.0	0.6	0.6
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 36

**Worldwide Semiconductor Market  
Diode Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	2,166	2,466	2,323	100.0	100.0	100.0
<b>Japanese Companies</b>	1,096	1,277	1,189	50.6	51.8	51.2
Fuji Electric	97	117	117	4.5	4.7	5.0
Hitachi	315	343	330	14.5	13.9	14.2
Matsushita	78	92	87	3.6	3.7	3.7
Mitsubishi	5	5	3	0.2	0.2	0.1
NEC	118	123	75	5.4	5.0	3.2
New JRC	0	0	1	0	0	0
Rohm	66	81	80	3.0	3.3	3.4
Sanken	114	146	150	5.3	5.9	6.5
Sanyo	28	32	31	1.3	1.3	1.3
Sony	53	77	66	2.4	3.1	2.8
Toshiba	211	256	244	9.7	10.4	10.5
<b>Other Japanese Companies</b>	11	5	5	0.5	0.2	0.2

Source: Dataquest (May 1990)

Table 37

Worldwide Semiconductor Market  
Diode Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	311.9	320.6	320.6	100.0	100.0	100.0
Japanese Companies	157.8	166.2	164.0	50.6	51.8	51.2
Fuji Electric	14.0	15.2	16.1	4.5	4.7	5.0
Hitachi	45.4	44.6	45.5	14.6	13.9	14.2
Matsushita	11.2	12.0	12.0	3.6	3.7	3.7
Mitsubishi	0.7	0.7	0.4	0.2	0.2	0.1
NEC	17.0	16.0	10.4	5.5	5.0	3.2
New JRC	0	0	0.1	0	0	0
Rohm	9.5	10.5	11.0	3.0	3.3	3.4
Sanken	16.4	19.0	20.7	5.3	5.9	6.5
Sanyo	4.0	4.2	4.3	1.3	1.3	1.3
Sony	7.6	10.0	9.1	2.4	3.1	2.8
Toshiba	30.4	33.3	33.7	9.7	10.4	10.5
Other Japanese Companies	1.6	0.7	0.7	0.5	0.2	0.2
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 38

**Worldwide Semiconductor Market  
Thyristor Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	500	567	584	100.0	100.0	100.0
Japanese Companies	168	198	235	33.6	34.9	40.2
Fuji Electric	3	3	5	0.6	0.5	0.9
Hitachi	29	36	37	5.8	6.3	6.3
Mitsubishi	54	61	71	10.8	10.8	12.2
NEC	15	16	34	3.0	2.8	5.8
Toshiba	65	80	86	13.0	14.1	14.7
Other Japanese Companies	2	2	2	0.4	0.4	0.3

Source: Dataquest (May 1990)

Table 39

**Worldwide Semiconductor Market  
Thyristor Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	72.0	73.7	80.6	100.0	100.0	100.0
Japanese Companies	24.3	25.8	32.5	33.8	35.0	40.3
Fuji Electric	0.4	0.4	0.7	0.6	0.5	0.9
Hitachi	4.2	4.7	5.1	5.8	6.4	6.3
Mitsubishi	7.8	7.9	9.8	10.8	10.7	12.2
NEC	2.2	2.1	4.7	3.1	2.8	5.8
Toshiba	9.4	10.4	11.9	13.1	14.1	14.8
Other Japanese Companies	0.3	0.3	0.3	0.4	0.4	0.4
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)



Table 40

**Worldwide Semiconductor Market  
Other Discrete Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	596	663	684	100.0	100.0	100.0
Japanese Companies	275	330	335	46.1	49.8	49.0
Fuji Electric	49	61	51	8.2	9.2	7.5
Hitachi	49	57	57	8.2	8.6	8.3
Mitsubishi	79	130	159	13.3	19.6	23.2
NEC	47	48	23	7.9	7.2	3.4
New JRC	0	0	3	0	0	0.4
Oki Semiconductor	7	9	10	1.2	1.4	1.5
Sanyo	31	8	19	5.2	1.2	2.8
Toshiba	12	16	12	2.0	2.4	1.8
Other Japanese Companies	1	1	1	0.2	0.2	0.1

Source: Dataquest (May 1990)

Table 41

**Worldwide Semiconductor Market  
Other Discrete Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	85.8	86.2	94.4	100.0	100.0	100.0
Japanese Companies	39.7	42.8	46.2	46.3	49.7	48.9
Fuji Electric	7.1	7.9	7.0	8.3	9.2	7.4
Hitachi	7.1	7.4	7.9	8.3	8.6	8.4
Mitsubishi	11.4	16.9	21.9	13.3	19.6	23.2
NEC	6.8	6.2	3.2	7.9	7.2	3.4
New JRC	0	0	0.4	0	0	0.4
Oki Semiconductor	1.0	1.2	1.4	1.2	1.4	1.5
Sanyo	4.5	1.0	2.6	5.2	1.2	2.8
Toshiba	1.7	2.1	1.7	2.0	2.4	1.8
Other Japanese Companies	0.1	0.1	0.1	0.1	0.1	0.1
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 42

**Worldwide Semiconductor Market  
Total Optoelectronic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	1,709	2,179	2,627	100.0	100.0	100.0
<b>Japanese Companies</b>	1,093	1,511	1,918	64.0	69.3	73.0
Fuji Electric	4	3	1	0.2	0.1	0
Fujitsu	71	105	116	4.2	4.8	4.4
Hitachi	47	70	66	2.8	3.2	2.5
Matsushita	145	178	306	8.5	8.2	11.6
Mitsubishi	26	27	30	1.5	1.2	1.1
NEC	55	88	120	3.2	4.0	4.6
New JRC	11	15	13	0.6	0.7	0.5
Oki Semiconductor	25	36	33	1.5	1.7	1.3
Rohm	70	109	96	4.1	5.0	3.7
Sanken	13	19	18	0.8	0.9	0.7
Sanyo	85	62	160	5.0	2.8	6.1
Sharp	223	285	328	13.0	13.1	12.5
Sony	138	217	249	8.1	10.0	9.5
Toshiba	132	215	308	7.7	9.9	11.7
<b>Other Japanese Companies</b>	48	82	74	2.8	3.8	2.8

Source: Dataquest (May 1990)

Table 43

**Worldwide Semiconductor Market  
Total Optoelectronic Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	246.1	283.3	362.5	100.0	100.0	100.0
Japanese Companies	157.4	196.7	264.7	64.0	69.4	73.0
Fuji Electric	0.6	0.4	0.1	0.2	0.1	0
Fujitsu	10.2	13.7	16.0	4.1	4.8	4.4
Hitachi	6.8	9.1	9.1	2.8	3.2	2.5
Matsushita	20.9	23.1	42.2	8.5	8.2	11.6
Mitsubishi	3.7	3.5	4.1	1.5	1.2	1.1
NEC	7.9	11.4	16.6	3.2	4.0	4.6
New JRC	1.6	2.0	1.8	0.7	0.7	0.5
Oki Semiconductor	3.6	4.7	4.6	1.5	1.7	1.3
Rohm	10.1	14.2	13.2	4.1	5.0	3.6
Sanken	1.9	2.5	2.5	0.8	0.9	0.7
Sanyo	12.2	8.1	22.1	5.0	2.9	6.1
Sharp	32.1	37.1	45.3	13.0	13.1	12.5
Sony	19.9	28.2	34.4	8.1	10.0	9.5
Toshiba	19.0	28.0	42.5	7.7	9.9	11.7
Other Japanese Companies	6.9	10.7	10.2	2.8	3.8	2.8
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 44

**Japanese Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	14,927	20,772	22,997	100.0	100.0	100.0
<b>North American Companies</b>	1,249	1,965	2,162	8.4	9.5	9.4
Acrian	1	2	2	0	0	0
Actel	NA	NA	1	NA	NA	0
Advanced Micro Devices	87	133	143	0.6	0.6	0.6
Altera	2	5	7	0	0	0
Analog Devices	52	63	59	0.3	0.3	0.3
Atmel	NA	NA	13	NA	NA	0.1
Brooktree	NA	NA	4	NA	NA	0
Burr-Brown	38	53	50	0.3	0.3	0.2
Catalyst	0	1	10	0	0	0
Cherry Semiconductor	2	2	0	0	0	0
Chips & Technologies	8	12	18	0.1	0.1	0.1
Cirrus Logic	NA	NA	2	NA	NA	0
Crystal	NA	NA	1	NA	NA	0
Cypress Semiconductor	0	4	9	0	0	0
Elantec	NA	NA	2	NA	NA	0
Exar	3	3	5	0	0	0
General Electric	7	8	0	0	0	0
General Instrument	22	27	16	0.1	0.1	0.1
Gennum	NA	NA	2	NA	NA	0
Gould AMI	1	2	6	0	0	0
Harris	10	15	36	0.1	0.1	0.2
Hewlett-Packard	25	29	25	0.2	0.1	0.1
Honeywell	7	7	0	0	0	0
Integrated CMOS Systems	NA	NA	3	NA	NA	0
Integrated Device Technology	3	11	15	0	0.1	0.1
Intel	156	285	301	1.0	1.4	1.3
International CMOS Technology	NA	NA	4	NA	NA	0
Int'l. Microelectronic Prod.	0	0	1	0	0	0
International Rectifier	4	5	5	0	0	0
ITT	25	33	25	0.2	0.2	0.1
Lattice	2	2	4	0	0	0
Linear Technology	4	6	8	0	0	0
LSI Logic	12	20	51	0.1	0.1	0.2
Macronix	NA	NA	8	NA	NA	0
Maxim	4	7	9	0	0	0

(Continued)

Table 44 (Continued)

Japanese Semiconductor Market  
Total Semiconductor Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
North American Companies (Continued)						
Micro Linear	0	0	1	0	0	0
Micro Power Systems	2	2	3	0	0	0
Microchip Technology	3	8	9	0	0	0
Micron Technology	4	8	2	0	0	0
Mitel	8	7	0	0.1	0	0
MOSel	0	1	1	0	0	0
Motorola	170	290	353	1.1	1.4	1.5
National Semiconductor	110	140	145	0.7	0.7	0.6
NCR	1	1	0	0	0	0
Performance Semiconductor	NA	NA	1	NA	NA	0
Precision Monolithics	6	10	5	0	0	0
Quality Technologies	NA	1	0	NA	0	0
Rockwell	9	88	100	0.1	0.4	0.4
SEEQ Technology	3	4	4	0	0	0
Silicon Systems	14	18	15	0.1	0.1	0.1
Siliconix	7	8	6	0	0	0
Sipex	NA	NA	1	NA	NA	0
Sprague	4	4	5	0	0	0
Standard Microsystems	1	1	1	0	0	0
Supertex	3	3	8	0	0	0
Teledyne	3	3	2	0	0	0
Texas Instruments	403	599	608	2.7	2.9	2.6
TRW	1	0	0	0	0	0
Unitrode	3	3	3	0	0	0
Vitellic	0	0	3	0	0	0
VLSI Technology	2	6	7	0	0	0
Weitek	1	4	4	0	0	0
Western Digital	7	8	11	0	0	0
Xicor	5	5	8	0	0	0
Xilinx	1	4	5	0	0	0
Zilog	3	4	5	0	0	0
Other North American Companies	0	0	1	0	0	0
Japanese Companies	13,588	18,630	20,628	91.0	89.7	89.7
Fuji Electric	205	284	303	1.4	1.4	1.3
Fujitsu	1,316	1,987	2,098	8.8	9.6	9.1
Hitachi	1,899	2,470	2,719	12.7	11.9	11.8

(Continued)

Table 44 (Continued)

Japanese Semiconductor Market  
Total Semiconductor Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Matsushita	1,290	1,622	1,521	8.6	7.8	6.6
Mitsubishi	1,132	1,596	1,769	7.6	7.7	7.7
NEC	2,488	3,287	3,600	16.7	15.8	15.7
New JRC	112	146	146	0.8	0.7	0.6
NMB Semiconductor	3	27	29	0	0.1	0.1
Oki Semiconductor	379	527	645	2.5	2.5	2.8
Ricoh	60	80	88	0.4	0.4	0.4
Rohm	409	592	600	2.7	2.8	2.6
Sanken	202	268	266	1.4	1.3	1.2
Sanyo	694	868	1,118	4.6	4.2	4.9
Seiko-Epson	173	226	284	1.2	1.1	1.2
Sharp	495	859	1,000	3.3	4.1	4.3
Sony	538	845	872	3.6	4.1	3.8
Toshiba	1,792	2,496	2,743	12.0	12.0	11.9
Yamaha	103	135	129	0.7	0.6	0.6
Other Japanese Companies	298	315	698	2.0	1.5	3.0
<b>European Companies</b>						
ABB-HAFO	3	3	2	0	0	0
Ericsson	0	2	2	0	0	0
Eurosil	1	1	1	0	0	0
Inmos	6	8	0	0	0	0
Matra MHS	0	2	1	0	0	0
Philips	40	62	69	0.3	0.3	0.3
Plessey	5	6	8	0	0	0
SGS-Thomson	9	12	22	0.1	0.1	0.1
Siemens	4	17	22	0	0.1	0.1
Telefunken Electronic	2	2	2	0	0	0
TMS	NA	NA	1	NA	NA	0
<b>Asia/Pacific Companies</b>						
Goldstar	0	9	5	0	0	0
Hyundai	0	1	3	0	0	0
Korean Electronic Co.	15	1	8	0.1	0	0
Samsung	5	49	59	0	0.2	0.3
United Microelectronics	0	2	2	0	0	0

NA = Not available  
Source: Dataquest (May 1990)

Table 45

**Japanese Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	2,149.1	2,700.8	3,173.1	100.0	100.0	100.0
<b>North American Companies</b>	179.5	255.5	298.3	8.4	9.5	9.4
Acrian	0.1	0.3	0.3	0	0	0
Actel	NA	NA	0.1	NA	NA	0
Advanced Micro Devices	12.5	17.3	19.7	0.6	0.6	0.6
Altera	0.3	0.7	1.0	0	0	0
Analog Devices	7.5	8.2	8.1	0.3	0.3	0.3
Atmel	NA	NA	1.8	NA	NA	0.1
Bipolar Integrated Technology	0	0	0	0	0	0
Brooktree	NA	NA	0.6	NA	NA	0
Burr-Brown	5.5	6.9	6.9	0.3	0.3	0.2
California Micro Devices	0	0	0	0	0	0
Catalyst	0	0.1	1.4	0	0	0
Cherry Semiconductor	0.3	0.3	0	0	0	0
Chips & Technologies	1.2	1.6	2.5	0.1	0.1	0.1
Cirrus Logic	NA	NA	0.3	NA	NA	0
Crystal	NA	NA	0.1	NA	NA	0
Cypress Semiconductor	0	0.5	1.2	0	0	0
Elantec	NA	NA	0.3	NA	NA	0
Exar	0.4	0.4	0.7	0	0	0
General Electric	1.0	1.0	0	0	0	0
General Instrument	3.2	3.5	2.2	0.1	0.1	0.1
Gennum	NA	NA	0.3	NA	NA	0
Gould AMI	0.1	0.3	0.8	0	0	0
GTE Microcircuits	0	0	0	0	0	0
Harris	1.4	2.0	5.0	0.1	0.1	0.2
Hewlett-Packard	3.6	3.8	3.5	0.2	0.1	0.1
Honeywell	1.0	0.9	0	0	0	0
IC Sensors	0	0	0	0	0	0
Integrated CMOS Systems	NA	NA	0.4	NA	NA	0
Integrated Device Technology	0.4	1.4	2.1	0	0.1	0.1
Intel	22.5	37.1	41.5	1.0	1.4	1.3
International CMOS Technology	0	0	0.6	0	0	0
Int'l. Microelectronic Prod.	0	0	0.1	0	0	0
International Rectifier	0.6	0.7	0.7	0	0	0
ITT	3.6	4.3	3.5	0.2	0.2	0.1
Kulite	0	0	0	0	0	0

(Continued)

Table 45 (Continued)

Japanese Semiconductor Market  
Total Semiconductor Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
North American Companies (Continued)						
Lattice	0.3	0.3	0.6	0	0	0
Linear Technology	0.6	0.8	1.1	0	0	0
LSI Logic	1.7	2.6	7.0	0.1	0.1	0.2
Macronix	NA	NA	1.1	NA	NA	0
Maxim	0.6	0.9	1.2	0	0	0
Micro Linear	0	0	0.1	0	0	0
Micro Power Systems	0.3	0.3	0.4	0	0	0
Microchip Technology	0.4	1.0	1.2	0	0	0
Micron Technology	0.6	1.0	0.3	0	0	0
Mitel	1.2	0.9	0	0.1	0	0
MOSel	0	0.1	0.1	0	0	0
Motorola	24.5	37.7	48.7	1.1	1.4	1.5
National Semiconductor	15.8	18.2	20.0	0.7	0.7	0.6
NCR	0.1	0.1	0	0	0	0
Performance Semiconductor	NA	NA	0.1	NA	NA	0
Powerex	0	0	0	0	0	0
Precision Monolithics	0.9	1.3	0.7	0	0	0
Quality Technologies	NA	0.1	0	NA	0	0
Rockwell	1.3	11.4	13.8	0.1	0.4	0.4
SEEQ Technology	0.4	0.5	0.6	0	0	0
Silicon Systems	2.0	2.3	2.1	0.1	0.1	0.1
Siliconix	1.0	1.0	0.8	0	0	0
Sipex	NA	NA	0.1	NA	NA	0
Sprague	0.6	0.5	0.7	0	0	0
Standard Microsystems	0.1	0.1	0.1	0	0	0
Supertex	0.4	0.4	1.1	0	0	0
Teledyne	0.4	0.4	0.3	0	0	0
Texas Instruments	58.0	77.9	83.9	2.7	2.9	2.6
TRW	0.1	0	0	0	0	0
Unitrode	0.4	0.4	0.4	0	0	0
Vitellic	0	0	0.4	0	0	0
VLSI Technology	0.3	0.8	1.0	0	0	0
Weitek	0.1	0.5	0.6	0	0	0
Western Digital	1.0	1.0	1.5	0	0	0
Xicor	0.7	0.7	1.1	0	0	0
Xilinx	0.1	0.5	0.7	0	0	0

(Continued)



Table 45 (Continued)

**Japanese Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Zilog	0.4	0.5	0.7	0	0	0
Other North American Companies	0	0	0.1	0	0	0
<b>Japanese Companies</b>						
Fuji Electric	29.5	36.9	41.8	1.4	1.4	1.3
Fujitsu	189.5	258.3	289.5	8.8	9.6	9.1
Hitachi	273.5	321.1	375.2	12.7	11.9	11.8
Matsushita	185.8	210.9	209.9	8.6	7.8	6.6
Mitsubishi	163.0	207.5	244.1	7.6	7.7	7.7
NEC	358.3	427.3	496.8	16.7	15.8	15.7
New JRC	16.1	19.0	20.1	0.7	0.7	0.6
NMB Semiconductor	0.4	3.5	4.0	0	0.1	0.1
Oki Semiconductor	54.6	68.5	89.0	2.5	2.5	2.8
Ricoh	8.6	10.4	12.1	0.4	0.4	0.4
Rohm	58.9	77.0	82.8	2.7	2.9	2.6
Sanken	29.1	34.8	36.7	1.4	1.3	1.2
Sanyo	99.9	112.8	154.3	4.6	4.2	4.9
Seiko-Epson	24.9	29.4	39.2	1.2	1.1	1.2
Sharp	71.3	111.7	138.0	3.3	4.1	4.3
Sony	77.5	109.9	120.3	3.6	4.1	3.8
Toshiba	258.0	324.5	378.5	12.0	12.0	11.9
Yamaha	14.8	17.6	17.8	0.7	0.7	0.6
Other Japanese Companies	42.9	41.0	96.3	2.0	1.5	3.0
<b>European Companies</b>						
ABB-HAFO	0.4	0.4	0.3	0	0	0
Ericsson	0	0.3	0.3	0	0	0
European Silicon Structures	0	0	0	0	0	0
Eurosil	0.1	0.1	0.1	0	0	0
Inmos	0.9	1.0	0	0	0	0
Matra MHS	0	0.3	0.1	0	0	0
MEDL	0	0	0	0	0	0
Mietec	0	0	0	0	0	0
Philips	5.8	8.1	9.5	0.3	0.3	0.3
Plessey	0.7	0.8	1.1	0	0	0
SGS-Thomson	1.3	1.6	3.0	0.1	0.1	0.1
Siemens	0.6	2.2	3.0	0	0.1	0.1

(Continued)

Table 45 (Continued)

**Japanese Semiconductor Market**  
**Total Semiconductor Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>European Companies (Continued)</b>						
STC	0	0	0	0	0	0
Telefunken Electronic	0.3	0.3	0.3	0	0	0
TMS	NA	NA	0.1	NA	NA	0
<b>Asia/Pacific Companies</b>						
Daewoo	0	0	0	0	0	0
ERSO	0	0	0	0	0	0
Goldstar	0	1.2	0.7	0	0	0
Hyundai	0	0.1	0.4	0	0	0
Korean Electronic Co.	2.2	0.1	1.1	0.1	0	0
Samsung	0.7	6.4	8.1	0	0.2	0.3
United Microelectronics	0	0.3	0.3	0	0	0
<b>Exchange Rate (\$/US\$1)</b>	<b>144</b>	<b>130</b>	<b>138</b>			

NA = Not available

Source: Dataquest (May 1990)

Table 46

**Japanese Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	11,263	16,127	17,946	100.0	100.0	100.0
<b>North American Companies</b>	1,172	1,868	2,082	10.4	11.6	11.6
Actel	NA	NA	1	NA	NA	0
Advanced Micro Devices	87	133	143	0.8	0.8	0.8
Altera	2	5	7	0	0	0
Analog Devices	52	63	59	0.5	0.4	0.3
Atmel	NA	NA	13	NA	NA	0.1
Brooktree	NA	NA	4	NA	NA	0
Burr-Brown	38	53	50	0.3	0.3	0.3
Catalyst	0	1	10	0	0	0.1
Cherry Semiconductor	2	2	0	0	0	0
Chips & Technologies	8	12	18	0.1	0.1	0.1
Cirrus Logic	NA	NA	2	NA	NA	0
Crystal	NA	NA	1	NA	NA	0
Cypress Semiconductor	0	4	9	0	0	0.1
Elantec	NA	NA	2	NA	NA	0
Exar	3	3	5	0	0	0
General Electric	7	8	0	0.1	0	0
Genum	NA	NA	2	NA	NA	0
Gould AMI	1	2	6	0	0	0
Harris	10	15	32	0.1	0.1	0.2
Honeywell	7	7	0	0.1	0	0
Integrated CMOS Systems	NA	NA	3	NA	NA	0
Integrated Device Technology	3	11	15	0	0.1	0.1
Intel	156	285	301	1.4	1.8	1.7
International CMOS Technology	NA	NA	4	NA	NA	0
Int'l. Microelectronic Prod.	0	0	1	0	0	0
ITT	16	18	15	0.1	0.1	0.1
Lattice	2	2	4	0	0	0
Linear Technology	4	6	8	0	0	0
LSI Logic	12	20	51	0.1	0.1	0.3
Macronix	NA	NA	8	NA	NA	0
Maxim	4	7	9	0	0	0.1
Micro Linear	0	0	1	0	0	0
Micro Power Systems	2	2	3	0	0	0
Microchip Technology	3	8	9	0	0	0.1
Micron Technology	4	8	2	0	0	0

(Continued)

Table 46 (Continued)

**Japanese Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Mitel	8	7	0	0.1	0	0
MOSel	0	1	1	0	0	0
Motorola	162	280	341	1.4	1.7	1.9
National Semiconductor	110	140	145	1.0	0.9	0.8
NCR	1	1	0	0	0	0
Performance Semiconductor	NA	NA	1	NA	NA	0
Precision Monolithics	6	10	5	0.1	0.1	0
Rockwell	9	88	100	0.1	0.5	0.6
SEEQ Technology	3	4	4	0	0	0
Silicon Systems	14	18	15	0.1	0.1	0.1
Siliconix	3	4	4	0	0	0
Sipex	NA	NA	1	NA	NA	0
Sprague	4	4	5	0	0	0
Standard Microsystems	1	1	1	0	0	0
Supertex	2	2	7	0	0	0
Teledyne	3	3	2	0	0	0
Texas Instruments	402	597	606	3.6	3.7	3.4
Unitrode	2	2	2	0	0	0
Vitellic	0	0	3	0	0	0
VLSI Technology	2	6	7	0	0	0
Weitek	1	4	4	0	0	0
Western Digital	7	8	11	0.1	0	0.1
Xicor	5	5	8	0	0	0
Xilinx	1	4	5	0	0	0
Zilog	3	4	5	0	0	0
Other North American Companies	0	0	1	0	0	0
<b>Japanese Companies</b>	<b>10,021</b>	<b>14,096</b>	<b>15,686</b>	<b>89.0</b>	<b>87.4</b>	<b>87.4</b>
Fuji Electric	38	59	65	0.3	0.4	0.4
Fujitsu	1,206	1,834	1,949	10.7	11.4	10.9
Hitachi	1,349	1,842	2,111	12.0	11.4	11.8
Matsushita	885	1,126	949	7.9	7.0	5.3
Mitsubishi	907	1,298	1,447	8.1	8.0	8.1
NEC	2,058	2,762	3,014	18.3	17.1	16.8
New JRC	94	126	132	0.8	0.8	0.7
NMB Semiconductor	3	27	29	0	0.2	0.2
Okii Semiconductor	348	484	602	3.1	3.0	3.4

(Continued)

Table 46 (Continued)

**Japanese Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Ricoh	60	80	88	0.5	0.5	0.5
Rohm	194	262	275	1.7	1.6	1.5
Sanken	88	111	107	0.8	0.7	0.6
Sanyo	452	671	784	4.0	4.2	4.4
Seiko-Epson	173	226	284	1.5	1.4	1.6
Sharp	298	607	720	2.6	3.8	4.0
Sony	333	522	537	3.0	3.2	3.0
Toshiba	1,230	1,724	1,873	10.9	10.7	10.4
Yamaha	103	135	129	0.9	0.8	0.7
Other Japanese Companies	202	200	591	1.8	1.2	3.3
<b>European Companies</b>						
ABB-HAFO	1	1	0	0	0	0
Ericsson	0	2	2	0	0	0
Eurosil	1	1	1	0	0	0
Inmos	6	8	0	0.1	0	0
Matra MHS	0	2	1	0	0	0
Philips	39	60	67	0.3	0.4	0.4
Plessey	5	6	8	0	0	0
SGS-Thomson	7	10	20	0.1	0.1	0.1
Siemens	0	13	11	0	0.1	0.1
Telefunken Electronic	2	2	2	0	0	0
<b>Asia/Pacific Companies</b>						
Goldstar	0	9	5	0	0.1	0
Hyundai	0	1	3	0	0	0
Korean Electronic Co.	5	0	1	0	0	0
Samsung	4	46	55	0	0.3	0.3
United Microelectronics	0	2	2	0	0	0

NA = Not available

Source: Dataquest (May 1990)

Table 47

**Japanese Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	1,621.5	2,096.7	2,476.7	100.0	100.0	100.0
<b>North American Companies</b>	168.5	242.8	287.3	10.4	11.6	11.6
Actel	NA	NA	0.1	NA	NA	0
Advanced Micro Devices	12.5	17.3	19.7	0.8	0.8	0.8
Altera	0.3	0.7	1.0	0	0	0
Analog Devices	7.5	8.2	8.1	0.5	0.4	0.3
Atmel	NA	NA	1.8	NA	NA	0.1
Brooktree	NA	NA	0.6	NA	NA	0
Burr-Brown	5.5	6.9	6.9	0.3	0.3	0.3
Catalyst	0	0.1	1.4	0	0	0.1
Cherry Semiconductor	0.3	0.3	0	0	0	0
Chips & Technologies	1.2	1.6	2.5	0.1	0.1	0.1
Cirrus Logic	NA	NA	0.3	NA	NA	0
Crystal	NA	NA	0.1	NA	NA	0
Cypress Semiconductor	0	0.5	1.2	0	0	0
Elantec	NA	NA	0.3	NA	NA	0
Exar	0.4	0.4	0.7	0	0	0
General Electric	1.0	1.0	0	0.1	0	0
Gennum	NA	NA	0.3	NA	NA	0
Gould AMI	0.1	0.3	0.8	0	0	0
Harris	1.4	2.0	4.4	0.1	0.1	0.2
Honeywell	1.0	0.9	0	0.1	0	0
Integrated CMOS Systems	NA	NA	0.4	NA	NA	0
Integrated Device Technology	0.4	1.4	2.1	0	0.1	0.1
Intel	22.5	37.1	41.5	1.4	1.8	1.7
International CMOS Technology	NA	NA	0.6	NA	NA	0
Int'l. Microelectronic Prod.	0	0	0.1	0	0	0
ITT	2.3	2.3	2.1	0.1	0.1	0.1
Lattice	0.3	0.3	0.6	0	0	0
Linear Technology	0.6	0.8	1.1	0	0	0
LSI Logic	1.7	2.6	7.0	0.1	0.1	0.3
Macronix	NA	NA	1.1	NA	NA	0
Maxim	0.6	0.9	1.2	0	0	0
Micro Linear	0	0	0.1	0	0	0
Micro Power Systems	0.3	0.3	0.4	0	0	0
Microchip Technology	0.4	1.0	1.2	0	0	0
Micron Technology	0.6	1.0	0.3	0	0	0

(Continued)

Table 47 (Continued)  
 Japanese Semiconductor Market  
 Total Integrated Circuit Market Share Estimates  
 Sales by Manufacturers  
 (Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
North American Companies (Continued)						
Mitel	1.2	0.9	0	0.1	0	0
MOSel	0	0.1	0.1	0	0	0
Motorola	23.3	36.4	47.1	1.4	1.7	1.9
National Semiconductor	15.8	18.2	20.0	1.0	0.9	0.8
NCR	0.1	0.1	0	0	0	0
Performance Semiconductor	NA	NA	0.1	NA	NA	0
Precision Monolithics	0.9	1.3	0.7	0.1	0.1	0
Rockwell	1.3	11.4	13.8	0.1	0.5	0.6
SEBQ Technology	0.4	0.5	0.6	0	0	0
Silicon Systems	2.0	2.3	2.1	0.1	0.1	0.1
Siliconix	0.4	0.5	0.6	0	0	0
Sipex	NA	NA	0.1	NA	NA	0
Sprague	0.6	0.5	0.7	0	0	0
Standard Microsystems	0.1	0.1	0.1	0	0	0
Supertex	0.3	0.3	1.0	0	0	0
Teledyne	0.4	0.4	0.3	0	0	0
Texas Instruments	57.9	77.6	83.6	3.6	3.7	3.4
Unitrode	0.3	0.3	0.3	0	0	0
Vitellic	0	0	0.4	0	0	0
VLSI Technology	0.3	0.8	1.0	0	0	0
Weitek	0.1	0.5	0.6	0	0	0
Western Digital	1.0	1.0	1.5	0.1	0	0.1
Xicor	0.7	0.7	1.1	0	0	0
Xilinx	0.1	0.5	0.7	0	0	0
Zilog	0.4	0.5	0.7	0	0	0
Other North American Companies	0	0	0.1	0	0	0
Japanese Companies						
Fuji Electric	5.5	7.7	9.0	0.3	0.4	0.4
Fujitsu	173.7	238.4	269.0	10.7	11.4	10.9
Hitachi	194.3	239.5	291.3	12.0	11.4	11.8
Matsushita	127.4	146.4	131.0	7.9	7.0	5.3
Mitsubishi	130.6	168.7	199.7	8.1	8.0	8.1
NEC	296.4	359.1	415.9	18.3	17.1	16.8
New JRC	13.5	16.4	18.2	0.8	0.8	0.7
NMB Semiconductor	0.4	3.5	4.0	0	0.2	0.2
Oki Semiconductor	50.1	62.9	83.1	3.1	3.0	3.4

(Continued)

Table 47 (Continued)

**Japanese Semiconductor Market**  
**Total Integrated Circuit Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Ricoh	8.6	10.4	12.1	0.5	0.5	0.5
Rohm	27.9	34.1	38.0	1.7	1.6	1.5
Sanken	12.7	14.4	14.8	0.8	0.7	0.6
Sanyo	65.1	87.2	108.2	4.0	4.2	4.4
Seiko-Epson	24.9	29.4	39.2	1.5	1.4	1.6
Sharp	42.9	78.9	99.4	2.6	3.8	4.0
Sony	48.0	67.9	74.1	3.0	3.2	3.0
Toshiba	177.1	224.1	258.5	10.9	10.7	10.4
Yamaha	14.8	17.6	17.8	0.9	0.8	0.7
Other Japanese Companies	29.1	26.0	81.6	1.8	1.2	3.3
<b>European Companies</b>						
ABB-HAFO	0.1	0.1	0	0	0	0
Ericsson	0	0.3	0.3	0	0	0
Eurosil	0.1	0.1	0.1	0	0	0
Inmos	0.9	1.0	0	0.1	0	0
Matra MHS	0	0.3	0.1	0	0	0
Philips	5.6	7.8	9.2	0.3	0.4	0.4
Plessey	0.7	0.8	1.1	0	0	0
SGS-Thomson	1.0	1.3	2.8	0.1	0.1	0.1
Siemens	0	1.7	1.5	0	0.1	0.1
Telefunken Electronic	0.3	0.3	0.3	0	0	0
<b>Asia/Pacific Companies</b>						
Goldstar	0	1.2	0.7	0	0.1	0
Hyundai	0	0.1	0.4	0	0	0
Korean Electronic Co.	0.7	0	0.1	0	0	0
Samsung	0.6	6.0	7.6	0	0.3	0.3
United Microelectronics	0	0.3	0.3	0	0	0
<b>Exchange Rate (¥/US\$1)</b>	<b>144</b>	<b>130</b>	<b>138</b>			

NA = Not available

Source: Dataquest (May 1990)



Table 48

**Japanese Semiconductor Market  
Bipolar Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	1,523	1,906	1,750	100.0	100.0	100.0
<b>North American Companies</b>	326	476	377	21.4	25.0	21.5
Advanced Micro Devices	43	62	59	2.8	3.3	3.4
Chips & Technologies	1	2	1	0.1	0.1	0.1
Intel	3	3	1	0.2	0.2	0.1
Motorola	39	65	56	2.6	3.4	3.2
National Semiconductor	50	78	67	3.3	4.1	3.8
Texas Instruments	190	266	193	12.5	14.0	11.0
<b>Japanese Companies</b>	1,179	1,397	1,338	77.4	73.3	76.5
Fujitsu	317	479	433	20.8	25.1	24.7
Hitachi	332	369	345	21.8	19.4	19.7
Matsushita	24	27	13	1.6	1.4	0.7
Mitsubishi	109	116	108	7.2	6.1	6.2
NEC	223	264	242	14.6	13.9	13.8
New JRC	1	1	1	0.1	0.1	0.1
Oki Semiconductor	29	37	48	1.9	1.9	2.7
Sanyo	27	38	62	1.8	2.0	3.5
Toshiba	117	66	86	7.7	3.5	4.9
<b>European Companies</b>	18	32	34	1.2	1.7	1.9
Philips	15	29	30	1.0	1.5	1.7
Plessey	3	3	4	0.2	0.2	0.2
<b>Asia/Pacific Companies</b>	0	1	1	0	0.1	0.1
Goldstar	0	1	1	0	0.1	0.1

Source: Dataquest (May 1990)

Table 49

**Japanese Semiconductor Market  
Bipolar Digital Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	219.2	247.9	241.3	100.0	100.0	100.0
North American Companies	46.9	62.0	51.8	21.4	25.0	21.5
Advanced Micro Devices	6.2	8.1	8.1	2.8	3.3	3.4
Chips & Technologies	0.1	0.3	0.1	0	0.1	0
Intel	0.4	0.4	0.1	0.2	0.2	0
Motorola	5.6	8.5	7.7	2.6	3.4	3.2
National Semiconductor	7.2	10.1	9.2	3.3	4.1	3.8
Texas Instruments	27.4	34.6	26.6	12.5	14.0	11.0
Japanese Companies	169.7	181.6	184.7	77.4	73.3	76.5
Fujitsu	45.6	62.3	59.8	20.8	25.1	24.8
Hitachi	47.8	48.0	47.6	21.8	19.4	19.7
Matsushita	3.5	3.5	1.8	1.6	1.4	0.7
Mitsubishi	15.7	15.1	14.9	7.2	6.1	6.2
NEC	32.1	34.3	33.4	14.6	13.8	13.8
New JRC	0.1	0.1	0.1	0	0	0
Oki Semiconductor	4.2	4.8	6.6	1.9	1.9	2.7
Sanyo	3.9	4.9	8.6	1.8	2.0	3.6
Toshiba	16.8	8.6	11.9	7.7	3.5	4.9
European Companies	2.6	4.2	4.7	1.2	1.7	1.9
Philips	2.2	3.8	4.1	1.0	1.5	1.7
Plessey	0.4	0.4	0.6	0.2	0.2	0.2
Asia/Pacific Companies	0	0.1	0.1	0	0	0
Goldstar	0	0.1	0.1	0	0	0
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 50

**Japanese Semiconductor Market  
TTL/Other Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	1,159	1,399	1,262	100.0	100.0	100.0
North American Companies	305	437	332	26.3	31.2	26.3
Advanced Micro Devices	43	62	49	3.7	4.4	3.9
Chips & Technologies	1	2	1	0.1	0.1	0.1
Intel	3	3	1	0.3	0.2	0.1
Motorola	23	32	28	2.0	2.3	2.2
National Semiconductor	45	72	60	3.9	5.1	4.8
Texas Instruments	190	266	193	16.4	19.0	15.3
Japanese Companies	840	933	898	72.5	66.7	71.2
Fujitsu	158	232	208	13.6	16.6	16.5
Hitachi	240	261	244	20.7	18.7	19.3
Matsushita	17	18	9	1.5	1.3	0.7
Mitsubishi	109	116	108	9.4	8.3	8.6
NEC	144	166	152	12.4	11.9	12.0
New JRC	1	1	1	0.1	0.1	0.1
NMB Semiconductor	1	1	0	0.1	0.1	0
Oki Semiconductor	26	34	43	2.2	2.4	3.4
Sanyo	27	38	62	2.3	2.7	4.9
Toshiba	117	66	71	10.1	4.7	5.6
European Companies	14	28	31	1.2	2.0	2.5
Philips	14	28	29	1.2	2.0	2.3
Plessey	0	0	2	0	0	0.2
Asia/Pacific Companies	0	1	1	0	0.1	0.1
Goldstar	0	1	1	0	0.1	0.1

Source: Dataquest (May 1990)

Table 51

**Japanese Semiconductor Market  
TTL/Other Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	166.7	181.9	174.1	100.0	100.0	100.0
<b>North American Companies</b>	43.9	57.0	45.8	26.3	31.3	26.3
Advanced Micro Devices	6.2	8.1	6.8	3.7	4.5	3.9
Chips & Technologies	0.1	0.3	0.1	0.1	0.2	0.1
Intel	0.4	0.4	0.1	0.2	0.2	0.1
Motorola	3.3	4.2	3.9	2.0	2.3	2.2
National Semiconductor	6.5	9.4	8.3	3.9	5.2	4.8
Texas Instruments	27.4	34.6	26.6	16.4	19.0	15.3
<b>Japanese Companies</b>	120.8	121.2	123.9	72.5	66.6	71.2
Fujitsu	22.8	30.2	28.7	13.7	16.6	16.5
Hitachi	34.6	33.9	33.7	20.8	18.6	19.4
Matsushita	2.4	2.3	1.2	1.4	1.3	0.7
Mitsubishi	15.7	15.1	14.9	9.4	8.3	8.6
NEC	20.7	21.6	21.0	12.4	11.9	12.1
New JRC	0.1	0.1	0.1	0.1	0.1	0.1
NMB Semiconductor	0.1	0.1	0	0.1	0.1	0
Oki Semiconductor	3.7	4.4	5.9	2.2	2.4	3.4
Sanyo	3.9	4.9	8.6	2.3	2.7	4.9
Toshiba	16.8	8.6	9.8	10.1	4.7	5.6
<b>European Companies</b>	2.0	3.6	4.3	1.2	2.0	2.5
Philips	2.0	3.6	4.0	1.2	2.0	2.3
Plessey	0	0	0.3	0	0	0.2
<b>Asia/Pacific Companies</b>	0	0.1	0.1	0	0.1	0.1
Goldstar	0	0.1	0.1	0	0.1	0.1
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

Source: Dataquest (May 1990)

Table 52

**Japanese Semiconductor Market  
ECL Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	365	508	488	100.0	100.0	100.0
<b>North American Companies</b>	21	39	45	5.8	7.7	9.2
Advanced Micro Devices	0	0	10	0	0	2.0
Motorola	16	33	28	4.4	6.5	5.7
National Semiconductor	5	6	7	1.4	1.2	1.4
<b>Japanese Companies</b>	340	465	440	93.2	91.5	90.2
Fujitsu	159	247	225	43.6	48.6	46.1
Hitachi	92	108	101	25.2	21.3	20.7
Matsushita	7	9	4	1.9	1.8	0.8
NEC	79	98	90	21.6	19.3	18.4
Oki Semiconductor	3	3	5	0.8	0.6	1.0
Toshiba	0	0	15	0	0	3.1
<b>European Companies</b>	4	4	3	1.1	0.8	0.6
Philips	1	1	1	0.3	0.2	0.2
Plessey	3	3	2	0.8	0.6	0.4

Source: Dataquest (May 1990)

Table 53

**Japanese Semiconductor Market  
ECL Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	52.4	66.0	67.5	100.0	100.0	100.0
<b>North American Companies</b>	3.0	5.1	6.3	5.7	7.7	9.3
Advanced Micro Devices	0	0	1.4	0	0	2.1
Motorola	2.3	4.3	3.9	4.4	6.5	5.8
National Semiconductor	0.7	0.8	1.0	1.3	1.2	1.5
<b>Japanese Companies</b>	48.9	60.4	60.8	93.3	91.5	90.1
Fujitsu	22.9	32.1	31.1	43.7	48.6	46.1
Hitachi	13.2	14.0	13.9	25.2	21.2	20.6
Matsushita	1.0	1.2	0.6	1.9	1.8	0.9
NEC	11.4	12.7	12.4	21.8	19.2	18.4
Oki Semiconductor	0.4	0.4	0.7	0.8	0.6	1.0
Toshiba	0	0	2.1	0	0	3.1
<b>European Companies</b>	0.5	0.5	0.4	1.0	0.8	0.6
Philips	0.1	0.1	0.1	0.2	0.2	0.1
Plessey	0.4	0.4	0.3	0.8	0.6	0.4
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

Source: Dataquest (May 1990)

Table 54

**Japanese Semiconductor Market**  
**Bipolar Digital Memory Market Share Estimates**  
**Sales by Manufacturers**  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	227	348	246	100.0	100.0	100.0
<b>North American Companies</b>	23	26	21	10.1	7.5	8.5
Advanced Micro Devices	6	8	9	2.6	2.3	3.7
Motorola	0	1	1	0	0.3	0.4
National Semiconductor	0	0	7	0	0	2.8
Texas Instruments	17	17	4	7.5	4.9	1.6
<b>Japanese Companies</b>	202	319	223	89.0	91.7	90.7
Fujitsu	111	190	124	48.9	54.6	50.4
Hitachi	63	90	82	27.8	25.9	33.3
NEC	28	39	17	12.3	11.2	6.9
<b>European Companies</b>	2	3	2	0.9	0.9	0.8
Philips	2	3	2	0.9	0.9	0.8

Source: Dataquest (May 1990)

Table 55

**Japanese Semiconductor Market**  
**Bipolar Digital Memory Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	32.7	45.2	33.9	100.0	100.0	100.0
North American Companies	3.3	3.3	2.9	10.1	7.3	8.6
Advanced Micro Devices	0.9	1.0	1.2	2.8	2.2	3.5
Motorola	0	0.1	0.1	0	0.2	0.3
National Semiconductor	0	0	1.0	0	0	2.9
Texas Instruments	2.4	2.2	0.6	7.3	4.9	1.8
Japanese Companies	29.1	41.5	30.7	89.0	91.8	90.6
Fujitsu	16.0	24.7	17.1	48.9	54.6	50.4
Hitachi	9.1	11.7	11.3	27.8	25.9	33.3
NEC	4.0	5.1	2.3	12.2	11.3	6.8
European Companies	0.3	0.4	0.3	0.9	0.9	0.9
Philips	0.3	0.4	0.3	0.9	0.9	0.9
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)



Table 56

**Japanese Semiconductor Market**  
**Bipolar Digital Logic Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	1,296	1,558	1,504	100.0	100.0	100.0
<b>North American Companies</b>	303	450	356	23.4	28.9	23.7
Advanced Micro Devices	37	54	50	2.9	3.5	3.3
Chips & Technologies	1	2	1	0.1	0.1	0.1
Intel	3	3	1	0.2	0.2	0.1
Motorola	39	64	55	3.0	4.1	3.7
National Semiconductor	50	78	60	3.9	5.0	4.0
Texas Instruments	173	249	189	13.3	16.0	12.6
<b>Japanese Companies</b>	977	1,078	1,115	75.4	69.2	74.1
Fujitsu	206	289	309	15.9	18.5	20.5
Hitachi	269	279	263	20.8	17.9	17.5
Matsushita	24	27	13	1.9	1.7	0.9
Mitsubishi	109	116	108	8.4	7.4	7.2
NEC	195	225	225	15.0	14.4	15.0
New JRC	1	1	1	0.1	0.1	0.1
Oki Semiconductor	29	37	48	2.2	2.4	3.2
Sanyo	27	38	62	2.1	2.4	4.1
Toshiba	117	66	86	9.0	4.2	5.7
<b>European Companies</b>	16	29	32	1.2	1.9	2.1
Philips	13	26	28	1.0	1.7	1.9
Plessey	3	3	4	0.2	0.2	0.3
<b>Asia/Pacific Companies</b>	0	1	1	0	0.1	0.1
Goldstar	0	1	1	0	0.1	0.1

Source: Dataquest (May 1990)

Table 57

**Japanese Semiconductor Market**  
**Bipolar Digital Logic Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	186.5	202.6	207.6	100.0	100.0	100.0
North American Companies	43.5	58.5	49.1	23.3	28.9	23.7
Advanced Micro Devices	5.3	7.0	6.9	2.8	3.5	3.3
Chips & Technologies	0.1	0.3	0.1	0.1	0.1	0
Intel	0.4	0.4	0.1	0.2	0.2	0
Motorola	5.6	8.3	7.6	3.0	4.1	3.7
National Semiconductor	7.2	10.1	8.3	3.9	5.0	4.0
Texas Instruments	24.9	32.4	26.1	13.4	16.0	12.6
Japanese Companies	140.7	140.2	153.9	75.4	69.2	74.1
Fujitsu	29.7	37.6	42.6	15.9	18.6	20.5
Hitachi	38.7	36.3	36.3	20.8	17.9	17.5
Matsushita	3.5	3.5	1.8	1.9	1.7	0.9
Mitsubishi	15.7	15.1	14.9	8.4	7.5	7.2
NEC	28.1	29.3	31.1	15.1	14.5	15.0
New JRC	0.1	0.1	0.1	0.1	0	0
Oki Semiconductor	4.2	4.8	6.6	2.3	2.4	3.2
Sanyo	3.9	4.9	8.6	2.1	2.4	4.1
Toshiba	16.8	8.6	11.9	9.0	4.2	5.7
European Companies	2.3	3.8	4.5	1.2	1.9	2.2
Philips	1.9	3.4	3.9	1.0	1.7	1.9
Plessey	0.4	0.4	0.6	0.2	0.2	0.3
Asia/Pacific Companies	0	0.1	0.1	0	0	0
Goldstar	0	0.1	0.1	0	0	0
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 58

**Japanese Semiconductor Market  
MOS Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	6,424	10,501	12,497	100.0	100.0	100.0
North American Companies	510	950	1,191	7.9	9.0	9.5
Actel	NA	NA	1	NA	NA	0
Advanced Micro Devices	34	60	72	0.5	0.6	0.6
Altera	2	5	7	0	0	0.1
Analog Devices	2	3	3	0	0	0
Atmel	NA	NA	6	NA	NA	0
Catalyst	0	1	10	0	0	0.1
Chips & Technologies	7	10	17	0.1	0.1	0.1
Cirrus Logic	NA	NA	2	NA	NA	0
Cypress Semiconductor	0	4	9	0	0	0.1
General Electric	5	6	0	0.1	0.1	0
Gould AMI	1	2	5	0	0	0
Harris	1	2	17	0	0	0.1
Integrated CMOS Systems	NA	NA	3	NA	NA	0
Integrated Device Technology	3	11	15	0	0.1	0.1
Intel	153	282	300	2.4	2.7	2.4
International CMOS Technology	NA	NA	4	NA	NA	0
ITT	10	10	13	0.2	0.1	0.1
Lattice	2	2	4	0	0	0
LSI Logic	12	20	51	0.2	0.2	0.4
Macronix	NA	NA	8	NA	NA	0.1
Microchip Technology	3	8	9	0	0.1	0.1
Micron Technology	4	8	2	0.1	0.1	0
MOSel	0	1	1	0	0	0
Motorola	87	160	236	1.4	1.5	1.9
National Semiconductor	25	24	51	0.4	0.2	0.4
NCR	1	1	0	0	0	0
Performance Semiconductor	NA	NA	1	NA	NA	0
Rockwell	9	88	1	0.1	0.8	0
SEEQ Technology	3	4	4	0	0	0
Standard Microsystems	1	1	1	0	0	0
Texas Instruments	126	206	294	2.0	2.0	2.4
Vitellic	0	0	3	0	0	0
VLSI Technology	2	6	7	0	0.1	0.1
Weitek	1	4	4	0	0	0
Western Digital	7	8	11	0.1	0.1	0.1
Xicor	5	5	8	0.1	0	0.1

(Continued)

Table 58 (Continued)

**Japanese Semiconductor Market  
MOS Digital Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Xilinx	1	4	5	0	0	0
Zilog	3	4	5	0	0	0
Other North American Companies	0	0	1	0	0	0
<b>Japanese Companies</b>						
	5,896	9,462	11,197	91.8	90.1	89.6
Fuji Electric	14	31	29	0.2	0.3	0.2
Fujitsu	743	1,212	1,370	11.6	11.5	11.0
Hitachi	744	1,172	1,477	11.6	11.2	11.8
Matsushita	545	745	653	8.5	7.1	5.2
Mitsubishi	569	958	1,007	8.9	9.1	8.1
NEC	1,370	2,090	2,433	21.3	19.9	19.5
New JRC	10	23	30	0.2	0.2	0.2
NMB Semiconductor	3	27	29	0	0.3	0.2
Oki Semiconductor	298	424	519	4.6	4.0	4.2
Ricoh	60	80	88	0.9	0.8	0.7
Rohm	7	47	59	0.1	0.4	0.5
Sanyo	114	246	321	1.8	2.3	2.6
Seiko-Epson	164	216	274	2.6	2.1	2.2
Sharp	247	541	658	3.8	5.2	5.3
Sony	136	224	270	2.1	2.1	2.2
Toshiba	766	1,288	1,455	11.9	12.3	11.6
Yamaha	103	135	118	1.6	1.3	0.9
Other Japanese Companies	3	3	407	0	0	3.3
<b>European Companies</b>						
	14	38	53	0.2	0.4	0.4
ABB-HAFO	1	1	0	0	0	0
Eurosil	1	1	1	0	0	0
Inmos	6	8	0	0.1	0.1	0
Matra MHS	0	2	1	0	0	0
Philips	3	7	24	0	0.1	0.2
Plessey	0	1	2	0	0	0
SGS-Thomson	3	5	14	0	0	0.1
Siemens	0	13	11	0	0.1	0.1
<b>Asia/Pacific Companies</b>						
	4	51	56	0.1	0.5	0.4
Goldstar	0	8	4	0	0.1	0
Hyundai	0	1	3	0	0	0
Samsung	4	40	47	0.1	0.4	0.4
United Microelectronics	0	2	2	0	0	0

NA = Not available  
Source: Dataquest (May 1990)

Table 59

**Japanese Semiconductor Market**  
**MOS Digital Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	924.2	1,365.0	1,724.4	100.0	100.0	100.0
<b>North American Companies</b>	72.9	123.4	164.2	7.9	9.0	9.5
Actel	NA	NA	0.1	NA	NA	0
Advanced Micro Devices	4.9	7.8	9.9	0.5	0.6	0.6
Altera	0.3	0.7	1.0	0	0.1	0.1
Analog Devices	0.3	0.4	0.4	0	0	0
Atmel	NA	NA	0.8	NA	NA	0
Catalyst	0	0.1	1.4	0	0	0.1
Chips & Technologies	1.0	1.3	2.3	0.1	0.1	0.1
Cirrus Logic	NA	NA	0.3	NA	NA	0
Cypress Semiconductor	0	0.5	1.2	0	0	0.1
General Electric	0.7	0.8	0	0.1	0.1	0
Gould AMI	0.1	0.3	0.7	0	0	0
Harris	0.1	0.3	2.3	0	0	0.1
Integrated CMOS Systems	NA	NA	0.4	NA	NA	0
Integrated Device Technology	0.4	1.4	2.1	0	0.1	0.1
Intel	22.0	36.7	41.4	2.4	2.7	2.4
International CMOS Technology	NA	NA	0.6	NA	NA	0
ITT	1.4	1.3	1.8	0.2	0.1	0.1
Lattice	0.3	0.3	0.6	0	0	0
LSI Logic	1.7	2.6	7.0	0.2	0.2	0.4
Macronix	NA	NA	1.1	NA	NA	0.1
Microchip Technology	0.4	1.0	1.2	0	0.1	0.1
Micron Technology	0.6	1.0	0.3	0.1	0.1	0
MOSel	0	0.1	0.1	0	0	0
Motorola	12.5	20.8	32.6	1.4	1.5	1.9
National Semiconductor	3.6	3.1	7.0	0.4	0.2	0.4
NCR	0.1	0.1	0	0	0	0
Performance Semiconductor	NA	NA	0.1	NA	NA	0
Rockwell	1.3	11.4	0.1	0.1	0.8	0
SEEQ Technology	0.4	0.5	0.6	0	0	0
Standard Microsystems	0.1	0.1	0.1	0	0	0
Texas Instruments	18.1	26.8	40.6	2.0	2.0	2.4
Vitellic	0	0	0.4	0	0	0
VLSI Technology	0.3	0.8	1.0	0	0.1	0.1
Weitek	0.1	0.5	0.6	0	0	0
Western Digital	1.0	1.0	1.5	0.1	0.1	0.1
Xicor	0.7	0.7	1.1	0.1	0.1	0.1
Xilinx	0.1	0.5	0.7	0	0	0

(Continued)

Table 59 (Continued)

**Japanese Semiconductor Market**  
**MOS Digital Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>North American Companies (Continued)</b>						
Zilog	0.4	0.5	0.7	0	0	0
Other North American Companies	0	0	0.1	0	0	0
<b>Japanese Companies</b>						
Fuji Electric	2.0	4.0	4.0	0.2	0.3	0.2
Fujitsu	107.0	157.6	189.1	11.6	11.5	11.0
Hitachi	107.1	152.4	203.8	11.6	11.2	11.8
Matsushita	78.5	96.9	90.1	8.5	7.1	5.2
Mitsubishi	81.9	124.5	139.0	8.9	9.1	8.1
NEC	197.3	271.7	335.8	21.3	19.9	19.5
New JRC	1.4	3.0	4.1	0.2	0.2	0.2
NMB Semiconductor	0.4	3.5	4.0	0	0.3	0.2
Oki Semiconductor	42.9	55.1	71.6	4.6	4.0	4.2
Ricoh	8.6	10.4	12.1	0.9	0.8	0.7
Rohm	1.0	6.1	8.1	0.1	0.4	0.5
Sanyo	16.4	32.0	44.3	1.8	2.3	2.6
Seiko-Epson	23.6	28.1	37.8	2.6	2.1	2.2
Sharp	35.6	70.3	90.8	3.9	5.2	5.3
Sony	19.6	29.1	37.3	2.1	2.1	2.2
Toshiba	110.3	167.4	200.8	11.9	12.3	11.6
Yamaha	14.8	17.6	16.3	1.6	1.3	0.9
Other Japanese Companies	0.4	0.4	56.2	0	0	3.3
<b>European Companies</b>						
ABB-HAFO	0.1	0.1	0	0	0	0
Eurosil	0.1	0.1	0.1	0	0	0
Inmos	0.9	1.0	0	0.1	0.1	0
Matra MHS	0	0.3	0.1	0	0	0
Philips	0.4	0.9	3.3	0	0.1	0.2
Plessey	0	0.1	0.3	0	0	0
SGS-Thomson	0.4	0.7	1.9	0	0.1	0.1
Siemens	0	1.7	1.5	0	0.1	0.1
<b>Asia/Pacific Companies</b>						
Goldstar	0	1.0	0.6	0	0.1	0
Hyundai	0	0.1	0.4	0	0	0
Samsung	0.6	5.2	6.5	0.1	0.4	0.4
United Microelectronics	0	0.3	0.3	0	0	0
Exchange Rate (¥/US\$1)	144	130	138			

NA = Not available

Source: Datquest (May 1990)

Table 60

Japanese Semiconductor Market  
N/PMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	3,469	4,055	4,173	100.0	100.0	100.0
North American Companies	311	507	501	9.0	12.5	12.0
Advanced Micro Devices	31	47	43	0.9	1.2	1.0
Gould AMI	1	2	5	0	0	0.1
Intel	113	142	148	3.3	3.5	3.5
ITT	6	6	4	0.2	0.1	0.1
Macronix	NA	NA	8	NA	NA	0.2
Microchip Technology	2	2	2	0.1	0	0
Micron Technology	4	8	2	0.1	0.2	0
Motorola	12	38	29	0.3	0.9	0.7
National Semiconductor	5	4	0	0.1	0.1	0
Rockwell	7	71	1	0.2	1.8	0
SEEQ Technology	2	2	2	0.1	0	0
Standard Microsystems	1	1	0	0	0	0
Texas Instruments	121	177	246	3.5	4.4	5.9
Xicor	5	5	8	0.1	0.1	0.2
Zilog	1	2	3	0	0	0.1
Japanese Companies	3,149	3,529	3,645	90.8	87.0	87.3
Fujitsu	561	383	391	16.2	9.4	9.4
Hitachi	310	459	481	8.9	11.3	11.5
Matsushita	303	344	248	8.7	8.5	5.9
Mitsubishi	430	512	429	12.4	12.6	10.3
NEC	896	786	824	25.8	19.4	19.7
Oki Semiconductor	101	133	149	2.9	3.3	3.6
Ricoh	36	37	36	1.0	0.9	0.9
Rohm	0	1	1	0	0	0
Sanyo	27	49	25	0.8	1.2	0.6
Sharp	79	164	197	2.3	4.0	4.7
Sony	30	42	52	0.9	1.0	1.2
Toshiba	353	589	587	10.2	14.5	14.1
Yamaha	21	28	39	0.6	0.7	0.9
Other Japanese Companies	2	2	186	0.1	0	4.5
European Companies	5	4	7	0.1	0.1	0.2
Philips	3	1	2	0.1	0	0
SGS-Thomson	2	3	5	0.1	0.1	0.1

(Continued)

Table 60 (Continued)

Japanese Semiconductor Market  
N/PMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Asia/Pacific Companies	4	15	20	0.1	0.4	0.5
Goldstar	0	0	1	0	0	0
Samsung	4	15	19	0.1	0.4	0.5

NA = Not available  
Source: Dataquest (May 1990)



Table 61

Japanese Semiconductor Market  
N/PMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	499.3	527.4	576.0	100.0	100.0	100.0
North American Companies	44.7	66.0	69.1	9.0	12.5	12.0
Advanced Micro Devices	4.5	6.1	5.9	0.9	1.2	1.0
Gould AMI	0.1	0.3	0.7	0	0.1	0.1
Intel	16.3	18.5	20.4	3.3	3.5	3.5
ITT	0.9	0.8	0.6	0.2	0.2	0.1
Macrorix	NA	NA	1.1	NA	NA	0.2
Microchip Technology	0.3	0.3	0.3	0.1	0.1	0.1
Micron Technology	0.6	1.0	0.3	0.1	0.2	0.1
Motorola	1.7	4.9	4.0	0.3	0.9	0.7
National Semiconductor	0.7	0.5	0	0.1	0.1	0
Rockwell	1.0	9.2	0.1	0.2	1.7	0
SEEQ Technology	0.3	0.3	0.3	0.1	0.1	0.1
Standard Microsystems	0.1	0.1	0	0	0	0
Texas Instruments	17.4	23.0	33.9	3.5	4.4	5.9
Xicor	0.7	0.7	1.1	0.1	0.1	0.2
Zilog	0.1	0.3	0.4	0	0.1	0.1
Japanese Companies	453.3	458.9	503.2	90.8	87.0	87.4
Fujitsu	80.8	49.8	54.0	16.2	9.4	9.4
Hitachi	44.6	59.7	66.4	8.9	11.3	11.5
Matsushita	43.6	44.7	34.2	8.7	8.5	5.9
Mitsubishi	61.9	66.6	59.2	12.4	12.6	10.3
NEC	129.0	102.2	113.7	25.8	19.4	19.7
Oki Semiconductor	14.5	17.3	20.6	2.9	3.3	3.6
Ricoh	5.2	4.8	5.0	1.0	0.9	0.9
Rohm	0	0.1	0.1	0	0	0
Sanyo	3.9	6.4	3.5	0.8	1.2	0.6
Sharp	11.4	21.3	27.2	2.3	4.0	4.7
Sony	4.3	5.5	7.2	0.9	1.0	1.3
Toshiba	50.8	76.6	81.0	10.2	14.5	14.1
Yamaha	3.0	3.6	5.4	0.6	0.7	0.9
Other Japanese Companies	0.3	0.3	25.7	0.1	0.1	4.5
European Companies	0.7	0.5	1.0	0.1	0.1	0.2
Philips	0.4	0.1	0.3	0.1	0	0.1
SGS-Thomson	0.3	0.4	0.7	0.1	0.1	0.1

(Continued)

Table 61 (Continued)

**Japanese Semiconductor Market  
N/PMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Asia/Pacific Companies	0.6	2.0	2.7	0.1	0.4	0.5
Goldstar	0	0	0.1	0	0	0
Samsung	0.6	2.0	2.6	0.1	0.4	0.5
Exchange Rate (¥/US\$1)	144	130	138			

NA = Not available  
Source: Dataquest (May 1990)

Table 62

**Japanese Semiconductor Market  
CMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	2,953	6,434	7,818	100.0	100.0	100.0
<b>North American Companies</b>	198	432	668	6.7	6.7	8.5
Actel	NA	NA	1	NA	NA	0
Advanced Micro Devices	3	13	29	0.1	0.2	0.4
Altera	2	5	7	0.1	0.1	0.1
Analog Devices	2	3	3	0.1	0	0
Atmel	NA	NA	6	NA	NA	0.1
Catalyst	0	1	10	0	0	0.1
Chips & Technologies	7	10	17	0.2	0.2	0.2
Cirrus Logic	NA	NA	2	NA	NA	0
Cypress Semiconductor	0	4	9	0	0.1	0.1
General Electric	5	6	0	0.2	0.1	0
Harris	1	2	17	0	0	0.2
Integrated CMOS Systems	NA	NA	3	NA	NA	0
Integrated Device Technology	3	11	15	0.1	0.2	0.2
Intel	40	140	152	1.4	2.2	1.9
International CMOS Technology	NA	NA	4	NA	NA	0.1
ITT	4	4	9	0.1	0.1	0.1
Lattice	2	2	4	0.1	0	0.1
LSI Logic	12	20	49	0.4	0.3	0.6
MOSel	0	1	1	0	0	0
Motorola	75	122	207	2.5	1.9	2.6
National Semiconductor	20	19	45	0.7	0.3	0.6
NCR	1	1	0	0	0	0
Performance Semiconductor	NA	NA	1	NA	NA	0
Rockwell	2	17	0	0.1	0.3	0
SEEQ Technology	1	2	2	0	0	0
Standard Microsystems	0	0	1	0	0	0
Texas Instruments	5	25	42	0.2	0.4	0.5
Vitellic	0	0	3	0	0	0
VLSI Technology	2	6	7	0.1	0.1	0.1
Weitek	1	4	4	0	0.1	0.1
Western Digital	7	8	11	0.2	0.1	0.1
Xilinx	1	4	5	0	0.1	0.1
Zilog	2	2	2	0.1	0	0

(Continued)

Table 62 (Continued)

Japanese Semiconductor Market  
CMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Japanese Companies	2,746	5,932	7,068	93.0	92.2	90.4
Fuji Electric	13	30	23	0.4	0.5	0.3
Fujitsu	182	829	875	6.2	12.9	11.2
Hitachi	434	713	846	14.7	11.1	10.8
Matsushita	242	401	405	8.2	6.2	5.2
Mitsubishi	139	446	578	4.7	6.9	7.4
NEC	474	1,304	1,522	16.1	20.3	19.5
New JRC	10	23	30	0.3	0.4	0.4
NMB Semiconductor	3	27	29	0.1	0.4	0.4
Oki Semiconductor	197	291	306	6.7	4.5	3.9
Ricoh	24	43	51	0.8	0.7	0.7
Rohm	7	46	58	0.2	0.7	0.7
Sanyo	87	197	296	2.9	3.1	3.8
Seiko-Epson	164	216	274	5.6	3.4	3.5
Sharp	168	377	461	5.7	5.9	5.9
Sony	106	182	218	3.6	2.8	2.8
Toshiba	413	699	796	14.0	10.9	10.2
Yamaha	82	107	79	2.8	1.7	1.0
Other Japanese Companies	1	1	221	0	0	2.8
European Companies	9	34	46	0.3	0.5	0.6
ABB-HAFO	1	1	0	0	0	0
Eurosil	1	1	1	0	0	0
Inmos	6	8	0	0.2	0.1	0
Matra MHS	0	2	1	0	0	0
Philips	0	6	22	0	0.1	0.3
Plessey	0	1	2	0	0	0
SGS-Thomson	1	2	9	0	0	0.1
Siemens	0	13	11	0	0.2	0.1
Asia/Pacific Companies	0	36	36	0	0.6	0.5
Goldstar	0	8	3	0	0.1	0
Hyundai	0	1	3	0	0	0
Samsung	0	25	28	0	0.4	0.4
United Microelectronics	0	2	2	0	0	0

NA = Not available

Source: Dataquest (May 1990)

Table 63

**Japanese Semiconductor Market  
CMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>424.9</b>	<b>836.6</b>	<b>1,078.6</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
North American Companies	28.3	56.3	92.2	6.7	6.7	8.5
Actel	NA	NA	0.1	NA	NA	0
Advanced Micro Devices	0.4	1.7	4.0	0.1	0.2	0.4
Altera	0.3	0.7	1.0	0.1	0.1	0.1
Analog Devices	0.3	0.4	0.4	0.1	0	0
Atmel	NA	NA	0.8	NA	NA	0.1
Catalyst	0	0.1	1.4	0	0	0.1
Chips & Technologies	1.0	1.3	2.3	0.2	0.2	0.2
Cirrus Logic	NA	NA	0.3	NA	NA	0
Cypress Semiconductor	0	0.5	1.2	0	0.1	0.1
General Electric	0.7	0.8	0	0.2	0.1	0
Harris	0.1	0.3	2.3	0	0	0.2
Integrated CMOS Systems	NA	NA	0.4	NA	NA	0
Integrated Device Technology	0.4	1.4	2.1	0.1	0.2	0.2
Intel	5.8	18.2	21.0	1.4	2.2	1.9
International CMOS Technology	NA	NA	0.6	NA	NA	0.1
ITT	0.6	0.5	1.2	0.1	0.1	0.1
Lattice	0.3	0.3	0.6	0.1	0	0.1
LSI Logic	1.7	2.6	6.8	0.4	0.3	0.6
MOSel	0	0.1	0.1	0	0	0
Motorola	10.8	15.9	28.6	2.5	1.9	2.7
National Semiconductor	2.9	2.5	6.2	0.7	0.3	0.6
NCR	0.1	0.1	0	0	0	0
Performance Semiconductor	NA	NA	0.1	NA	NA	0
Rockwell	0.3	2.2	0	0.1	0.3	0
SEEQ Technology	0.1	0.3	0.3	0	0	0
Standard Microsystems	0	0	0.1	0	0	0
Texas Instruments	0.7	3.3	5.8	0.2	0.4	0.5
Vitellic	0	0	0.4	0	0	0
VLSI Technology	0.3	0.8	1.0	0.1	0.1	0.1
Weitek	0.1	0.5	0.6	0	0.1	0.1
Western Digital	1.0	1.0	1.5	0.2	0.1	0.1
Xilinx	0.1	0.5	0.7	0	0.1	0.1
Zilog	0.3	0.3	0.3	0.1	0	0

(Continued)

Table 63 (Continued)

Japanese Semiconductor Market  
CMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Japanese Companies	395.4	771.2	975.2	93.1	92.2	90.4
Fuji Electric	1.9	3.9	3.2	0.4	0.5	0.3
Fujitsu	26.2	107.8	120.8	6.2	12.9	11.2
Hitachi	62.5	92.7	116.7	14.7	11.1	10.8
Matsushita	34.8	52.1	55.9	8.2	6.2	5.2
Mitsubishi	20.0	58.0	79.8	4.7	6.9	7.4
NEC	68.3	169.5	210.0	16.1	20.3	19.5
New JRC	1.4	3.0	4.1	0.3	0.4	0.4
NMB Semiconductor	0.4	3.5	4.0	0.1	0.4	0.4
Oki Semiconductor	28.4	37.8	42.2	6.7	4.5	3.9
Ricoh	3.5	5.6	7.0	0.8	0.7	0.6
Rohm	1.0	6.0	8.0	0.2	0.7	0.7
Sanyo	12.5	25.6	40.8	2.9	3.1	3.8
Seiko-Epson	23.6	28.1	37.8	5.6	3.4	3.5
Sharp	24.2	49.0	63.6	5.7	5.9	5.9
Sony	15.3	23.7	30.1	3.6	2.8	2.8
Toshiba	59.5	90.9	109.8	14.0	10.9	10.2
Yamaha	11.8	13.9	10.9	2.8	1.7	1.0
Other Japanese Companies	0.1	0.1	30.5	0	0	2.8
European Companies	1.2	4.4	6.2	0.3	0.5	0.6
ABB-HAFO	0.1	0.1	0	0	0	0
Eurosil	0.1	0.1	0.1	0	0	0
Inmos	0.9	1.0	0	0.2	0.1	0
Matra MHS	0	0.3	0.1	0	0	0
Philips	0	0.8	3.0	0	0.1	0.3
Plessey	0	0.1	0.3	0	0	0
SGS-Thomson	0.1	0.3	1.2	0	0	0.1
Siemens	0	1.7	1.5	0	0.2	0.1
Asia/Pacific Companies	0	4.7	5.0	0	0.6	0.5
Goldstar	0	1.0	0.4	0	0.1	0
Hyundai	0	0.1	0.4	0	0	0
Samsung	0	3.3	3.9	0	0.4	0.4
United Microelectronics	0	0.3	0.3	0	0	0
Exchange Rate (¥/US\$1)	144	130	138			

NA = Not available  
Source: Dataquest (May 1990)

Table 64

**Japanese Semiconductor Market  
BiCMOS Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	2	12	506	100.0	100.0	100.0
<b>North American Companies</b>	1	11	22	50.0	91.7	4.3
LSI Logic	0	0	2	0	0	0.4
Microchip Technology	1	6	7	50.0	50.0	1.4
National Semiconductor	0	1	6	0	8.3	1.2
Texas Instruments	0	4	6	0	33.3	1.2
Other North American Companies	0	0	1	0	0	0.2
<b>Japanese Companies</b>	1	1	484	50.0	8.3	95.7
Fuji Electric	1	1	6	50.0	8.3	1.2
Fujitsu	0	0	104	0	0	20.6
Hitachi	0	0	150	0	0	29.6
NEC	0	0	87	0	0	17.2
Oki Semiconductor	0	0	64	0	0	12.6
Ricoh	0	0	1	0	0	0.2
Toshiba	0	0	72	0	0	14.2

Source: Dataquest (May 1990)

Table 65

**Japanese Semiconductor Market  
BiCMOS Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	0.2	1.5	69.7	100.0	100.0	100.0
North American Companies	0.1	1.4	3.0	50.0	93.3	4.3
LSI Logic	0	0	0.3	0	0	0.4
Microchip Technology	0.1	0.8	1.0	50.0	53.3	1.4
National Semiconductor	0	0.1	0.8	0	6.7	1.1
Texas Instruments	0	0.5	0.8	0	33.3	1.1
Other North American Companies	0	0	0.1	0	0	0.1
Japanese Companies	0.1	0.1	66.7	50.0	6.7	95.7
Fuji Electric	0.1	0.1	0.8	50.0	6.7	1.1
Fujitsu	0	0	14.4	0	0	20.7
Hitachi	0	0	20.7	0	0	29.7
NEC	0	0	12.0	0	0	17.2
Oki Semiconductor	0	0	8.8	0	0	12.6
Ricoh	0	0	0.1	0	0	0.1
Toshiba	0	0	9.9	0	0	14.2
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)



Table 66

Japanese Semiconductor Market  
MOS Memory Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	2,268	4,424	5,992	100.0	100.0	100.0
North American Companies	107	222	429	4.7	5.0	7.2
Advanced Micro Devices	4	20	41	0.2	0.5	0.7
Atmel	NA	NA	3	NA	NA	0.1
Catalyst	0	1	10	0	0	0.2
Cypress Semiconductor	0	2	7	0	0	0.1
Gould AMI	1	2	1	0	0	0
Harris	0	0	8	0	0	0.1
Integrated Device Technology	3	8	10	0.1	0.2	0.2
Intel	35	42	45	1.5	0.9	0.8
International CMOS Technology	NA	NA	4	NA	NA	0.1
Macronix	NA	NA	8	NA	NA	0.1
Microchip Technology	2	7	8	0.1	0.2	0.1
Micron Technology	4	8	2	0.2	0.2	0
MOSel	0	1	1	0	0	0
Motorola	4	28	98	0.2	0.6	1.6
National Semiconductor	5	5	4	0.2	0.1	0.1
Performance Semiconductor	NA	NA	1	NA	NA	0
SEEQ Technology	2	3	3	0.1	0.1	0.1
Texas Instruments	42	90	163	1.9	2.0	2.7
Vitellic	0	0	3	0	0	0.1
Xicor	5	5	8	0.2	0.1	0.1
Other North American Companies	0	0	1	0	0	0
Japanese Companies	2,156	4,147	5,494	95.1	93.7	91.7
Fujitsu	427	754	784	18.8	17.0	13.1
Hitachi	306	621	850	13.5	14.0	14.2
Matsushita	87	151	218	3.8	3.4	3.6
Mitsubishi	279	518	607	12.3	11.7	10.1
NEC	517	859	924	22.8	19.4	15.4
NMB Semiconductor	3	27	29	0.1	0.6	0.5
Oki Semiconductor	48	110	162	2.1	2.5	2.7
Ricoh	16	24	28	0.7	0.5	0.5
Rohm	0	8	10	0	0.2	0.2
Sanyo	25	84	119	1.1	1.9	2.0
Seiko-Epson	42	58	109	1.9	1.3	1.8
Sharp	107	265	368	4.7	6.0	6.1

(Continued)

Table 66 (Continued)

Japanese Semiconductor Market  
MOS Memory Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Sony	48	92	127	2.1	2.1	2.1
Toshiba	251	576	757	11.1	13.0	12.6
Other Japanese Companies	0	0	402	0	0	6.7
<b>European Companies</b>						
Inmos	1	4	0	0	0.1	0
Matra MHS	0	1	1	0	0	0
Philips	0	3	13	0	0.1	0.2
SGS-Thomson	0	5	3	0	0.1	0.1
<b>Asia/Pacific Companies</b>						
Goldstar	0	6	3	0	0.1	0.1
Hyundai	0	1	3	0	0	0.1
Samsung	4	35	46	0.2	0.8	0.8

NA = Not available  
Source: Dataquest (May 1990)

Table 67

**Japanese Semiconductor Market  
MOS Memory Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>326.3</b>	<b>575.1</b>	<b>826.9</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>15.3</b>	<b>28.9</b>	<b>59.2</b>	<b>4.7</b>	<b>5.0</b>	<b>7.2</b>
Advanced Micro Devices	0.6	2.6	5.7	0.2	0.5	0.7
Atmel	NA	NA	0.4	NA	NA	0
Catalyst	0	0.1	1.4	0	0	0.2
Cypress Semiconductor	0	0.3	1.0	0	0.1	0.1
Gould AMI	0.1	0.3	0.1	0	0.1	0
Harris	0	0	1.1	0	0	0.1
Integrated Device Technology	0.4	1.0	1.4	0.1	0.2	0.2
Intel	5.0	5.5	6.2	1.5	1.0	0.7
International CMOS Technology	NA	NA	0.6	NA	NA	0.1
Macronix	NA	NA	1.1	NA	NA	0.1
Microchip Technology	0.3	0.9	1.1	0.1	0.2	0.1
Micron Technology	0.6	1.0	0.3	0.2	0.2	0
MOSel	0	0.1	0.1	0	0	0
Motorola	0.6	3.6	13.5	0.2	0.6	1.6
National Semiconductor	0.7	0.7	0.6	0.2	0.1	0.1
Performance Semiconductor	NA	NA	0.1	NA	NA	0
SEEQ Technology	0.3	0.4	0.4	0.1	0.1	0
Texas Instruments	6.0	11.7	22.5	1.8	2.0	2.7
Vitellic	0	0	0.4	0	0	0
Xicor	0.7	0.7	1.1	0.2	0.1	0.1
Other North American Companies	0	0	0.1	0	0	0
<b>Japanese Companies</b>	<b>310.3</b>	<b>539.0</b>	<b>758.3</b>	<b>95.1</b>	<b>93.7</b>	<b>91.7</b>
Fujitsu	61.5	98.0	108.2	18.8	17.0	13.1
Hitachi	44.1	80.7	117.3	13.5	14.0	14.2
Matsushita	12.5	19.6	30.1	3.8	3.4	3.6
Mitsubishi	40.2	67.3	83.8	12.3	11.7	10.1
NEC	74.4	111.7	127.5	22.8	19.4	15.4
NMB Semiconductor	0.4	3.5	4.0	0.1	0.6	0.5
Oki Semiconductor	6.9	14.3	22.4	2.1	2.5	2.7
Ricoh	2.3	3.1	3.9	0.7	0.5	0.5
Rohm	0	1.0	1.4	0	0.2	0.2
Sanyo	3.6	10.9	16.4	1.1	1.9	2.0
Seiko-Epson	6.0	7.5	15.0	1.8	1.3	1.8
Sharp	15.4	34.5	50.8	4.7	6.0	6.1

(Continued)

Table 67 (Continued)

**Japanese Semiconductor Market  
MOS Memory Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Sony	6.9	12.0	17.5	2.1	2.1	2.1
Toshiba	36.1	74.9	104.5	11.1	13.0	12.6
Other Japanese Companies	0	0	55.5	0	0	6.7
<b>European Companies</b>						
Inmos	0.1	0.5	0	0	0.1	0
Matra MHS	0	0.1	0.1	0	0	0
Philips	0	0.4	1.8	0	0.1	0.2
SGS-Thomson	0	0.7	0.4	0	0.1	0
<b>Asia/Pacific Companies</b>						
Goldstar	0	0.8	0.4	0	0.1	0
Hyundai	0	0.1	0.4	0	0	0
Samsung	0.6	4.6	6.3	0.2	0.8	0.8
<b>Exchange Rate (¥/US\$1)</b>	<b>144</b>	<b>130</b>	<b>138</b>			

NA = Not available

Source: Dataquest (May 1990)

Table 68

Japanese Semiconductor Market  
MOS Microcomponents Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	1,902	2,573	2,828	100.0	100.0	100.0
North American Companies	262	444	496	13.8	17.3	17.5
Advanced Micro Devices	28	35	23	1.5	1.4	0.8
Analog Devices	2	3	3	0.1	0.1	0.1
Chips & Technologies	7	10	17	0.4	0.4	0.6
Cirrus Logic	NA	NA	2	NA	NA	0.1
Harris	1	2	7	0.1	0.1	0.2
Integrated Device Technology	0	0	1	0	0	0
Intel	113	235	250	5.9	9.1	8.8
ITT	3	2	0	0.2	0.1	0
Motorola	49	73	82	2.6	2.8	2.9
National Semiconductor	5	6	28	0.3	0.2	1.0
Rockwell	0	0	1	0	0	0
Standard Microsystems	1	1	1	0.1	0	0
Texas Instruments	42	60	59	2.2	2.3	2.1
VLSI Technology	0	1	2	0	0	0.1
Weitek	1	4	4	0.1	0.2	0.1
Western Digital	7	8	11	0.4	0.3	0.4
Zilog	3	4	5	0.2	0.2	0.2
Japanese Companies	1,630	2,116	2,309	85.7	82.2	81.6
Fujitsu	125	169	172	6.6	6.6	6.1
Hitachi	280	350	365	14.7	13.6	12.9
Matsushita	187	215	202	9.8	8.4	7.1
Mitsubishi	245	350	328	12.9	13.6	11.6
NEC	369	533	669	19.4	20.7	23.7
Oki Semiconductor	57	70	78	3.0	2.7	2.8
Ricoh	14	19	22	0.7	0.7	0.8
Rohm	3	16	16	0.2	0.6	0.6
Sanyo	42	55	48	2.2	2.1	1.7
Seiko-Epson	6	12	12	0.3	0.5	0.4
Sharp	31	45	94	1.6	1.7	3.3
Sony	21	37	47	1.1	1.4	1.7
Toshiba	249	244	255	13.1	9.5	9.0
Other Japanese Companies	1	1	1	0.1	0	0

(Continued)

Table 68 (Continued)

**Japanese Semiconductor Market**  
**MOS Microcomponents Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
European Companies	10	13	23	0.5	0.5	0.8
Inmos	5	4	0	0.3	0.2	0
Matra MHS	0	1	0	0	0	0
Philips	3	1	11	0.2	0	0.4
SGS-Thomson	2	0	7	0.1	0	0.2
Siemens	0	7	5	0	0.3	0.2

NA = Not available

Source: Dataquest (May 1990)

Table 69

**Japanese Semiconductor Market**  
**MOS Microcomponents Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>273.5</b>	<b>334.7</b>	<b>390.3</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>37.5</b>	<b>57.8</b>	<b>68.4</b>	<b>13.7</b>	<b>17.3</b>	<b>17.5</b>
Advanced Micro Devices	4.0	4.6	3.2	1.5	1.4	0.8
Analog Devices	0.3	0.4	0.4	0.1	0.1	0.1
Chips & Technologies	1.0	1.3	2.3	0.4	0.4	0.6
Cirrus Logic	NA	NA	0.3	NA	NA	0.1
Harris	0.1	0.3	1.0	0	0.1	0.3
Integrated Device Technology	0	0	0.1	0	0	0
Intel	16.3	30.6	34.5	6.0	9.1	8.8
ITT	0.4	0.3	0	0.1	0.1	0
Motorola	7.1	9.5	11.3	2.6	2.8	2.9
National Semiconductor	0.7	0.8	3.9	0.3	0.2	1.0
Rockwell	0	0	0.1	0	0	0
Standard Microsystems	0.1	0.1	0.1	0	0	0
Texas Instruments	6.0	7.8	8.1	2.2	2.3	2.1
VLSI Technology	0	0.1	0.3	0	0	0.1
Weitek	0.1	0.5	0.6	0	0.1	0.2
Western Digital	1.0	1.0	1.5	0.4	0.3	0.4
Zilog	0.4	0.5	0.7	0.1	0.1	0.2
<b>Japanese Companies</b>	<b>234.6</b>	<b>275.3</b>	<b>318.7</b>	<b>85.8</b>	<b>82.3</b>	<b>81.7</b>
Fujitsu	18.0	22.0	23.7	6.6	6.6	6.1
Hitachi	40.3	45.5	50.4	14.7	13.6	12.9
Matsushita	26.9	28.0	27.9	9.8	8.4	7.1
Mitsubishi	35.3	45.5	45.3	12.9	13.6	11.6
NEC	53.1	69.3	92.3	19.4	20.7	23.6
Oki Semiconductor	8.2	9.1	10.8	3.0	2.7	2.8
Ricoh	2.0	2.5	3.0	0.7	0.7	0.8
Rohm	0.4	2.1	2.2	0.1	0.6	0.6
Sanyo	6.0	7.2	6.6	2.2	2.2	1.7
Seiko-Epson	0.9	1.6	1.7	0.3	0.5	0.4
Sharp	4.5	5.9	13.0	1.6	1.8	3.3
Sony	3.0	4.8	6.5	1.1	1.4	1.7
Toshiba	35.9	31.7	35.2	13.1	9.5	9.0
Other Japanese Companies	0.1	0.1	0.1	0	0	0

(Continued)

Table 69 (Continued)

**Japanese Semiconductor Market**  
**MOS Microcomponents Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
European Companies	1.4	1.6	3.2	0.5	0.5	0.8
Inmos	0.7	0.5	0	0.3	0.1	0
Matra MHS	0	0.1	0	0	0	0
Philips	0.4	0.1	1.5	0.1	0	0.4
SGS-Thomson	0.3	0	1.0	0.1	0	0.3
Siemens	0	0.9	0.7	0	0.3	0.2
Exchange Rate (¥/US\$1)	144	130	138			

NA = Not available

Source: Dataquest (May 1990)



Table 70

Japanese Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	2,254	3,504	3,677	100.0	100.0	100.0
North American Companies	141	284	266	6.3	8.1	7.2
Actel	NA	NA	1	NA	NA	0
Advanced Micro Devices	2	5	8	0.1	0.1	0.2
Altera	2	5	7	0.1	0.1	0.2
Atmel	NA	NA	3	NA	NA	0.1
Cypress Semiconductor	0	2	2	0	0.1	0.1
General Electric	5	6	0	0.2	0.2	0
Gould AMI	0	0	4	0	0	0.1
Harris	0	0	2	0	0	0.1
Integrated CMOS Systems	NA	NA	3	NA	NA	0.1
Integrated Device Technology	0	3	4	0	0.1	0.1
Intel	5	5	5	0.2	0.1	0.1
ITT	7	8	13	0.3	0.2	0.4
Lattice	2	2	4	0.1	0.1	0.1
LSI Logic	12	20	51	0.5	0.6	1.4
Microchip Technology	1	1	1	0	0	0
Motorola	34	59	56	1.5	1.7	1.5
National Semiconductor	15	13	19	0.7	0.4	0.5
NCR	1	1	0	0	0	0
Rockwell	9	88	0	0.4	2.5	0
SEEQ Technology	1	1	1	0	0	0
Texas Instruments	42	56	72	1.9	1.6	2.0
VLSI Technology	2	5	5	0.1	0.1	0.1
Xilinx	1	4	5	0	0.1	0.1
Japanese Companies	2,110	3,199	3,394	93.6	91.3	92.3
Fuji Electric	14	31	29	0.6	0.9	0.8
Fujitsu	191	289	414	8.5	8.2	11.3
Hitachi	158	201	262	7.0	5.7	7.1
Matsushita	271	379	233	12.0	10.8	6.3
Mitsubishi	45	90	72	2.0	2.6	2.0
NEC	484	698	840	21.5	19.9	22.8
New JRC	10	23	30	0.4	0.7	0.8
Oki Semiconductor	193	244	279	8.6	7.0	7.6
Ricoh	30	37	38	1.3	1.1	1.0
Rohm	4	23	33	0.2	0.7	0.9

(Continued)

Table 70 (Continued)

Japanese Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Sanyo	47	107	154	2.1	3.1	4.2
Seiko-Epson	116	146	153	5.1	4.2	4.2
Sharp	109	231	196	4.8	6.6	5.3
Sony	67	95	96	3.0	2.7	2.6
Toshiba	266	468	443	11.8	13.4	12.0
Yamaha	103	135	118	4.6	3.9	3.2
Other Japanese Companies	2	2	4	0.1	0.1	0.1
<b>European Companies</b>						
ABB-HAFO	1	1	0	0	0	0
Eurosil	1	1	1	0	0	0
Plessey	0	1	2	0	0	0.1
SGS-Thomson	1	0	4	0	0	0.1
Siemens	0	6	6	0	0.2	0.2
<b>Asia/Pacific Companies</b>						
Goldstar	0	2	1	0	0.1	0
Samsung	0	5	1	0	0.1	0
United Microelectronics	0	2	2	0	0.1	0.1

NA = Not available  
Source: Dataquest (May 1990)

Table 71

**Japanese Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>324.2</b>	<b>455.8</b>	<b>507.3</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>20.1</b>	<b>37.1</b>	<b>36.7</b>	<b>6.2</b>	<b>8.1</b>	<b>7.2</b>
Actel	NA	NA	0.1	NA	NA	0
Advanced Micro Devices	0.3	0.7	1.1	0.1	0.2	0.2
Altera	0.3	0.7	1.0	0.1	0.2	0.2
Atmel	NA	NA	0.4	NA	NA	0.1
Cypress Semiconductor	0	0.3	0.3	0	0.1	0.1
General Electric	0.7	0.8	0	0.2	0.2	0
Gould AMI	0	0	0.6	0	0	0.1
Harris	0	0	0.3	0	0	0.1
Integrated CMOS Systems	NA	NA	0.4	NA	NA	0.1
Integrated Device Technology	0	0.4	0.6	0	0.1	0.1
Intel	0.7	0.7	0.7	0.2	0.2	0.1
ITT	1.0	1.0	1.8	0.3	0.2	0.4
Lattice	0.3	0.3	0.6	0.1	0.1	0.1
LSI Logic	1.7	2.6	7.0	0.5	0.6	1.4
Microchip Technology	0.1	0.1	0.1	0	0	0
Motorola	4.9	7.7	7.7	1.5	1.7	1.5
National Semiconductor	2.2	1.7	2.6	0.7	0.4	0.5
NCR	0.1	0.1	0	0	0	0
Rockwell	1.3	11.4	0	0.4	2.5	0
SEEQ Technology	0.1	0.1	0.1	0	0	0
Texas Instruments	6.0	7.3	9.9	1.9	1.6	2.0
VLSI Technology	0.3	0.7	0.7	0.1	0.2	0.1
Xilinx	0.1	0.5	0.7	0	0.1	0.1
<b>Japanese Companies</b>	<b>303.8</b>	<b>415.9</b>	<b>468.3</b>	<b>93.7</b>	<b>91.2</b>	<b>92.3</b>
Fuji Electric	2.0	4.0	4.0	0.6	0.9	0.8
Fujitsu	27.5	37.6	57.1	8.5	8.2	11.3
Hitachi	22.8	26.1	36.2	7.0	5.7	7.1
Matsushita	39.0	49.3	32.2	12.0	10.8	6.3
Mitsubishi	6.5	11.7	9.9	2.0	2.6	2.0
NEC	69.7	90.7	115.9	21.5	19.9	22.8
New JRC	1.4	3.0	4.1	0.4	0.7	0.8
Oki Semiconductor	27.8	31.7	38.5	8.6	7.0	7.6
Ricoh	4.3	4.8	5.2	1.3	1.1	1.0
Rohm	0.6	3.0	4.6	0.2	0.7	0.9

(Continued)

Table 71 (Continued)

**Japanese Semiconductor Market  
MOS Logic Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Japanese Companies (Continued)</b>						
Sanyo	6.8	13.9	21.3	2.1	3.0	4.2
Seiko-Epson	16.7	19.0	21.1	5.2	4.2	4.2
Sharp	15.7	30.0	27.0	4.8	6.6	5.3
Sony	9.6	12.4	13.2	3.0	2.7	2.6
Toshiba	38.3	60.8	61.1	11.8	13.3	12.0
Yamaha	14.8	17.6	16.3	4.6	3.9	3.2
Other Japanese Companies	0.3	0.3	0.6	0.1	0.1	0.1
<b>European Companies</b>						
ABB-HAFO	0.1	0.1	0	0	0	0
Eurosil	0.1	0.1	0.1	0	0	0
Plessey	0	0.1	0.3	0	0	0.1
SGS-Thomson	0.1	0	0.6	0	0	0.1
Siemens	0	0.8	0.8	0	0.2	0.2
<b>Asia/Pacific Companies</b>						
Goldstar	0	0.3	0.1	0	0.1	0
Samsung	0	0.7	0.1	0	0.2	0
United Microelectronics	0	0.3	0.3	0	0.1	0.1
<b>Exchange Rate (¥/US\$1)</b>	<b>144</b>	<b>130</b>	<b>138</b>			

NA = Not available

Source: Dataquest (May 1990)

Table 72

Japanese Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	3,316	3,720	3,699	100.0	100.0	100.0
North American Companies	336	442	514	10.1	11.9	13.9
Advanced Micro Devices	10	11	12	0.3	0.3	0.3
Analog Devices	50	60	56	1.5	1.6	1.5
Atmel	NA	NA	7	NA	NA	0.2
Brooktree	NA	NA	4	NA	NA	0.1
Burr-Brown	38	53	50	1.1	1.4	1.4
Cherry Semiconductor	2	2	0	0.1	0.1	0
Crystal	NA	NA	1	NA	NA	0
Elantec	NA	NA	2	NA	NA	0.1
Exar	3	3	5	0.1	0.1	0.1
General Electric	2	2	0	0.1	0.1	0
Gennum	NA	NA	2	NA	NA	0.1
Gould AMI	0	0	1	0	0	0
Harris	9	13	15	0.3	0.3	0.4
Honeywell	7	7	0	0.2	0.2	0
Int'l. Microelectronic Prod.	0	0	1	0	0	0
ITT	6	8	2	0.2	0.2	0.1
Linear Technology	4	6	8	0.1	0.2	0.2
Maxim	4	7	9	0.1	0.2	0.2
Micro Linear	0	0	1	0	0	0
Micro Power Systems	2	2	3	0.1	0.1	0.1
Mitel	8	7	0	0.2	0.2	0
Motorola	36	55	49	1.1	1.5	1.3
National Semiconductor	35	38	27	1.1	1.0	0.7
Precision Monolithics	6	10	5	0.2	0.3	0.1
Rockwell	0	0	99	0	0	2.7
Silicon Systems	14	18	15	0.4	0.5	0.4
Siliconix	3	4	4	0.1	0.1	0.1
Sipex	NA	NA	1	NA	NA	0
Sprague	4	4	5	0.1	0.1	0.1
Supertex	2	2	7	0.1	0.1	0.2
Teledyne	3	3	2	0.1	0.1	0.1
Texas Instruments	86	125	119	2.6	3.4	3.2
Unitrode	2	2	2	0.1	0.1	0.1

(Continued)

Table 72 (Continued)

Japanese Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Japanese Companies	2,946	3,237	3,151	88.8	87.0	85.2
Fuji Electric	24	28	36	0.7	0.8	1.0
Fujitsu	146	143	146	4.4	3.8	3.9
Hitachi	273	301	289	8.2	8.1	7.8
Matsushita	316	354	283	9.5	9.5	7.7
Mitsubishi	229	224	332	6.9	6.0	9.0
NEC	465	408	339	14.0	11.0	9.2
New JRC	83	102	101	2.5	2.7	2.7
Oki Semiconductor	21	23	35	0.6	0.6	0.9
Rohm	187	215	216	5.6	5.8	5.8
Sanken	88	111	107	2.7	3.0	2.9
Sanyo	311	387	401	9.4	10.4	10.8
Seiko-Epson	9	10	10	0.3	0.3	0.3
Sharp	51	66	62	1.5	1.8	1.7
Sony	197	298	267	5.9	8.0	7.2
Toshiba	347	370	332	10.5	9.9	9.0
Yamaha	0	0	11	0	0	0.3
Other Japanese Companies	199	197	184	6.0	5.3	5.0
European Companies	29	35	25	0.9	0.9	0.7
Ericsson	0	2	2	0	0.1	0.1
Philips	21	24	13	0.6	0.6	0.4
Plessey	2	2	2	0.1	0.1	0.1
SGS-Thomson	4	5	6	0.1	0.1	0.2
Telefunken Electronic	2	2	2	0.1	0.1	0.1
Asia/Pacific Companies	5	6	9	0.2	0.2	0.2
Korean Electronic Co.	5	0	1	0.2	0	0
Samsung	0	6	8	0	0.2	0.2

NA = Not available

Source: Dataquest (May 1990)

Table 73

Japanese Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	477.8	483.8	510.6	100.0	100.0	100.0
North American Companies	48.5	57.6	71.1	10.2	11.9	13.9
Advanced Micro Devices	1.4	1.4	1.7	0.3	0.3	0.3
Analog Devices	7.2	7.8	7.7	1.5	1.6	1.5
Annel	NA	NA	1.0	NA	NA	0.2
Brooktree	NA	NA	0.6	NA	NA	0.1
Burr-Brown	5.5	6.9	6.9	1.2	1.4	1.4
Cherry Semiconductor	0.3	0.3	0	0.1	0.1	0
Crystal	NA	NA	0.1	NA	NA	0
Elantec	NA	NA	0.3	NA	NA	0.1
Exar	0.4	0.4	0.7	0.1	0.1	0.1
General Electric	0.3	0.3	0	0.1	0.1	0
Gennum	NA	NA	0.3	NA	NA	0.1
Gould AMI	0	0	0.1	0	0	0
Harris	1.3	1.7	2.1	0.3	0.4	0.4
Honeywell	1.0	0.9	0	0.2	0.2	0
Int'l. Microelectronic Prod.	0	0	0.1	0	0	0
ITT	0.9	1.0	0.3	0.2	0.2	0.1
Linear Technology	0.6	0.8	1.1	0.1	0.2	0.2
Maxim	0.6	0.9	1.2	0.1	0.2	0.2
Micro Linear	0	0	0.1	0	0	0
Micro Power Systems	0.3	0.3	0.4	0.1	0.1	0.1
Mitel	1.2	0.9	0	0.3	0.2	0
Motorola	5.2	7.2	6.8	1.1	1.5	1.3
National Semiconductor	5.0	4.9	3.7	1.0	1.0	0.7
Precision Monolithics	0.9	1.3	0.7	0.2	0.3	0.1
Rockwell	0	0	13.7	0	0	2.7
Silicon Systems	2.0	2.3	2.1	0.4	0.5	0.4
Siliconix	0.4	0.5	0.6	0.1	0.1	0.1
Sipex	NA	NA	0.1	NA	NA	0
Sprague	0.6	0.5	0.7	0.1	0.1	0.1
Supertex	0.3	0.3	1.0	0.1	0.1	0.2
Teledyne	0.4	0.4	0.3	0.1	0.1	0.1
Texas Instruments	12.4	16.3	16.4	2.6	3.4	3.2
Unitrode	0.3	0.3	0.3	0.1	0.1	0.1

(Continued)

Table 73 (Continued)

Japanese Semiconductor Market  
Analog Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Japanese Companies	424.4	420.7	434.8	88.8	87.0	85.2
Fuji Electric	3.5	3.6	5.0	0.7	0.7	1.0
Fujitsu	21.0	18.6	20.1	4.4	3.8	3.9
Hitachi	39.3	39.1	39.9	8.2	8.1	7.8
Matsushita	45.5	46.0	39.1	9.5	9.5	7.7
Mitsubishi	33.0	29.1	45.8	6.9	6.0	9.0
NEC	67.0	53.0	46.8	14.0	11.0	9.2
New JRC	12.0	13.3	13.9	2.5	2.7	2.7
Oki Semiconductor	3.0	3.0	4.8	0.6	0.6	0.9
Rohm	26.9	28.0	29.8	5.6	5.8	5.8
Sanken	12.7	14.4	14.8	2.7	3.0	2.9
Sanyo	44.8	50.3	55.3	9.4	10.4	10.8
Seiko-Epson	1.3	1.3	1.4	0.3	0.3	0.3
Sharp	7.3	8.6	8.6	1.5	1.8	1.7
Sony	28.4	38.7	36.8	5.9	8.0	7.2
Toshiba	50.0	48.1	45.8	10.5	9.9	9.0
Yamaha	0	0	1.5	0	0	0.3
Other Japanese Companies	28.7	25.6	25.4	6.0	5.3	5.0
European Companies	4.2	4.7	3.5	0.9	1.0	0.7
Ericsson	0	0.3	0.3	0	0.1	0.1
Philips	3.0	3.1	1.8	0.6	0.6	0.4
Plessey	0.3	0.3	0.3	0.1	0.1	0.1
SGS-Thomson	0.6	0.7	0.8	0.1	0.1	0.2
Telefunken Electronic	0.3	0.3	0.3	0.1	0.1	0.1
Asia/Pacific Companies	0.7	0.8	1.2	0.1	0.2	0.2
Korean Electronic Co.	0.7	0	0.1	0.1	0	0
Samsung	0	0.8	1.1	0	0.2	0.2
Exchange Rate (¥/US\$1)	144	130	138			

NA = Not available

Source: Dataquest (May 1990)



Table 74

**Japanese Semiconductor Market**  
**Total Discrete Market Share Estimates**  
**Sales by Manufacturers**  
(Millions of Dollars)

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>2,693</b>	<b>3,282</b>	<b>3,321</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>56</b>	<b>72</b>	<b>57</b>	<b>2.1</b>	<b>2.2</b>	<b>1.7</b>
Acrian	1	2	2	0	0.1	0.1
General Instrument	21	27	16	0.8	0.8	0.5
Harris	0	0	3	0	0	0.1
Hewlett-Packard	5	5	3	0.2	0.2	0.1
International Rectifier	4	5	5	0.1	0.2	0.2
ITT	9	15	10	0.3	0.5	0.3
Motorola	8	10	12	0.3	0.3	0.4
Siliconix	4	4	2	0.1	0.1	0.1
Supertex	1	1	1	0	0	0
Texas Instruments	1	2	2	0	0.1	0.1
TRW	1	0	0	0	0	0
Unitrode	1	1	1	0	0	0
<b>Japanese Companies</b>	<b>2,621</b>	<b>3,199</b>	<b>3,242</b>	<b>97.3</b>	<b>97.5</b>	<b>97.6</b>
Fuji Electric	164	222	237	6.1	6.8	7.1
Fujitsu	55	65	58	2.0	2.0	1.7
Hitachi	522	580	564	19.4	17.7	17.0
Matsushita	263	320	268	9.8	9.8	8.1
Mitsubishi	203	274	293	7.5	8.3	8.8
NEC	384	447	478	14.3	13.6	14.4
New JRC	8	7	3	0.3	0.2	0.1
Oki Semiconductor	7	9	10	0.3	0.3	0.3
Rohm	153	230	238	5.7	7.0	7.2
Sanken	101	138	141	3.8	4.2	4.2
Sanyo	159	138	191	5.9	4.2	5.8
Sony	67	106	86	2.5	3.2	2.6
Toshiba	487	630	642	18.1	19.2	19.3
Other Japanese Companies	48	33	33	1.8	1.0	1.0
<b>European Companies</b>	<b>5</b>	<b>7</b>	<b>12</b>	<b>0.2</b>	<b>0.2</b>	<b>0.4</b>
Philips	1	2	2	0	0.1	0.1
SGS-Thomson	2	2	2	0.1	0.1	0.1
Siemens	2	3	8	0.1	0.1	0.2
<b>Asia/Pacific Companies</b>	<b>11</b>	<b>4</b>	<b>10</b>	<b>0.4</b>	<b>0.1</b>	<b>0.3</b>
Korean Electronic Co.	10	1	6	0.4	0	0.2
Samsung	1	3	4	0	0.1	0.1

Source: Dataquest (May 1990)

Table 75

**Japanese Semiconductor Market  
Total Discrete Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>387.4</b>	<b>426.9</b>	<b>458.5</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>7.9</b>	<b>9.5</b>	<b>7.9</b>	<b>2.0</b>	<b>2.2</b>	<b>1.7</b>
Acrian	0.1	0.3	0.3	0	0.1	0.1
General Instrument	3.0	3.5	2.2	0.8	0.8	0.5
Harris	0	0	0.4	0	0	0.1
Hewlett-Packard	0.7	0.7	0.4	0.2	0.2	0.1
International Rectifier	0.6	0.7	0.7	0.2	0.2	0.2
ITT	1.3	2.0	1.4	0.3	0.5	0.3
Motorola	1.2	1.3	1.7	0.3	0.3	0.4
Siliconix	0.6	0.5	0.3	0.2	0.1	0.1
Supertex	0.1	0.1	0.1	0	0	0
Texas Instruments	0.1	0.3	0.3	0	0.1	0.1
TRW	0.1	0	0	0	0	0
Unitrode	0.1	0.1	0.1	0	0	0
<b>Japanese Companies</b>	<b>377.3</b>	<b>415.9</b>	<b>447.5</b>	<b>97.4</b>	<b>97.4</b>	<b>97.6</b>
Fuji Electric	23.6	28.9	32.7	6.1	6.8	7.1
Fujitsu	7.9	8.5	8.0	2.0	2.0	1.7
Hitachi	75.2	75.4	77.8	19.4	17.7	17.0
Matsushita	37.9	41.6	37.0	9.8	9.7	8.1
Mitsubishi	29.2	35.6	40.4	7.5	8.3	8.8
NEC	55.3	58.1	66.0	14.3	13.6	14.4
New JRC	1.2	0.9	0.4	0.3	0.2	0.1
Oki Semiconductor	1.0	1.2	1.4	0.3	0.3	0.3
Rohm	22.0	29.9	32.8	5.7	7.0	7.2
Sanken	14.5	17.9	19.5	3.7	4.2	4.3
Sanyo	22.9	17.9	26.4	5.9	4.2	5.8
Sony	9.6	13.8	11.9	2.5	3.2	2.6
Toshiba	70.1	81.9	88.6	18.1	19.2	19.3
Other Japanese Companies	6.9	4.3	4.6	1.8	1.0	1.0
<b>European Companies</b>	<b>0.7</b>	<b>1.0</b>	<b>1.7</b>	<b>0.2</b>	<b>0.2</b>	<b>0.4</b>
Philips	0.1	0.3	0.3	0	0.1	0.1
SGS-Thomson	0.3	0.3	0.3	0.1	0.1	0.1
Siemens	0.3	0.4	1.1	0.1	0.1	0.2
<b>Asia/Pacific Companies</b>	<b>1.5</b>	<b>0.5</b>	<b>1.4</b>	<b>0.4</b>	<b>0.1</b>	<b>0.3</b>
Korean Electronic Co.	1.4	0.1	0.8	0.4	0	0.2
Samsung	0.1	0.4	0.6	0	0.1	0.1
<b>Exchange Rate (¥/US\$1)</b>	<b>144</b>	<b>130</b>	<b>138</b>			

Source: Dataquest (May 1990)

Table 76

**Japanese Semiconductor Market  
Transistor Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	1,460	1,822	1,852	100.0	100.0	100.0
<b>North American Companies</b>	21	26	26	1.4	1.4	1.4
Acrian	1	2	2	0.1	0.1	0.1
Harris	0	0	2	0	0	0.1
Hewlett-Packard	2	2	0	0.1	0.1	0
International Rectifier	3	3	3	0.2	0.2	0.2
ITT	3	5	5	0.2	0.3	0.3
Motorola	5	7	9	0.3	0.4	0.5
Siliconix	4	4	2	0.3	0.2	0.1
Supertex	1	1	1	0.1	0.1	0.1
Texas Instruments	1	2	2	0.1	0.1	0.1
TRW	1	0	0	0.1	0	0
<b>Japanese Companies</b>	1,426	1,788	1,811	97.7	98.1	97.8
Fuji Electric	46	82	96	3.2	4.5	5.2
Fujitsu	55	65	58	3.8	3.6	3.1
Hitachi	203	232	228	13.9	12.7	12.3
Matsushita	200	244	203	13.7	13.4	11.0
Mitsubishi	87	110	101	6.0	6.0	5.5
NEC	280	340	358	19.2	18.7	19.3
New JRC	8	7	0	0.5	0.4	0
Rohm	104	169	180	7.1	9.3	9.7
Sanken	14	23	24	1.0	1.3	1.3
Sanyo	103	102	146	7.1	5.6	7.9
Sony	14	29	20	1.0	1.6	1.1
Toshiba	278	360	372	19.0	19.8	20.1
Other Japanese Companies	34	25	25	2.3	1.4	1.3
<b>European Companies</b>	2	4	5	0.1	0.2	0.3
Philips	1	2	1	0.1	0.1	0.1
SGS-Thomson	0	0	1	0	0	0.1
Siemens	1	2	3	0.1	0.1	0.2
<b>Asia/Pacific Companies</b>	11	4	10	0.8	0.2	0.5
Korean Electronic Co.	10	1	6	0.7	0.1	0.3
Samsung	1	3	4	0.1	0.2	0.2

Source: Dataquest (May 1990)

Table 77

**Japanese Semiconductor Market  
Transistor Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	<b>209.7</b>	<b>237.3</b>	<b>255.4</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>2.8</b>	<b>3.5</b>	<b>3.6</b>	<b>1.3</b>	<b>1.5</b>	<b>1.4</b>
Acrian	0.1	0.3	0.3	0	0.1	0.1
Harris	0	0	0.3	0	0	0.1
Hewlett-Packard	0.3	0.3	0	0.1	0.1	0
International Rectifier	0.4	0.4	0.4	0.2	0.2	0.2
ITT	0.4	0.7	0.7	0.2	0.3	0.3
Motorola	0.7	0.9	1.2	0.3	0.4	0.5
Siliconix	0.6	0.5	0.3	0.3	0.2	0.1
Supertex	0.1	0.1	0.1	0	0	0
Texas Instruments	0.1	0.3	0.3	0	0.1	0.1
TRW	0.1	0	0	0	0	0
<b>Japanese Companies</b>	<b>205.2</b>	<b>232.7</b>	<b>249.8</b>	<b>97.9</b>	<b>98.1</b>	<b>97.8</b>
Fuji Electric	6.6	10.7	13.2	3.1	4.5	5.2
Fujitsu	7.9	8.5	8.0	3.8	3.6	3.1
Hitachi	29.2	30.2	31.5	13.9	12.7	12.3
Matsushita	28.8	31.7	28.0	13.7	13.4	11.0
Mitsubishi	12.5	14.3	13.9	6.0	6.0	5.4
NEC	40.3	44.2	49.4	19.2	18.6	19.3
New JRC	1.2	0.9	0	0.6	0.4	0
Rohm	15.0	22.0	24.8	7.2	9.3	9.7
Sanken	2.0	3.0	3.3	1.0	1.3	1.3
Sanyo	14.8	13.3	20.1	7.1	5.6	7.9
Sony	2.0	3.8	2.8	1.0	1.6	1.1
Toshiba	40.0	46.8	51.3	19.1	19.7	20.1
Other Japanese Companies	4.9	3.3	3.5	2.3	1.4	1.4
<b>European Companies</b>	<b>0.2</b>	<b>0.6</b>	<b>0.6</b>	<b>0.1</b>	<b>0.3</b>	<b>0.2</b>
Philips	0.1	0.3	0.1	0	0.1	0
SGS-Thomson	0	0	0.1	0	0	0
Siemens	0.1	0.3	0.4	0	0.1	0.2
<b>Asia/Pacific Companies</b>	<b>1.5</b>	<b>0.5</b>	<b>1.4</b>	<b>0.7</b>	<b>0.2</b>	<b>0.5</b>
Korean Electronic Co.	1.4	0.1	0.8	0.7	0	0.3
Samsung	0.1	0.4	0.6	0	0.2	0.2
<b>Exchange Rate (¥/US\$1)</b>	<b>144</b>	<b>130</b>	<b>138</b>			

Source: Dataquest (May 1990)

Table 78

**Japanese Semiconductor Market  
Diode Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	890	1,051	999	100.0	100.0	100.0
<b>North American Companies</b>	35	42	28	3.9	4.0	2.8
General Instrument	21	27	16	2.4	2.6	1.6
Hewlett-Packard	3	3	3	0.3	0.3	0.3
International Rectifier	1	1	1	0.1	0.1	0.1
ITT	6	7	4	0.7	0.7	0.4
Motorola	3	3	3	0.3	0.3	0.3
Unitrode	1	1	1	0.1	0.1	0.1
<b>Japanese Companies</b>	852	1,006	964	95.7	95.7	96.5
Fuji Electric	77	91	93	8.7	8.7	9.3
Hitachi	260	278	265	29.2	26.5	26.5
Matsushita	63	76	65	7.1	7.2	6.5
Mitsubishi	5	5	3	0.6	0.5	0.3
NEC	69	72	69	7.8	6.9	6.9
New JRC	0	0	1	0	0	0.1
Rohm	49	61	58	5.5	5.8	5.8
Sanken	87	115	117	9.8	10.9	11.7
Sanyo	25	28	30	2.8	2.7	3.0
Sony	53	77	66	6.0	7.3	6.6
Toshiba	153	198	192	17.2	18.8	19.2
Other Japanese Companies	11	5	5	1.2	0.5	0.5
<b>European Companies</b>	3	3	7	0.3	0.3	0.7
Philips	0	0	1	0	0	0.1
SGS-Thomson	2	2	1	0.2	0.2	0.1
Siemens	1	1	5	0.1	0.1	0.5

Source: Dataquest (May 1990)

Table 79

**Japanese Semiconductor Market  
Diode Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	127.9	136.6	137.6	100.0	100.0	100.0
<b>North American Companies</b>	4.9	5.4	3.8	3.8	4.0	2.8
General Instrument	3.0	3.5	2.2	2.3	2.6	1.6
Hewlett-Packard	0.4	0.4	0.4	0.3	0.3	0.3
International Rectifier	0.1	0.1	0.1	0.1	0.1	0.1
ITT	0.9	0.9	0.6	0.7	0.7	0.4
Motorola	0.4	0.4	0.4	0.3	0.3	0.3
Unitrode	0.1	0.1	0.1	0.1	0.1	0.1
<b>Japanese Companies</b>	122.6	130.8	132.9	95.9	95.8	96.6
Fuji Electric	11.1	11.8	12.8	8.7	8.6	9.3
Hitachi	37.4	36.1	36.6	29.2	26.4	26.6
Matsushita	9.1	9.9	9.0	7.1	7.2	6.5
Mitsubishi	0.7	0.7	0.4	0.5	0.5	0.3
NEC	9.9	9.4	9.5	7.7	6.9	6.9
New JRC	0	0	0.1	0	0	0.1
Rohm	7.1	7.9	8.0	5.6	5.8	5.8
Sanken	12.5	15.0	16.1	9.8	11.0	11.7
Sanyo	3.6	3.6	4.1	2.8	2.6	3.0
Sony	7.6	10.0	9.1	5.9	7.3	6.6
Toshiba	22.0	25.7	26.5	17.2	18.8	19.3
Other Japanese Companies	1.6	0.7	0.7	1.3	0.5	0.5
<b>European Companies</b>	0.4	0.4	0.9	0.3	0.3	0.7
Philips	0	0	0.1	0	0	0.1
SGS-Thomson	0.3	0.3	0.1	0.2	0.2	0.1
Siemens	0.1	0.1	0.7	0.1	0.1	0.5
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

Source: Dataquest (May 1990)

Table 80

**Japanese Semiconductor Market  
Thyristor Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	133	162	199	100.0	100.0	100.0
Japanese Companies	133	162	199	100.0	100.0	100.0
Fuji Electric	3	3	5	2.3	1.9	2.5
Hitachi	20	25	25	15.0	15.4	12.6
Mitsubishi	51	59	62	38.3	36.4	31.2
NEC	4	4	30	3.0	2.5	15.1
Toshiba	53	69	75	39.8	42.6	37.7
Other Japanese Companies	2	2	2	1.5	1.2	1.0

Source: Dataquest (May 1990)

Table 81

**Japanese Semiconductor Market  
Thyristor Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	19.1	21.2	27.6	100.0	100.0	100.0
Japanese Companies	19.1	21.2	27.6	100.0	100.0	100.0
Fuji Electric	0.4	0.4	0.7	2.1	1.9	2.5
Hitachi	2.9	3.3	3.5	15.2	15.6	12.7
Mitsubishi	7.3	7.7	8.6	38.2	36.3	31.2
NEC	0.6	0.5	4.1	3.1	2.4	14.9
Toshiba	7.6	9.0	10.4	39.8	42.5	37.7
Other Japanese Companies	0.3	0.3	0.3	1.6	1.4	1.1
Exchange Rate (¥/US\$1)	144	130	138			

Source: Dataquest (May 1990)

Table 82

**Japanese Semiconductor Market  
Other Discrete Market Share Estimates  
Sales by Manufacturers  
(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
Total Market	210	247	271	100.0	100.0	100.0
North American Companies	0	4	3	0	1.6	1.1
Harris	0	0	1	0	0	0.4
International Rectifier	0	1	1	0	0.4	0.4
ITT	0	3	1	0	1.2	0.4
Japanese Companies	210	243	268	100.0	98.4	98.9
Fuji Electric	38	46	43	18.1	18.6	15.9
Hitachi	39	45	46	18.6	18.2	17.0
Mitsubishi	60	100	127	28.6	40.5	46.9
NEC	31	31	21	14.8	12.6	7.7
New JRC	0	0	2	0	0	0.7
Oki Semiconductor	7	9	10	3.3	3.6	3.7
Sanyo	31	8	15	14.8	3.2	5.5
Toshiba	3	3	3	1.4	1.2	1.1
Other Japanese Companies	1	1	1	0.5	0.4	0.4

Source: Dataquest (May 1990)



Table 83

**Japanese Semiconductor Market  
Other Discrete Market Share Estimates  
Sales by Manufacturers  
(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	30.2	32.1	37.2	100.0	100.0	100.0
North American Companies	0	0.5	0.3	0	1.6	0.8
Harris	0	0	0.1	0	0	0.3
International Rectifier	0	0.1	0.1	0	0.3	0.3
ITT	0	0.4	0.1	0	1.2	0.3
Japanese Companies	30.2	31.6	36.9	100.0	98.4	99.2
Fuji Electric	5.5	6.0	5.9	18.2	18.7	15.9
Hitachi	5.6	5.9	6.3	18.5	18.4	16.9
Mitsubishi	8.6	13.0	17.5	28.5	40.5	47.0
NEC	4.5	4.0	2.9	14.9	12.5	7.8
New JRC	0	0	0.3	0	0	0.8
Oki Semiconductor	1.0	1.2	1.4	3.3	3.7	3.8
Sanyo	4.5	1.0	2.1	14.9	3.1	5.6
Toshiba	0.4	0.4	0.4	1.3	1.2	1.1
Other Japanese Companies	0.1	0.1	0.1	0.3	0.3	0.3
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

Source: Dataquest (May 1990)

Table 84

**Japanese Semiconductor Market**  
**Total Optoelectronic Market Share Estimates**  
**Sales by Manufacturers**  
**(Millions of Dollars)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	971	1,363	1,730	100.0	100.0	100.0
<b>North American Companies</b>	21	25	23	2.2	1.8	1.3
General Instrument	1	0	0	0.1	0	0
Harris	0	0	1	0	0	0.1
Hewlett-Packard	20	24	22	2.1	1.8	1.3
Quality Technologies	NA	1	0	NA	0.1	0
<b>Japanese Companies</b>	946	1,335	1,700	97.4	97.9	98.3
Fuji Electric	3	3	1	0.3	0.2	0.1
Fujitsu	55	88	91	5.7	6.5	5.3
Hitachi	28	48	44	2.9	3.5	2.5
Matsushita	142	176	304	14.6	12.9	17.6
Mitsubishi	22	24	29	2.3	1.8	1.7
NEC	46	78	108	4.7	5.7	6.2
New JRC	10	13	11	1.0	1.0	0.6
Oki Semiconductor	24	34	33	2.5	2.5	1.9
Rohm	62	100	87	6.4	7.3	5.0
Sanken	13	19	18	1.3	1.4	1.0
Sanyo	83	59	143	8.5	4.3	8.3
Sharp	197	252	280	20.3	18.5	16.2
Sony	138	217	249	14.2	15.9	14.4
Toshiba	75	142	228	7.7	10.4	13.2
Other Japanese Companies	48	82	74	4.9	6.0	4.3
<b>European Companies</b>	4	3	6	0.4	0.2	0.3
ABB-HAFO	2	2	2	0.2	0.1	0.1
Siemens	2	1	3	0.2	0.1	0.2
TMS	NA	NA	1	NA	NA	0.1
<b>Asia/Pacific Companies</b>	0	0	1	0	0	0.1
Korean Electronic Co.	0	0	1	0	0	0.1

NA = Not available

Source: Dataquest (May 1990)

Table 85

**Japanese Semiconductor Market**  
**Total Optoelectronic Market Share Estimates**  
**Sales by Manufacturers**  
**(Billions of Yen)**

	Revenue			Market Share (Percent)		
	1987	1988	1989	1987	1988	1989
<b>Total Market</b>	139.8	177.2	238.7	100.0	100.0	100.0
<b>North American Companies</b>	3.0	3.2	3.1	2.1	1.8	1.3
General Instrument	0.1	0	0	0.1	0	0
Harris	0	0	0.1	0	0	0
Hewlett-Packard	2.9	3.1	3.0	2.1	1.7	1.3
Quality Technologies	NA	0.1	0	NA	0.1	0
<b>Japanese Companies</b>	136.2	173.6	234.7	97.4	98.0	98.3
Fuji Electric	0.4	0.4	0.1	0.3	0.2	0
Fujitsu	7.9	11.4	12.6	5.7	6.4	5.3
Hitachi	4.0	6.2	6.1	2.9	3.5	2.6
Matsushita	20.4	22.9	42.0	14.6	12.9	17.6
Mitsubishi	3.2	3.1	4.0	2.3	1.7	1.7
NEC	6.6	10.1	14.9	4.7	5.7	6.2
New JRC	1.4	1.7	1.5	1.0	1.0	0.6
Oki Semiconductor	3.5	4.4	4.6	2.5	2.5	1.9
Rohm	8.9	13.0	12.0	6.4	7.3	5.0
Sanken	1.9	2.5	2.5	1.4	1.4	1.0
Sanyo	12.0	7.7	19.7	8.6	4.3	8.3
Sharp	28.4	32.8	38.6	20.3	18.5	16.2
Sony	19.9	28.2	34.4	14.2	15.9	14.4
Toshiba	10.8	18.5	31.5	7.7	10.4	13.2
Other Japanese Companies	6.9	10.7	10.2	4.9	6.0	4.3
<b>European Companies</b>	0.6	0.4	0.8	0.4	0.2	0.3
ABB-HAFO	0.3	0.3	0.3	0.2	0.2	0.1
Siemens	0.3	0.1	0.4	0.2	0.1	0.2
TMS	NA	NA	0.1	NA	NA	0
<b>Asia/Pacific Companies</b>	0	0	0.1	0	0	0
Korean Electronic Co.	0	0	0.1	0	0	0
<b>Exchange Rate (¥/US\$1)</b>	144	130	138			

NA = Not available

Source: Dataquest (May 1990)

# Dataquest

**DB** a company of  
The Dun & Bradstreet Corporation

## *Dataquest Research and Sales Offices:*

**Dataquest Incorporated**  
1290 Ridder Park Drive  
San Jose, California 95131-2398  
Phone: (408) 437-8000  
Telex: 171973  
Fax: (408) 437-0292

**Technology Products Group**  
Phone: (800) 624-3280

**Dataquest Incorporated**  
**Invitational Computer Conferences Division**  
3151 Airway Avenue, C-2  
Costa Mesa, California 92626  
Phone: (714) 957-0171  
Telex: 5101002189 ICCDQ  
Fax: (714) 957-0903

**Dataquest Incorporated**  
**Ledgeway Group**  
430 Bedford Street  
Suite 340  
Lexington, MA 02173  
Phone: (617) 862-8500  
Fax: (617) 862-8207

**Dataquest Australia**  
Suite 1, Century Plaza  
80 Berry Street  
North Sydney, NSW 2060  
Australia  
Phone: (02) 959 4544  
Telex: 25468  
Fax: (02) 929 0635

**Dataquest Boston**  
1740 Massachusetts Ave.  
Boxborough, MA 01719-2209  
Phone: (508) 264-4373  
Telex: 171973  
Fax: (508) 635-0183

**Dataquest Europe GmbH**  
Rosenkavalierplatz 17  
D-8000 Munich 81  
West Germany  
Phone: (089) 91 1064  
Telex: 5218070  
Fax: (089) 91 2189

**Dataquest Europe Limited**  
Roussel House, Broadwater Park  
Denham, Uxbridge, Middx UB9 5HP  
England  
Phone: 0895-835050  
Telex: 266195  
Fax: 0895 835260/1/2

**Dataquest Europe SA**  
Tour Gallieni 2  
36, avenue Gallieni  
93175 Bagnolet Cedex  
France  
Phone: (1) 48 97 31 00  
Telex: 233 263  
Fax: (1) 48 97 34 00

**Dataquest Hong Kong**  
Rm. 401, Connaught Comm. Bldg.  
185 Wanchai Rd.  
Wanchai, Hong Kong  
Phone: 8387336  
Telex: 80587  
Fax: 5722375

**Dataquest Israel**  
59 Mishmar Ha'yarden Street  
Tel Aviv, Israel 69865  
or  
P.O. Box 18198  
Tel Aviv, Israel  
Phone: 52 913937  
Telex: 341118  
Fax: 52 32865

**Dataquest Japan Limited**  
Shinkawa Sanko Building  
1-3-17 Shinkawa, Chuo-ku  
Tokyo 104 Japan  
Phone: (03) 5566-0411  
Fax: (03) 5566-0425

**Dataquest Korea**  
Daeheung Bldg., Room 505  
648-23 Yeoksam-dong  
Kangnam-gu  
Seoul, Korea 135  
Phone: (02) 552-2332  
Fax: (02) 552-2661

**Dataquest Singapore**  
4012 Ang Mo Kio Industrial Park 1  
Ave. 10, #03-10 to #03-12  
Singapore 2056  
Phone: 4597181  
Telex: 38257  
Fax: 4563129

**Dataquest Taiwan**  
Room 801/8th Floor  
Ever Spring Building  
147, Sect. 2, Chien Kuo N. Rd.  
Taipei, Taiwan R.O.C. 104  
Phone: (02) 501-7960  
Telex: 27459  
Fax: (02) 505-4265

**Dataquest West Germany**  
In der Schneithohl 17  
6242 Kronberg 2  
West Germany  
Phone: 06173/61685  
Telex: 418089  
Fax: 06173/67901

**Analog Market Share Estimates  
1990**

**Source:  
Dataquest**

**Dataquest**

**Semiconductors *Worldwide*  
Analog and Mixed-Signal ICs**

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# *Introduction*

## **Estimated 1990 Market Shares**

This booklet presents market share ranking by company revenue within the categories of product type, geographic region, and application market. These detailed categories represent only monolithic ICs. The last few tables expand the revenue to include analog hybrid ICs.

## **Analog ICs by Category**

The categories of analog ICs, as listed in the tables, include the following:

- Total Monolithic Analog IC Revenue
- Revenue by Product Category
  - Amplifiers
  - Comparators
  - Regulators
  - Data Converters
  - Interface
  - Special Functions
  - Telecom
  - ASICs
  - Consumer- and Automotive-Specific ICs
- Revenue by Geographic Region
  - North America
  - Europe
  - Japan
  - Asia/Pacific-Rest of World
- Revenue by Application Market
  - Consumer
  - Automotive
  - Industrial
  - Computer
  - Communications
  - Military
- Hybrid Analog IC Overview
  - Hybrid ICs
  - Total Monolithic and Hybrid Analog Revenue

Table 1.1 lists the market shares by supplier for the monolithic analog IC sales. Tables in the following chapters further refine the monolithic revenue by product, region, and market.



**Table 1.1**  
**Monolithic Analog ICs—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	National Semiconductor	6.4	590.0
2	Philips	6.3	581.0
3	SGS-Thomson	6.0	554.0
4	Toshiba	6.0	549.0
5	Texas Instruments	5.0	458.0
6	Matsushita	4.5	410.0
7	Sanyo	4.3	395.0
8	Motorola	4.3	393.0
9	Sony	3.9	363.0
10	NEC	3.6	330.0
11	Mitsubishi	3.4	314.0
12	Analog Devices	3.3	305.0
13	Harris	2.7	250.0
14	Hitachi	2.7	250.0
15	Rohm	2.4	221.5
16	AT&T	2.1	197.0
17	Siemens	2.1	190.0
18	Silicon Systems	1.8	165.0
19	Rockwell	1.7	160.0
20	GEC Plessey	1.6	147.0
21	New Japan Radio	1.3	122.0
22	Fujitsu	1.2	111.0
23	Telefunken Electronics	1.2	107.0
24	ITT	1.1	103.0
25	Allegro Microsystems	1.0	96.0
26	Samsung	1.0	92.0
27	Precision Monolithics	1.0	91.0
28	Linear Technology	0.9	83.0
29	Burr-Brown	0.9	81.0
30	AMD	0.8	76.0
31	Exar	0.8	75.0
32	Sharp	0.8	74.0
33	Mietec	0.8	72.0
34	Brooktree	0.8	70.0
35	Maxim	0.7	62.0
	Others	11.6	1,070.5
	<b>Total</b>	<b>100.0</b>	<b>9,208.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

# Revenue by Product Category

This chapter shows revenue by company for each of the major product segments within Dataquest's analog IC coverage. Figure 2.1 shows each of these segments, illustrating their relative revenue as a percentage of the total analog monolithic IC revenue.

## Market Share Summary of Product Sales by Region

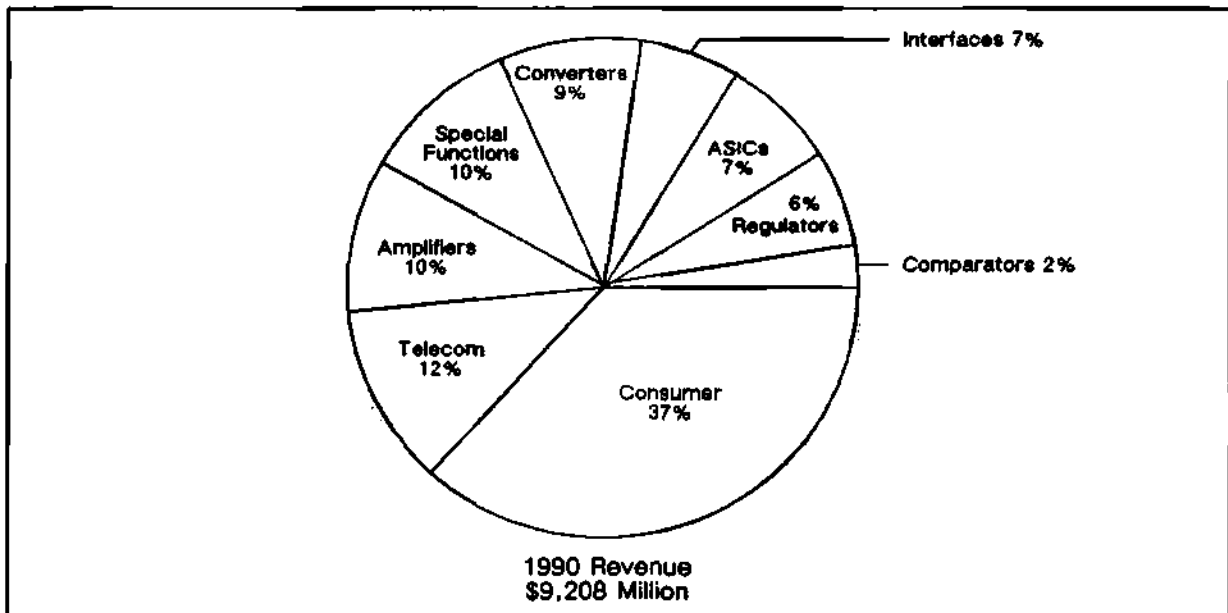
A summary of revenue for each product type for the companies headquartered in the four major geographical regions is shown in Table 2.1. To find the percentage of product revenue generated by companies within a specific region, read across the table. Thus, North American vendors have 56 percent of the amplifiers market, with Japan, Europe, and

Asia/Pacific-Rest of World (ROW) suppliers following with 29, 9, and 6 percent, respectively.

## Supplier Database

These market share tables come from a monolithic analog IC database of 100 suppliers. Japan has a small number of very large analog IC vendors with broad product coverage. Other regions, particularly North America, have a few large suppliers along with a number of smaller, more niche-oriented suppliers. North America has four times more suppliers than does Japan but only generates 22 percent more revenue. Table 2.2 shows the breakdown of our database by origin of the supplier. Table 2.3 through 2.11 further break down 1990 market share by product type.

Figure 2.1  
Monolithic Analog IC Revenue by Product Category



Source: Dataquest (May 1991)

**Table 2.1**  
**Vendors' Share of Product Category Revenue by Company Base of Origin**  
**(Revenue in Millions of Dollars)**

Product Consumed	Revenue	Percentage of Revenue by Home Base of Vendor			
		North America	Europe	Japan	A/P-ROW
Amplifiers	931	56	9	29	6
Comparators	154	55	7	24	14
Regulators	592	65	9	24	2
Data Converters	875	76	9	14	1
Interface	601	64	15	18	3
Special Functions	901	54	15	18	3
Telecommunications	1,122	64	11	34	1
ASIC	617	60	31	9	3
Consumer/Auto	3,415	11	26	60	3
<b>Total</b>	<b>9,208</b>	<b>45</b>	<b>19</b>	<b>35</b>	<b>3</b>

Source: Dataquest (May 1991)

**Table 2.2**  
**Number of Suppliers in Analog IC Database**

	Number of Suppliers
North America	65
Europe	11
Japan	16
Asia/Pacific-ROW	8
<b>Total</b>	<b>100</b>

Source: Dataquest (May 1991)

**Table 2.3**  
**Amplifiers—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	National Semiconductor	11.8	110.0
2	NEC	10.1	94.0
3	Harris	8.6	80.0
4	Texas Instruments	7.7	72.0
5	Mitsubishi	6.2	58.0
6	Motorola	5.7	53.0
7	New Japan Radio	5.5	51.5
8	Precision Monolithics	5.5	51.0
9	Analog Devices	3.5	32.5
10	SGS-Thomson	3.2	30.0
11	Toshiba	3.2	30.0
12	Burr-Brown	2.9	27.0
13	Phillips	2.5	23.0
14	Linear Technology	2.3	21.0
15	GEC Plessey	2.3	21.0
16	Maxim	1.4	13.2
17	Samsung	1.4	13.0
18	Sanyo	1.2	10.8
19	Exar	1.1	10.0
20	Tektronix	1.1	10.0
21	Matsushita	1.0	9.0
22	Raytheon Semiconductor	1.0	9.0
23	Siemens	0.9	8.0
24	Gennium	0.8	7.0
25	Fujitsu	0.6	6.0
26	Rohm	0.6	6.0
27	Elaantec	0.6	5.9
28	Comlinear	0.5	5.0
29	AT&T	0.5	4.4
30	Hitachi	0.4	4.0
31	Teledyne Components	0.4	4.0
32	Sharp	0.3	3.0
33	Silicon General	0.3	3.0
34	Goldstar	0.2	2.0
35	TRW	0.1	1.0
	Others	4.6	42.7
	<b>Total</b>	<b>100.0</b>	<b>931.0</b>

Note: Some columns do not add to totals shown because of rounding.

Source: Dataquest (May 1991)

**Table 2.4**  
**Comparators—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	National Semiconductor	18.2	28.0
2	Texas Instruments	10.4	16.0
3	Motorola	7.8	12.0
4	New Japan Radio	6.0	9.2
5	Philips	5.9	9.0
6	NEC	4.9	7.5
7	Analog Devices	4.4	6.8
8	Matsushita	3.9	6.0
9	Harris	2.6	4.0
10	Linear Technology	2.6	4.0
11	Precision Monolithics	2.2	3.4
12	Toshiba	2.1	3.2
13	AMD	2.0	3.0
14	Hitachi	2.0	3.0
15	Mitsubishi	2.0	3.0
16	Sharp	1.3	2.0
17	MCE	1.2	1.8
18	Raytheon Semiconductor	1.2	1.8
19	Samsung	1.0	1.6
20	Burr-Brown	0.7	1.0
21	Fujitsu	0.7	1.0
22	Sanyo	0.7	1.0
23	Siliconix	0.7	1.0
24	Unitrode	0.7	1.0
25	GEC Plessey	0.7	1.0
26	Signal Processing Tech.	0.7	1.0
27	Oki	0.5	0.7
28	Rohm	0.3	0.5
29	Siemens	0.3	0.5
30	Goldstar	0.3	0.4
31	Elantec	0.1	0.1
	Others	12.4	19.5
	<b>Total</b>	<b>100.0</b>	<b>154.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 2.5**  
**Regulators—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	National Semiconductor	17.2	102.0
2	Motorola	12.8	76.0
3	Texas Instruments	7.9	47.0
4	SGS-Thomson	6.5	39.0
5	AT&T	5.4	32.0
6	NEC	5.0	29.5
7	Linear Technology	4.1	24.0
8	Matsushita	4.1	24.0
9	Toshiba	3.9	23.2
10	Silicon General	3.7	22.0
11	Unitrode	3.7	22.0
12	Mitsubishi	3.6	21.0
13	New Japan Radio	3.0	17.5
14	Analog Devices	2.4	14.4
15	Hitachi	1.9	11.0
16	Exar	1.6	9.5
17	Samsung	1.3	7.4
18	Maxim	1.2	7.2
19	Sanyo	1.2	7.2
20	Harris	1.2	7.0
21	Seagate Micro-Electronics	1.2	7.0
22	GEC Plessey	1.0	6.0
23	Precision Monolithics	0.8	5.0
24	Sharp	0.7	4.0
25	Toko	0.6	3.4
26	Philips	0.5	3.0
27	Raytheon Semiconductor	0.4	2.6
28	Siemens	0.4	2.5
29	Goldstar	0.4	2.4
30	Fujitsu	0.3	2.0
31	Siliconix	0.3	2.0
32	Cherry Semiconductor	0.3	2.0
33	Semtech	0.3	2.0
34	Fuji Electric	0.2	1.2
35	Micro Power Systems	0.2	1.0
	Others	0.5	2.9
	Total	100.0	592.0

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 2.6**  
**Data Converters—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Analog Devices	24.9	218.0
2	Harris	7.7	67.0
3	National Semiconductor	6.9	60.0
4	Brooktree	6.9	60.0
5	Burr-Brown	5.4	47.3
6	Siliconix	4.7	41.0
7	SGS-Thomson	4.3	38.0
8	Maxim	3.9	34.0
9	Sony	3.9	34.0
10	Precision Monolithics	3.4	29.6
11	Texas Instruments	2.9	25.0
12	GEC Plessey	2.3	20.0
13	Philips	2.3	20.0
14	Micro Power Systems	2.1	18.0
15	Motorola	2.1	18.0
16	Fujitsu	1.5	13.0
17	Teledyne Components	1.4	12.6
18	Toshiba	1.4	12.4
19	TRW	1.4	12.0
20	Matsushita	1.3	11.0
21	Hitachi	1.1	10.0
22	Mitsubishi	1.1	10.0
23	Crystal Semiconductor	0.9	8.0
24	Yamaha	0.9	8.0
25	New Japan Radio	0.9	7.5
26	Toko	0.8	6.8
27	Linear Technology	0.5	4.0
28	Sanyo	0.5	4.0
29	Siemens	0.5	4.0
30	Signal Processing Tech.	0.5	4.0
31	NEC	0.3	3.0
32	Integrated Device Tech.	0.3	3.0
33	AMD	0.2	2.0
34	Rohm	0.2	2.0
35	Micro Linear	0.2	2.0
	Others	0.7	5.8
	<b>Total</b>	<b>100.0</b>	<b>875.0</b>

Note: Some columns do not add to totals shown because of rounding.  
 Source: Dataquest (May 1991)

**Table 2.7**  
**Interface ICs—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Texas Instruments	25.8	155.0
2	National Semiconductor	14.5	87.0
3	SGS-Thomson	9.7	58.0
4	Allegro Microsystems	7.2	43.0
5	Toshiba	6.3	37.9
6	Motorola	5.7	34.0
7	NEC	3.3	20.0
8	Philips	2.5	15.0
9	Linear Technology	1.7	10.0
10	Supertex	1.7	10.0
11	Samsung	1.5	9.0
12	Telefunken Electronics	1.4	8.5
13	Sanyo	1.3	8.0
14	Maxim	1.3	7.6
15	Fujitsu	1.2	7.0
16	Sharp	1.2	7.0
17	Exar	1.1	6.5
18	Harris	1.0	6.0
19	Siemens	1.0	6.0
20	Unitrode	1.0	6.0
21	Hughes	1.0	6.0
22	Seiko Epson	1.0	6.0
23	Hitachi	0.8	5.0
24	STC	0.8	5.0
25	New Japan Radio	0.8	4.9
26	Mitsubishi	0.7	4.0
27	AMD	0.5	3.0
28	Matsushita	0.5	3.0
29	Rohm	0.5	3.0
30	Siliconix	0.5	3.0
31	Goldstar	0.3	2.0
32	Micrel	0.3	2.0
33	Teledyne Components	0.3	1.9
34	Analog Devices	0.2	1.0
35	Silicon General	0.2	1.0
	Others	1.4	8.7
	Total	100.0	601.0

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)



**Table 2.8**  
**Special Functions ICs—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Silicon Systems	10.8	97.0
2	Hitachi	7.7	69.0
3	Mitsubishi	5.9	53.0
4	Philips	5.0	47.0
5	National Semiconductor	4.7	42.0
6	Matsushita	4.1	37.0
7	Texas Instruments	3.7	33.0
8	Fujitsu	3.6	32.0
9	SGS-Thomson	3.3	30.0
10	Sony	3.2	29.0
11	Analog Devices	3.1	28.3
12	Kulite Semiconductor	3.1	28.0
13	Tektronix	2.8	25.0
14	Toshiba	2.7	24.6
15	Allegro Microsystems	2.6	24.0
16	VTC	2.6	24.0
17	Micro Linear	2.5	23.0
18	NEC	2.3	21.0
19	Rohm	2.3	21.0
20	Siemens	2.3	21.0
21	Honeywell	2.1	20.0
22	Sierra	2.1	19.7
23	Linear Technology	1.6	15.0
24	Motorola	1.4	13.0
25	Sharp	1.3	12.0
26	Novasensor Inc.	1.2	11.5
27	Unitrode	1.2	11.0
28	Brooktree	1.1	10.0
29	Samsung	1.0	9.5
30	Gennum	1.0	9.0
31	Fuji Electric	0.9	8.6
32	Cherry Semiconductor	0.8	7.0
33	Ericsson	0.7	6.1
34	Mitel	0.6	6.0
35	Siliconix	0.6	6.0
	Others	3.1	27.7
	<b>Total</b>	<b>100.0</b>	<b>901.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 2.9**  
**Telecommunications ICs—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Rockwell	14.3	160.0
2	SGS-Thomson	12.9	145.0
3	AT&T	9.9	110.8
4	AMD	6.1	68.0
5	ITT	5.5	61.8
6	Motorola	5.4	61.0
7	National Semiconductor	5.3	60.0
8	Siemens	3.1	35.0
9	Ericsson	3.1	34.9
10	Sierra	2.7	30.1
11	Mitel	2.5	28.0
12	Harris	2.4	27.0
13	Silicon Systems	2.2	25.0
14	Philips	2.0	23.0
15	Winbond Electronics	1.6	18.0
16	Oki	1.5	17.0
17	California Micro Devices	1.4	16.0
18	Fujitsu	1.3	15.0
19	NEC	1.3	15.0
20	Hitachi	1.2	14.0
21	Exar	1.2	13.1
22	Allegro Microsystems	1.2	13.0
23	Matsushita	1.2	13.0
24	Texas Instruments	1.2	13.0
25	GEC Plessey	1.1	12.0
26	Telefunken Electronics	1.0	11.0
27	Intel	0.8	9.0
28	Toshiba	0.8	8.6
29	Rohm	0.7	8.0
30	Sharp	0.7	8.0
31	Crystal Semiconductor	0.6	7.0
32	KEC	0.5	6.0
33	Austrian Mikro Systeme	0.4	5.0
34	Micro Linear	0.4	4.0
35	Matra MHS	0.4	4.0
	Others	2.0	22.8
	<b>Total</b>	<b>100.0</b>	<b>1,122.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 2.10**  
**Linear and Mixed-Signal ASICs—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	GEC Plessey	13.1	81.0
2	Mietec	11.2	69.0
3	AT&T	8.1	49.8
4	Harris	7.3	45.0
5	Silicon Systems	6.5	40.0
6	Exar	5.8	35.9
7	National Semiconductor	5.4	33.0
8	NCR Microelectronics	4.9	30.0
9	Texas Instruments	4.6	28.0
10	Sony	4.2	26.0
11	Fujitsu	3.2	20.0
12	Gould Semiconductor	3.2	20.0
13	Int'l Micro Products	2.9	18.0
14	Austrian Mikro Systeme	2.7	17.0
15	SGS-Thomson	2.6	16.0
16	Micro Linear	2.6	16.0
17	VTC	1.4	9.0
18	Allegro Microsystems	1.1	7.0
19	Ericsson	1.1	7.0
20	TMS	1.0	6.0
21	Raytheon Semiconductor	0.8	5.0
22	Sierra	0.8	5.0
23	Holt Integrated Circuits	0.8	5.0
24	Analog Devices	0.6	4.0
25	Mitsubishi	0.6	4.0
26	Cherry Semiconductor	0.6	4.0
27	Universal	0.6	4.0
28	Toshiba	0.5	3.4
29	Siemens	0.5	3.0
30	Sipex	0.5	3.0
	Others	0.5	2.8
	<b>Total</b>	<b>100.0</b>	<b>617.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 2.11**  
**Consumer-Specific ICs (including Automotive)—1990 Worldwide Market Share**  
**(Sales in Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Philips	12.9	441.0
2	Toshiba	11.9	405.7
3	Sanyo	10.6	362.0
4	Matsushita	9.0	307.0
5	Sony	8.0	274.0
6	SGS-Thomson	6.9	237.0
7	Rohm	5.3	181.0
8	Mitsubishi	4.7	160.0
9	NEC	4.1	140.0
10	Hitachi	3.9	134.0
11	Motorola	3.7	126.0
12	Siemens	3.2	110.0
13	Telefunken Electronics	2.6	87.5
14	Texas Instruments	2.1	70.0
15	National Semiconductor	2.0	68.0
16	Samsung	1.5	50.0
17	ITT	1.2	41.2
18	Sharp	1.1	38.0
19	New Japan Radio	0.7	25.6
20	Toko	0.7	23.8
21	Cherry Semiconductor	0.7	23.0
22	KEC	0.6	22.0
23	Fujitsu	0.4	15.0
24	Goldstar	0.3	10.7
25	Daewoo Semiconductor	0.3	10.0
26	Allegro Microsystems	0.3	9.0
27	Harris	0.3	9.0
28	GEC Plessey	0.2	6.0
29	Anadigics Inc.	0.1	4.5
30	Pacific Monolithics Inc.	0.1	4.5
31	Atmel	0.1	4.0
32	California Micro Devices	0.1	3.0
33	Silicon General	0.1	3.0
34	Silicon Systems	0.1	3.0
35	Linear Technology	0.1	2.0
	Others	0.1	4.5
	Total	100.0	3,415.0

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)



# Revenue by Geographic Region

This chapter shows monolithic analog IC revenue by company for each of the four major geographic regions. Figure 3.1 summarizes the total revenue for each region.

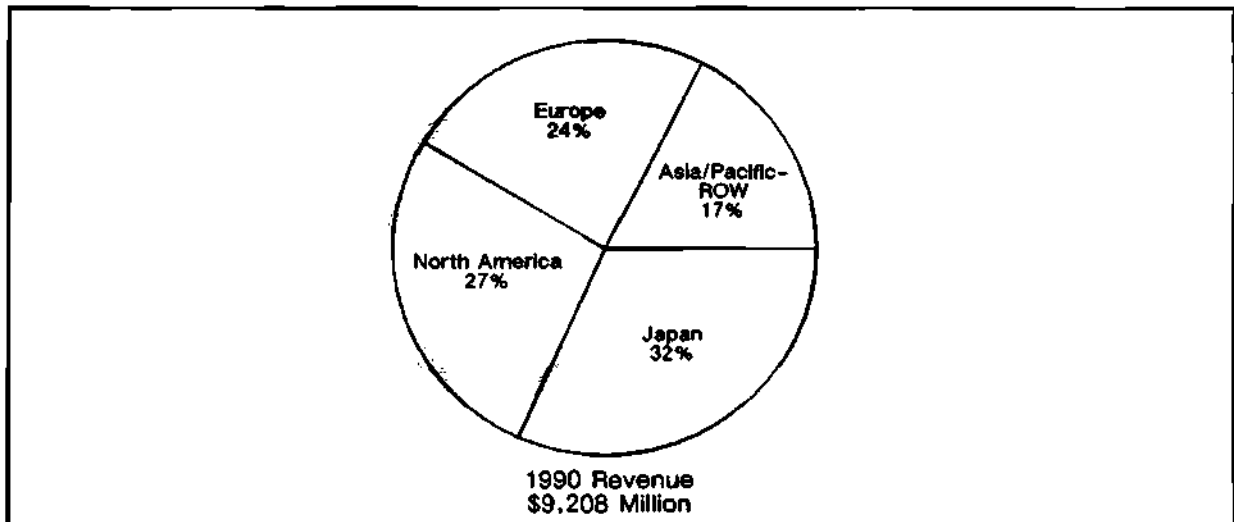
## Market Share Summary by Region

A summary of sales revenue by region for suppliers headquartered in the four major geographical regions is shown in Table 3.1.

To find the percentage of a regional market's sales revenue that is generated by companies headquartered within one of the four regions, read across the table. Thus, North American vendors have 85 percent of the North American market (top row); Europe, Japan, and Asia/Pacific-ROW follow with 10, 4, and 1 percent, respectively. In general, suppliers indigenous to a region have the largest market share there.

Tables 3.2 through 3.5 list the market share by company for each of the four geographical sales regions.

Figure 3.1  
Monolithic Analog IC Revenue by Regional Market



Source: Dataquest (May 1991)

**Table 3.1**  
**Regional Vendors' Share of Application Markets**  
**(Revenue in Millions of Dollars)**

Area of Product Consumption	Revenue	Percentage of Revenue by Home Base of Vendor			
		North America	Europe	Japan	A/P-ROW
North America	2,441	85	10	4	1
Europe	2,183	43	51	5	1
Japan	2,994	18	2	80	0
Asia/Pacific-ROW	1,590	27	21	40	12
Total	9,208	43	19	35	3

Source: Dataquest (May 1991)

**Table 3.2**  
**1990 North American Revenue by Company—Monolithic Analog ICs**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	National Semiconductor	11.8	289.1
2	AT&T	7.3	179.3
3	Harris	7.3	178.5
4	Texas Instruments	7.1	174.0
5	Analog Devices	7.0	170.8
6	Motorola	6.3	153.3
7	SGS-Thomson	3.4	83.1
8	Silicon Systems	2.9	71.0
9	Philips	2.9	69.7
10	Allegro Microsystems	2.2	54.7
11	Precision Monolithics	2.2	53.7
12	Brooktree	2.2	53.2
13	Linear Technology	2.0	48.1
14	GEC Plessey	1.9	45.6
15	Micro Linear	1.6	38.3
16	AMD	1.6	38.0
17	Exar	1.5	36.8
18	Sierra	1.3	32.9
19	Rockwell	1.3	32.0
20	Silicon General	1.1	28.1
21	Siliconix	1.1	27.5
22	Burr-Brown	1.1	25.9
23	VTC	1.0	25.1
24	Cherry Semiconductor	1.0	24.8
25	Maxim	1.0	24.8
26	Kulite Semiconductor	0.9	23.0
27	Unitrode	0.9	22.8
28	Gould Semiconductor	0.9	21.4
29	NCR Microelectronics	0.9	21.0
30	Tektronix	0.9	21.0
31	Hitachi	0.7	17.5
32	Toshiba	0.7	16.5
33	California Micro Devices	0.7	16.2
34	Rohm	0.6	15.5
35	ITT	0.6	15.5
	Others	12.0	292.6
	<b>Total</b>	<b>100.0</b>	<b>2,441.0</b>

Note: Some columns do not add to totals shown because of rounding.  
 Source: Dataquest (May 1991)



**Table 3.3**  
**1990 European Revenue by Company—Monolithic Analog ICs**  
 (Millions of Dollars)

Rank	Company	Percent Share	Sales
1	Philips	16.8	366.0
2	SGS-Thomson	15.2	332.4
3	Siemens	7.6	165.3
4	National Semiconductor	7.3	159.3
5	Texas Instruments	5.7	123.7
6	Motorola	4.3	94.3
7	Analog Devices	3.8	82.4
8	ITT	3.5	76.2
9	Mietec	3.0	66.2
10	Telefunken Electronics	2.8	62.1
11	GEC Plessey	2.4	51.5
12	Harris	2.2	48.5
13	Ericsson	1.8	38.4
14	Sony	1.7	36.3
15	Rockwell	1.5	32.0
16	Allegro Microsystems	1.3	28.8
17	Precision Monolithics	1.3	28.2
18	Toshiba	1.3	27.5
19	Burr-Brown	1.2	25.9
20	AMD	1.0	22.0
21	Austrian Mikro Systeme	1.0	22.0
22	Maxim	0.9	19.8
23	Mitsubishi	0.9	18.8
24	Siliconix	0.8	17.8
25	Linear Technology	0.8	16.6
26	Exar	0.7	15.0
27	Mitel	0.5	11.2
28	Tektronix	0.5	11.2
29	Unitrode	0.5	10.0
30	Sierra	0.5	9.9
31	TMS	0.4	9.0
32	Sanyo	0.4	7.9
33	AT&T	0.4	7.9
34	Hitachi	0.3	7.5
35	Gennum	0.3	7.2
	Others	5.7	124.3
	Total	100.0	2,183.0

Note: Some columns do not add to totals shown because of rounding.  
 Source: Dataquest (May 1991)

**Table 3.4**  
**1990 Japanese Revenue by Company—Monolithic Analog ICs**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Matsushita	10.5	315.7
2	Toshiba	10.3	307.4
3	Sanyo	8.8	264.7
4	NEC	8.5	254.1
5	Sony	8.4	250.5
6	Mitsubishi	8.1	241.8
7	Hitachi	7.2	215.0
8	Rohm	5.8	172.8
9	Texas Instruments	4.6	137.4
10	New Japan Radio	3.5	103.7
11	Fujitsu	3.4	101.0
12	Rockwell	2.7	80.0
13	Sharp	2.3	70.3
14	Motorola	2.0	59.0
15	Analog Devices	1.2	36.6
16	National Semiconductor	1.2	35.4
17	Philips	1.0	29.1
18	Toko	1.0	28.9
19	Burr-Brown	0.9	27.5
20	Silicon Systems	0.7	21.5
21	Oki	0.7	21.0
22	Exar	0.6	18.0
23	SGS-Thomson	0.6	16.6
24	Harris	0.5	15.3
25	AMD	0.5	13.7
26	Maxim	0.4	12.4
27	GEC Plessey	0.3	10.3
28	Mitel	0.3	10.2
29	Seiko Epson	0.3	10.1
30	Linear Technology	0.3	10.0
31	Fuji Electric	0.3	9.1
32	Yamaha	0.2	7.4
33	Precision Monolithics	0.2	7.3
34	KEC	0.2	7.0
35	Brooktree	0.2	7.0
	Others	2.2	66.5
	<b>Total</b>	<b>100.0</b>	<b>2,994.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 3.5**  
**1990 Asia/Pacific-ROW Revenue by Company—Monolithic Analog ICs**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Toshiba	12.4	197.6
2	SGS-Thomson	7.7	121.9
3	Philips	7.3	116.2
4	Sanyo	7.0	110.6
5	National Semiconductor	6.7	106.2
6	Motorola	5.4	86.5
7	Matsushita	5.4	86.1
8	Samsung	5.3	84.6
9	Sony	4.6	72.6
10	Silicon Systems	4.2	66.0
11	NEC	3.7	59.4
12	Mitsubishi	3.0	47.1
13	GEC Plessey	2.5	39.7
14	Rohm	1.8	28.8
15	Telefunken Electronics	1.7	27.8
16	Texas Instruments	1.4	22.9
17	KEC	1.3	21.0
18	New Japan Radio	1.1	17.1
19	Winbond Electronics	1.1	16.9
20	Rockwell	1.0	16.0
21	Goldstar	1.0	15.8
22	Analog Devices	1.0	15.3
23	Siemens	1.0	15.2
24	Harris	0.8	12.8
25	Daewoo Semiconductor	0.7	11.0
26	Hitachi	0.6	10.0
27	Sierra	0.6	9.9
28	AT&T	0.6	9.9
29	Allegro Microsystems	0.6	9.6
30	ITT	0.6	9.3
31	NCR Microelectronics	0.6	9.0
32	Linear Technology	0.5	8.3
33	Cherry Semiconductor	0.5	7.2
34	Unitrode	0.5	7.2
35	Ericsson	0.4	5.8
	Others	5.6	88.9
	<b>Total</b>	<b>100.0</b>	<b>1,590.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

# Revenue by Application Market

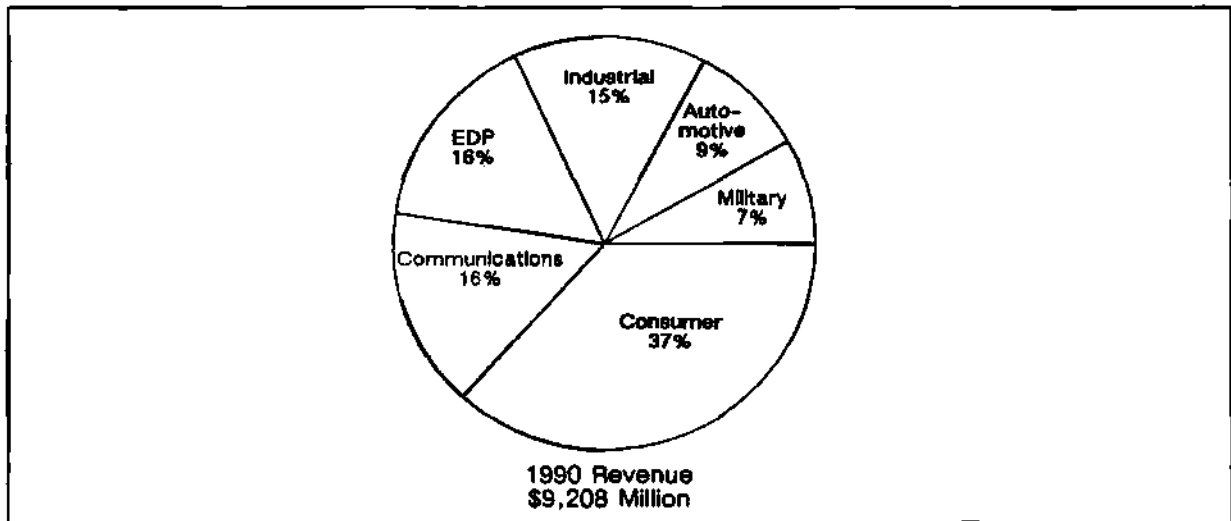
This chapter shows revenue by company for each of the six major application markets served by analog ICs. Figure 4.1 illustrates the relative size of each application market segment within the analog IC market, which is largely dominated by the needs of consumer products.

## Summary by Share of Regional Suppliers

A summary of sales revenue for each application market is shown in Table 4.1. This

revenue is divided among the suppliers, based on the geographic location of their headquarters. To find the percentage of the application market revenue that is generated by companies within a specific region, read across the table. Thus, Japanese vendors have 63 percent of the consumer market, with Europe, North America, and Asia/Pacific-ROW following with 22, 12, and 3 percent, respectively. Tables 4.2 through 4.7 show the supplier market shares for each of the six applications markets.

Figure 4.1  
Monolithic Analog IC Revenue by Application Market



Source: Dataquest (May 1991)

**Table 4.1**  
**Regional Vendors' Share of Application Markets**  
**(Revenue in Millions of Dollars)**

Area of Product Consumption	Revenue	Percentage of Revenue by Home Base of Vendor			
		North America	Europe	Japan	A/P-ROW
Consumer	3,207	12	22	63	3
Automotive	810	48	22	29	1
Industrial	1,390	57	12	28	3
Computer	1,660	57	14	27	2
Communications	1,494	60	27	11	2
Military	647	85	13	-	2
Total	9,208	43	19	35	3

Source: Dataquest (May 1991)

**Table 4.2**  
**1990 Consumer Market Revenue by Company—Monolithic Analog ICs**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Philips	11.2	360.2
2	Sanyo	8.7	280.5
3	Sony	8.5	272.3
4	Matsushita	8.4	270.6
5	Toshiba	7.9	252.5
6	NEC	6.5	207.9
7	Mitsubishi	6.0	191.5
8	Rohm	5.5	177.2
9	SGS-Thomson	4.1	133.0
10	Texas Instruments	3.1	100.8
11	Hitachi	3.0	97.5
12	New Japan Radio	2.9	91.5
13	Siemens	2.9	91.2
14	Motorola	2.3	70.7
15	Telefunken Electronics	1.9	58.9
16	National Semiconductor	1.7	53.1
17	Sharp	1.5	48.1
18	Samsung	1.2	35.9
19	Fujitsu	1.1	34.4
20	ITT	1.0	30.9
21	KEC	0.7	22.1
22	Toko	0.7	22.1
23	GEC Plessey	0.7	22.1
24	Harris	0.6	17.9
25	Burr-Brown	0.4	13.0
26	Maxim	0.4	12.4
27	Exar	0.4	11.3
28	Gennum	0.3	10.8
29	Daewoo Semiconductor	0.3	10.0
30	Goldstar	0.3	10.0
	Others	6.1	196.8
	<b>Total</b>	<b>100.0</b>	<b>3,207.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 4.3**  
**1990 Automotive Market Revenue by Company—Monolithic Analog ICs**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	National Semiconductor	12.4	100.3
2	SGS-Thomson	12.3	99.7
3	Motorola	10.8	86.5
4	Texas Instruments	8.6	68.7
5	Toshiba	5.5	43.9
6	Hitachi	4.7	37.5
7	Sanyo	4.5	35.6
8	NEC	4.1	33.0
9	Matsushita	4.1	32.8
10	Siemens	3.6	28.5
11	Telefunken Electronics	3.2	25.7
12	Allegro Microsystems	3.0	24.0
13	Cherry Semiconductor	2.9	23.4
14	Mitsubishi	2.4	18.8
15	Harris	2.2	17.9
16	Gould Semiconductor	1.7	13.8
17	Philips	1.5	11.6
18	Rohm	1.4	11.1
19	Mietec	1.0	7.9
20	Fujitsu	1.0	7.8
21	Etar	0.9	7.5
22	NCR Microelectronics	0.8	6.3
23	Honeywell	0.6	5.0
24	Fuji Electric	0.6	5.0
25	Samsung	0.6	4.6
26	Linear Technology	0.5	4.2
27	Sensym Corporation	0.5	3.6
28	Maxim	0.4	3.1
29	Analog Devices	0.4	3.1
30	Silicon General	0.4	3.0
	Others	4.5	36.3
	<b>Total</b>	<b>100.0</b>	<b>810.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 4.4**  
**1990 Industrial Market Revenue by Company—Monolithic Analog ICs**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	National Semiconductor	10.2	141.6
2	Analog Devices	8.8	122.0
3	Toshiba	7.5	104.3
4	Texas Instruments	6.6	91.6
5	Motorola	5.1	70.7
6	Philips	4.2	58.1
7	Mitsubishi	4.1	56.5
8	Harris	3.7	51.0
9	SGS-Thomson	3.6	49.9
10	NEC	3.3	46.2
11	Precision Monolithics	2.9	41.0
12	Burr-Brown	2.9	40.5
13	Sony	2.6	36.3
14	Siemens	2.6	36.1
15	Hitachi	2.5	35.0
16	Maxim	2.2	31.0
17	Linear Technology	2.1	29.1
18	Sanyo	2.0	27.7
19	AT&T	2.0	27.6
20	Samsung	1.9	26.7
21	Exar	1.9	26.3
22	New Japan Radio	1.5	22.0
23	Fujitsu	1.6	21.1
24	Matsushita	1.5	20.5
25	Rohm	1.3	17.7
26	Siliconix	1.2	16.2
27	Allegro Microsystems	1.0	14.4
28	Sharp	0.9	14.1
29	Tektronix	0.9	14.0
30	Teledyne Components	0.9	13.3
	Others	6.3	87.8
	Total	100.0	1,390.0

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)



**Table 4.5**  
**1990 Computer/Office Automation Market Revenue by Company—Monolithic**  
**Analog ICs**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Silicon Systems	8.0	132.0
2	Toshiba	7.3	120.8
3	National Semiconductor	7.1	118.0
4	Texas Instruments	6.9	114.5
5	SGS-Thomson	6.7	110.8
6	Matsushita	4.5	73.8
7	Motorola	4.3	70.7
8	Analog Devices	3.9	64.1
9	Brooktree	3.8	63.0
10	GEC Plessey	3.6	58.8
11	Hitachi	3.5	57.5
12	AT&T	3.0	49.3
13	Philips	2.8	46.5
14	Mitsubishi	2.7	44.0
15	Sanyo	2.6	43.5
16	Sony	2.2	36.3
17	Harris	2.0	33.2
18	Fujitsu	1.9	32.2
19	Micro Linear	1.9	31.5
20	VTC	1.8	29.7
21	NEC	1.6	26.4
22	Sierra	1.5	24.7
23	Unitrode	1.4	23.2
24	Allegro Microsystems	1.4	23.0
25	Linear Technology	1.3	20.8
26	Samsung	1.1	17.5
27	NCR Microelectronics	0.9	15.6
28	Burr-Brown	0.9	15.4
29	Rockwell	0.9	14.4
30	Int'l Micro Products	0.7	10.8
	Others	8.3	138.4
	<b>Total</b>	<b>100.0</b>	<b>1,660.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 4.6**  
**1990 Communications Market Revenue by Company—Monolithic Analog ICs**  
 (Millions of Dollars)

Rank	Company	Percent Share	Sales
1	Rockwell	9.7	145.6
2	SGS-Thomson	9.6	144.0
3	AT&T	7.4	110.3
4	National Semiconductor	5.9	88.5
5	Philips	4.7	69.7
6	Motorola	4.5	66.8
7	Harris	4.4	66.3
8	AMD	4.3	64.6
9	ITT	4.1	61.8
10	Mietec	3.4	50.4
11	Ericsson	3.1	45.6
12	Siemens	2.3	34.2
13	Texas Instruments	2.1	32.1
14	Sierra	2.0	30.1
15	Silicon Systems	2.0	29.7
16	GEC Plessey	2.0	29.4
17	Mitel	1.9	27.9
18	Toshiba	1.8	27.5
19	Hitachi	1.5	22.5
20	Analog Devices	1.2	18.3
21	Sony	1.2	18.2
22	Oki	1.2	17.9
23	NEC	1.1	16.5
24	California Micro Devices	1.1	16.0
25	Fujitsu	1.0	15.5
26	Exar	1.0	15.0
27	Allegro Microsystems	1.0	14.4
28	Linear Technology	0.8	12.5
29	Matsushita	0.8	12.3
30	Rohm	0.7	11.1
	Others	12.0	179.5
	<b>Total</b>	<b>100.0</b>	<b>1,494.0</b>

Note: Some columns do not add to totals shown because of rounding.  
 Source: Dataquest (May 1991)

**Table 4.7**  
**1990 Military Market Revenue by Company—Monolithic Analog ICS**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Analog Devices	14.1	91.5
2	National Semiconductor	13.7	88.5
3	Harris	10.6	68.9
4	Texas Instruments	7.8	50.4
5	Philips	5.4	34.9
6	Precision Monolithics	5.3	34.6
7	GEC Plessey	4.5	29.4
8	Motorola	4.3	27.5
9	Kulite Semiconductor	3.9	25.2
10	Siliconix	3.2	20.5
11	SGS-Thomson	2.6	16.6
12	Linear Technology	2.6	16.6
13	Silicon General	2.6	16.5
14	Exar	1.7	11.3
15	Allegro Microsystems	1.6	10.6
16	Tektronix	1.6	10.5
17	AT&T	1.5	9.9
18	Raytheon Semiconductor	1.4	9.0
19	Burr-Brown	1.3	8.1
20	Micro Power Systems	1.1	7.2
21	Unitrode	0.9	5.6
22	TRW	0.8	5.2
23	Hughes	0.6	4.2
24	Holt Integrated Circuits	0.6	3.9
25	Elantec	0.6	3.6
26	Maxim	0.5	3.1
27	Comlinear	0.4	2.8
28	Signal Processing Tech.	0.3	2.3
29	Honeywell	0.3	2.0
30	Austrian Mikro Systeme	0.3	1.8
	Others	2.8	25.2
	<b>Total</b>	<b>100.0</b>	<b>647.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

## *Hybrid Analog IC Overview*

Dataquest's measure of the hybrid IC market is limited to analog hybrid ICs supplied by semiconductor manufacturers. Hybrid ICs represent another means of shipping analog chips that would otherwise not be counted if we focused only on monolithic IC sales. Dataquest's hybrid IC data are not intended to be a picture of the total hybrid market, which is an approximately \$2.9 billion merchant market (about \$6.5 billion, including captives).

Hybrid ICs comprise several different product types. About 22 percent are amplifiers and 20 percent data converters. The remaining 58 percent include power ICs, along with a wide range of precision and high-speed analog functions. Many of the hybrids are special consumer or automotive products. This consumer orientation is why the Japanese market is disproportionately large, as shown in Table 5.1. Sanken is an example of a semiconductor company that sells no analog ICs but has very large sales of analog hybrids for consumer audio products.

Table 5.2 lists the market share for analog hybrid IC suppliers that are also semiconductor manufacturers. Table 5.3 shows the total combined analog revenue from both monolithic and hybrid ICs.

**Table 5.1**  
**1988 Worldwide Hybrid ICs by Region**  
**(Millions of Dollars)**

	Revenue	Percent
North America	222	16
Japan	810	60
Europe	139	10
Asia/Pacific-ROW	192	14
Total	1,363	100

Source: Dataquest (May 1991)

**Table 5.2**  
**Analog Hybrid ICs 1990 Worldwide Market Share**  
**(Semiconductor Suppliers Only)**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Sanken	12.0	164.0
2	Sanyo	10.7	146.0
3	Mitsubishi	9.3	127.0
4	Motorola	7.2	98.0
5	Hitachi	7.1	97.0
6	NEC	6.4	87.0
7	Philips	5.3	72.0
8	Burr-Brown	4.7	64.0
9	Rohm	4.5	61.0
10	Toshiba	4.4	60.0
11	Analog Devices	4.0	55.0
12	Fujitsu	4.0	54.0
13	Fuji Electric	2.9	39.0
14	Sony	2.6	36.0
15	Shindengen Electric	2.4	33.0
16	National Semiconductor	2.1	29.0
17	GEC Plessey	1.9	26.0
18	Toko	1.5	20.0
19	Sipex	1.3	18.0
20	Oki	1.0	14.0
21	Mitel	1.0	13.0
22	Unitrode	0.7	10.0
23	Solitron	0.7	9.0
24	Comlinear	0.6	8.0
25	Apex Microtechnology	0.5	6.9
26	Harris	0.4	5.0
27	Telefunken Electronics	0.3	4.0
28	Elantec	0.3	4.0
29	Silicon General	0.2	3.0
30	Maxim	0.2	3.0
	Others	0.3	4.0
	<b>Total</b>	<b>100.0</b>	<b>1,363.0</b>

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

**Table 5.3**  
**Combined Monolithic and Hybrid Analog IC Revenue**  
**1990 Worldwide Market Share**  
**(Semiconductor Suppliers Only)**  
**(Millions of Dollars)**

Rank	Company	Percent Share	Sales
1	Philips	6.2	653.0
2	National Semiconductor	5.9	619.0
3	Toshiba	5.8	609.0
4	SGS-Thomson	5.2	554.0
5	Sanyo	5.1	541.0
6	Motorola	4.6	491.0
7	Texas Instruments	4.3	458.0
8	Mitsubishi	4.2	441.0
9	NEC	3.9	417.0
10	Matsushita	3.9	410.0
11	Sony	3.8	399.0
12	Analog Devices	3.4	360.0
13	Hitachi	3.3	347.0
14	Rohm	2.7	282.5
15	Harris	2.5	260.0
16	AT&T	1.9	197.0
17	Siemens	1.8	190.0
18	GEC Plessey	1.6	173.0
19	Fujitsu	1.6	165.0
20	Silicon Systems	1.6	165.0
21	Sanken	1.6	164.0
22	Rockwell	1.5	160.0
23	Burr-Brown	1.4	145.0
24	New Japan Radio	1.2	122.0
25	Telefunken Electronics	1.1	111.0
26	ITT	1.0	103.0
27	Allegro Microsystems	0.9	96.0
28	Samsung	0.9	92.0
29	Precision Monolithics	0.9	91.0
30	Linear Technology	0.8	83.0
31	AMD	0.7	76.0
32	Exar	0.7	75.0
33	Sharp	0.7	74.0
34	Mietec	0.7	72.0
35	Brooktree	0.7	70.0
	Others	12.4	1,305.5
	Total	100.0	10,571.0

Note: Some columns do not add to totals shown because of rounding.  
Source: Dataquest (May 1991)

# Dataquest

## *Dataquest Research and Sales Offices:*

**Dataquest Incorporated**  
1290 Ridder Park Drive  
San Jose, California 95131-2398  
Phone: (408) 437-8000  
Telex: 171973  
Fax: (408) 437-0292

**Technology Products Group**  
Phone: (800) 624-3280

**Dataquest Incorporated**  
**Ledgeway/Dataquest**  
The Corporate Center  
550 Cochituate Road  
Framingham, MA 01701  
Phone: (508) 370-5555  
Fax: (508) 370-6262

**Dataquest Incorporated**  
**Invitational Computer Conferences Division**  
3151 Airway Avenue, C-2  
Costa Mesa, California 92626  
Phone: (714) 957-0171  
Telex: 5101002189 ICCDQ  
Fax: (714) 957-0903

**Dataquest Australia**  
Suite 1, Century Plaza  
80 Berry Street  
North Sydney, NSW 2060  
Australia  
Phone: (02) 959 4544  
Telex: 25468  
Fax: (02) 929 0635

**Dataquest GmbH**  
Kronstadter Strasse 9  
8000 Munich 80  
West Germany  
Phone: 011 49 89 93 09 09 0  
Fax: 49 89 930 3277

**Dataquest Europe Limited**  
Roussel House, Broadwater Park  
Denham, Uxbridge, Middx UB9 5HP  
England  
Phone: 0895-835050  
Telex: 266195  
Fax: 0895 835260/1/2

**Dataquest Europe SA**  
Tour Galliéni 2  
36, avenue du Général-de-Gaulle  
93175 Bagnolet Cedex  
France  
Phone: (1) 48 97 31 00  
Telex: 233 263  
Fax: (1) 48 97 34 00

**Dataquest Hong Kong**  
Rm. 401, Connaught Comm. Bldg.  
185 Wanchai Rd.  
Wanchai, Hong Kong  
Phone: 8387336  
Telex: 80587  
Fax: 5722375

**Dataquest Israel**  
59 Mishmar Ha'yarden Street  
Tel Aviv, Israel 69865  
or  
P.O. Box 18198  
Tel Aviv, Israel  
Phone: 52 913937  
Telex: 341118  
Fax: 52 32865

**Dataquest Japan Limited**  
Shinkawa Sanko Building  
1-3-17 Shinkawa, Chuo-ku  
Tokyo 104 Japan  
Phone: (03) 5566-0411  
Fax: (03) 5566-0425

**Dataquest Korea**  
Daeheung Bldg. 1105  
648-23 Yeoksam-dong  
Kangnam-gu  
Seoul, Korea 135  
Phone: (02) 556-4166  
Fax: (02) 552-2661

**Dataquest Singapore**  
4012 Ang Mo Kio Industrial Park 1  
Ave. 10, #03-10 to #03-12  
Singapore 2056  
Phone: 4597181  
Telex: 38257  
Fax: 4563129

**Dataquest Taiwan**  
Room 801/8th Floor  
Ever Spring Building  
147, Sect. 2, Chien Kuo N. Rd.  
Taipei, Taiwan R.O.C. 104  
Phone: (02) 501-7960  
Telex: 27459  
Fax: (02) 505-4265

**Dataquest West Germany**  
In der Schneithohl 17  
6242 Kronberg 2  
West Germany  
Phone: 06173/61685  
Telex: 418089  
Fax: 06173/67901

**Final Worldwide Semiconductor  
Market Share**

**June 29, 1992**

**Source:  
Dataquest**

**Market Statistics**

**Semiconductors *Worldwide*  
Products, Markets, and Technologies**

**SCWW-PMT-MS-9201**

**Dataquest**



# **Final Worldwide Semiconductor Market Share**

**June 29, 1992**

**Source:  
Dataquest**

**Market Statistics**

**Dataquest®**

File behind the *Market Statistics* tab inside the  
binder labeled *Semiconductor Worldwide*

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June 1992

# Final Worldwide Semiconductor Market Share

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Note: All tables show estimated data.

# *The 1991 Semiconductor Industry in Review*

## **Worldwide Semiconductor Industry Review**

Worldwide semiconductor revenue in 1991 was up only 9 percent, the result of the continuation of the protracted recession in the United States as well as the significant political turmoil in Europe. This 9 percent growth rate was an increase over the anemic 1990 rate of 0.4 percent.

The years 1990 and 1991 in the worldwide semiconductor industry have been very slow when compared with the previous 10-year trend (1980 to 1990). Significant events occurring during 1990 and 1991 negatively impacted the industry. Some of these events are as follows:

- Iraq's invasion of Kuwait took more than \$40 billion out of the world electronics and semiconductor industries in 1990 and 1991.
- Defense spending declined with the end of the cold war. The U.S. Department of Defense estimates that 300,000 directly and indirectly related jobs will disappear in 1992 and at least a third of this number disappeared in 1991.
- U.S. business failures were 50 percent higher in 1991 than in 1990.
- Japan's economy slid for most of 1991 and took a large drop in the fourth quarter. Many systems and semiconductor companies have reduced staff and restructured their organizations. Most economists believe that the first half of 1992 will continue to decline, further exacerbating the Japanese electronics industry's already poor financial conditions.
- The Organization of Economic Communities and Development (OECD) posted a decline in GDP growth in 1991, relative to 1990. Current estimates are that the GDP for the OECD countries grew only 0.9 percent in 1991.

In 1991, the U.S.-based semiconductor companies lost worldwide share; however, many of

these companies continued to lead the world in microprocessors and design-intensive ASIC/ASSP chips. This leadership has enabled them to depend less on manufacturing strength vis-a-vis the Japanese companies and to be less vulnerable to price attrition.

Last year, the Japanese continued their dominance of the DRAM industry but lost share to the Koreans. Samsung, largest by far of the Koreans, jumped into the No. 2 position in DRAMs behind Toshiba.

The Europe-based semiconductor companies as a group lost share in the world market as the largest European company, Philips, continued a massive restructuring started in 1990. Siemens and SGS/Thomson also lost share because their product mixes were not in tune with 1991 growth areas.

## **Worldwide Market Share and Product Trends**

Table 1 shows Dataquest's final 1991 market share rankings. NEC still ranks No. 1, followed by Toshiba. Intel became the No. 3 supplier, overtaking Hitachi and Motorola based on its strength in microprocessors. The fourth-largest semiconductor supplier was Motorola, which passed Hitachi. Motorola's growth was fueled by its CMOS gate arrays, microprocessors, and customer-specific microcontroller products. Texas Instruments also changed ranking this year, moving up to No. 6, ahead of Fujitsu. TI's strength came from its applications-specific products and its digital signal processors.

Table 2 shows that MOS micro was the product enjoying the most growth in 1991. The explosive growth of the 386 family drove this category to a level of 23 percent growth over 1990. The category with the least growth was the digital bipolar family of devices, which declined by 13 percent. Even the discrete devices had a better year than digital bipolar, growing by 5 percent. MOS memory also had a sluggish year as a result of excess capacity and sluggish desktop PC sales.

**Table 1**  
**1991 Top 10 Rankings in the Worldwide Semiconductor Market**

Company	(\$M)
1. NEC	4,774
2. Toshiba	4,579
3. Intel	4,019
4. Motorola	3,802
5. Hitachi	3,765
6. Texas Instruments	2,738
7. Fujitsu	2,705
8. Mitsubishi	2,303
9. Matsushita	2,037
10. Philips	2,022

Source: Dataquest (June 1992)

**Table 2**  
**1991 Worldwide Semiconductor Market Summary, Growth and Revenue**

	1991	
	Growth (%)	(\$M)
ICs	10	48,855
MOS Memory	6	12,841
MOS Micro	23	11,774
MOS Logic	15	9,700
Digital Bipolar	-13	3,628
Analog	8	10,912
Discrete	5	8,035
Optoelectronic	16	2,804
Total	9	59,694

Source: Dataquest (June 1992)

## North American Semiconductor Industry Review

For all but a few companies 1991 will be remembered as a year of flat revenue and little profit. Intel and AMD were the noteworthy exceptions. These companies participated in the explosive growth of the X86 products, especially the 386. Intel had an incredible year, with sales in North America rising by 14 percent to \$1,952 million. AMD revenue increased 6 percent in North America to \$547 million, largely because of the success of its Am386DX and Am386SX.

Although the North American market grew by 3 percent, the region lost 1.6 percentage points of worldwide market share to the other

faster-growing regions of the world. This is not too surprising, because it is common knowledge that the manufacturing base in the United States is eroding. In the 1950s, 35 percent of the U.S. work force was employed in manufacturing. In the 1970s, 28 percent was in manufacturing. Today the figure is about 17 percent.

The principal applications driver in North America last year was undoubtedly portable electronics products and workstations. Networking of office PCs also had a hand in this growth. Automotive and military electronics lagged.

The past year saw several major changes in the market structure as well as changes with several major companies. These changes are as follows:

- Intel saw several favorable court rulings, including dismissal of a major portion of the antitrust suit filed by AMD, two decisions preventing patent infringers from using licensed founders to avoid infringement, and dismissal of five separate antitrust suits.
- Motorola formed a massive technology alliance with IBM and Apple to jointly design, manufacture, and market a family of RISC microprocessors called PowerPC.
- Charlie Sporck of National Semiconductor retired after 24 years of service and turned over the President and CEO roles to Gil Amelio.
- The ACE consortium lost considerable ground as several key system players chose different strategic directions than they had planned earlier. Digital Equipment Corporation announced in the first quarter of 1992 its own RISC chip called ALPHA; Compaq withdrew from the consortium in second quarter of 1992; and ACE members Convex and Group Bull left in favor of other RISC alliances.
- Memory cards saw high growth paralleling the growth of palmtop and pen-based computers.
- Three-volt devices were introduced as portable systems grew in popularity.
- Seeq joined the ranks of fabless semiconductor companies, putting its fab in mothballs.

## North American Market Share and Product Trends

The No. 1 North American semiconductor supplier in 1991 was Intel, surpassing Motorola for the first time. Intel had domestic revenue of almost \$2 billion, a growth rate of 14 percent. Motorola's estimated revenue was \$1,883 million, a growth rate of 4 percent.

Intel's X86 architecture is the standard for the principal desktop computing software environment. In 1991 Microsoft (Windows/NT), Sun Microsystems (SunSoft Solaris 2.0), the new Apple/IBM joint venture (Taligent's operating system), and NeXT Inc. (NeXTstep/486) announced that their operating systems will be ported to the Intel architecture. Even though Intel's U.S. business grew 14 percent, its international business exceeded its domestic sales for the first time. Another significant event was Intel's announcement, with IBM, of the formation of the Robert N. Noyce Development Center in Boca Raton, Florida that will design "highly integrated" microprocessors.

Motorola's broad spectrum of product technologies and their ability to produce highly efficient customer solutions enabled the company to expand its customer base in 1991. Motorola is still the world's largest semiconductor supplier to the automotive electronics and industrial markets. It introduced several new products that received wide market acceptance, including 10ns and 12ns, 256Kb, and 1Mb BiCMOS fast static RAMs and the 88204 cache memory management unit. Motorola's 68040 microprocessor also achieved volume production.

Table 3 shows the complete market share ranking for the top 10 companies in the North American market.

Product trends in North America in 1991 were not much different from worldwide trends. Bipolar logic continued its long-term slide, declining 16 percent. MOS microcomponents were the product leader, growing 16 percent, followed by MOS logic. Clearly the PLD growth rate of 32 percent caused MOS logic to have a 7 percent growth. In 1991 we saw a fundamental change in design methodology as electronic manufacturers switched to high-density PLDs in their systems.

MOS memory had a lackluster year because of low desktop sales and price attrition. We estimate that this category grew by only 4 percent. For many companies 1991 was a year for getting positioned for higher growth in 1992, when the United States is expected to crawl out of its recession. Flash memories received much attention because of their non-volatile properties and the growth of memory cards using this technology. In the hotly contested fast static RAM market, Motorola became the highest-ranking North American supplier. Table 4 shows our product market growth estimates.

**Table 3**  
1991 Top 10 Rankings in the North American Semiconductor Market

Company	(\$M)
1. Intel	1,952
2. Motorola	1,883
3. Texas Instruments	1,024
4. Toshiba	934
5. National Semiconductor	765
6. AT&T	607
7. Advanced Micro Devices	547
8. NEC	546
9. Hitachi	518
10. LSI Logic	453

Source: Dataquest (June 1992)

**Table 4**  
1991 North American Semiconductor Market Summary, Growth and Revenue

	1991	
	Growth (%)	(\$M)
ICs	4	15,269
MOS Memory	4	4,510
MOS Micro	16	3,916
MOS Logic	7	2,870
Digital Bipolar	-16	1,331
Analog	0	2,642
Discrete	-14	1,389
Optoelectronic	6	332
Total	3	16,990

Source: Dataquest (June 1992)



## Japanese Semiconductor Industry Review

According to Dataquest's final 1991 semiconductor market share estimates, the Japanese market represented \$22,496 million (¥3,059.4 billion), or 38 percent of the world-wide market. On the basis of a dollar value calculation, the Japanese market grew 11 percent over 1990 (4.9 percent based on yen calculation). The major factors affecting the semiconductor industry's growth were as follows:

- Total manufacturing and housing expenditures had negative growth.
- Capital spending that used to be the driving force maintaining high Japanese economic growth lost momentum.

## Japanese Market Share and Product Trends

On the basis of a supplier's country of origin, North American companies increased their share of the Japanese market to 12.6 percent in 1991, up from 11.8 percent in 1990. This increase in market penetration was due to U.S. pressure on Japanese systems companies to purchase more devices, as called out in the Semiconductor Trade Agreement. The Japanese market decelerated dramatically in the fourth quarter; the deceleration still continues in 1992. Table 5 lists the top 10 semiconductor companies.

The principal market driver last year in Japan was consumer electronics products, especially video cameras. However, as mentioned earlier, the consumer market turned sluggish in the fourth quarter, as did the other markets.

As usual, the top 10 positions in the ranking of suppliers to the Japanese market were all occupied by Japanese companies. In spite of the many market and product dynamics, no change in the ranking was recorded in 1991.

Companies with strong consumer products such as Sony, Rohm, Sharp, and Matsushita had double-digit growth despite the sluggish fourth-quarter consumer market. Companies with strong computer and industrial products such as Hitachi and Fujitsu did not fare as

well. Table 6 shows equipment growth by categories.

Consumer electronic equipment production led total Japanese electronic equipment production. In particular, video cameras, air conditioners, and DAD players were the leading products in the market. Japanese video camera production exported to Europe grew in 1991. As a whole, Japanese electronic equipment had healthy growth in the first and second quarters, but declined in the third and fourth quarters.

Switching our attention to the semiconductor markets, we saw continuation of price erosion in the memory market, which started in 1989. This resulted from the slow PC market and oversupply of 4Mb DRAMs (1Mbx1). Because many Japanese semiconductor manufacturers are heavily dependent on the memory

**Table 5**  
1991 Top 10 Rankings in the Japanese Semiconductor Market

Company	(\$M)
1. NEC	3,479
2. Hitachi	2,566
3. Toshiba	2,436
4. Fujitsu	1,975
5. Matsushita	1,717
6. Mitsubishi	1,512
7. Sharp	1,070
8. Sanyo	974
9. Sony	946
10. Rohm	760

Source: Dataquest (June 1992)

**Table 6**  
1991 Equipment Growth in Japan, by Category

Category	Growth (%)
Data Processing	3.6
Communication	1.5
Industrial	2.7
Consumer	7.0
Transportation	-0.4
Total	3.9

Source: Dataquest (June 1992)

products for their revenue, which were very soft, several Japanese companies lost market share.

MOS memory sales of \$4,228 million reflected growth of only 1.0 percent, with DRAMs and SRAMs declining by 2 percent and 3 percent, respectively. Nonvolatile memories grew 9.4 percent, in part because of the large and growing video game market. MOS microcontrollers, ASICs, and optoelectronic products also had high growth rates because of the strong consumer market in the first half.

## European Semiconductor Industry Review

The European semiconductor market increased from \$10,415 million in 1990 to \$11,014 million in 1991, a 6 percent increase in dollars. However, strengthening European currencies meant that the actual annual growth rate when measured in European currency units (ECUs) was 8.8 percent.

## European Market Share and Product Trends

While the big three Europeans continued to hold the top spots, the headlines went to Intel, which grew its European sales by 23 percent through a substantial increase in microprocessor revenue as the PC migrated from lower-priced 80286s to the more expensive 80386s, and the 80486 established itself.

Because Intel controls 60 percent of the European microprocessor market, it is easy to understand why last year microprocessor was the strongest market in Europe, and indeed worldwide. It should be noted, however, that Intel was not alone. Not surprisingly, AMD more than doubled its European microprocessors sales. Table 7 shows the top 10 semiconductor rankings.

A review of the behavior of various semiconductor product and applications markets last year provides a valuable guide to the reason behind a company's performance. With the consumer market plagued with inventory problems, and the industrial market depressed by prevailing economic conditions, the discrete, microcontroller, and analog

**Table 7**  
1991 Top 10 Rankings in the European Semiconductor Market

Company	(\$M)
1. Philips	1,144
2. Siemens	970
3. SGS-Thomson	855
4. Motorola	776
5. Intel	765
6. Texas Instruments	632
7. Toshiba	441
8. NEC	405
9. National Semiconductor	400
10. Advanced Micro Devices	294

Source: Dataquest (June 1992)

markets achieved very little growth, as reflected in the flat sales performances of Philips, SGS-Thomson, Motorola, and National Semiconductor.

There were a few bright spots in the EDP segment, but overall a slowing PC market and continued restructuring among the big customers in Europe led to slow demand. This resulted in continued price erosion, particularly in memories, as reflected in the sales of Siemens, Texas Instruments, Toshiba, and NEC, which rely on memories for a significant proportion of their revenue.

Major industry events in and about Europe last year included the following:

- The extension of an IBM and Siemens relationship over DRAM, as the companies agreed to cooperate over manufacturing and marketing IBM's 16Mb DRAM.
- The growing reality of how bankrupt the Eastern European states are. This led to a rapid reduction of interest from electronics and semiconductor companies in investment and marketing into the region.
- Fujitsu and TI each completed large 4Mb DRAM fabs, while NEC and Motorola upgraded existing facilities in order to increase local DRAM production. Intel began construction of a \$600 million fab project in Ireland, intended to produce state-of-the-art processors by 1994.

Table 8 shows our product market growth estimates.

**Table 8**  
1991 European Semiconductor Market Summary,  
Growth and Revenue

	1991	
	Growth (%)	(\$M)
ICs	7	8,701
MOS Memory	4	2,129
MOS Micro	16	2,082
MOS Logic	20	1,642
Digital Bipolar	-14	486
Analog	2	2,362
Discrete	-4	1,828
Optoelectronic	20	485
Total	6	11,014

Source: Dataquest (June 1992)

## Asia/Pacific-Rest of World Semiconductor Industry Review

The results of Dataquest's worldwide semiconductor vendor market share survey indicate that the Asia/Pacific-Rest of World market expanded by 25 percent in 1991 over the previous year and grew to \$9,194 billion.

## Asia/Pacific-ROW Market Share and Product Trends

In 1991, North American companies competed very successfully and increased market share from 36.6 percent in 1990 to 37.8 in 1991. The less numerous Asia/Pacific companies have made impressive strides in market share, growing from 15.8 percent in 1990 to 17.4 in 1991. European companies have faced severe competition and have been less successful in responding to the Asia/Pacific market forces.

The top-ranking company in the region was Intel, which grew an incredible 75 percent. This high growth was attributed to the explosive growth of microprocessor sales. The No. 2 supplier was Toshiba, which had an excellent year with growth of 31 percent. Because of its fast-growing sales of DRAMs, Samsung grew 14 percent. But this was not good enough in 1991, as it slipped to the No. 3 position. Motorola recorded sales of \$651 million, which landed it in fourth place.

Philips had sales of \$406 million and came in fifth in this region. Table 9 shows the top 10 ranking and our revenue estimates.

During the past two years, the MOS micro-component product family has replaced MOS memory as the key growth driver and in 1991 it was the largest revenue producer. Also, while memory growth and prices have had wild swings over the last three years, MOS micros have been holding relatively stable but at a very high level. For example, MOS memory's growth from 1987 to 1990 has been 136.2 percent, 168.4 percent, negative 1.9 percent, and 26.8 percent, respectively. MOS micros' growth was 57 percent in 1990 and 55 percent in 1991. Overall the market grew by only 26 percent. Table 10 shows our estimates for the products in this region.

**Table 9**  
1991 Top 10 Rankings in the Asia/Pacific-ROW  
Semiconductor Market

Company	(\$M)
1. Intel	832
2. Toshiba	768
3. Samsung	713
4. Motorola	651
5. Philips	406
6. Hitachi	405
7. Texas Instruments	352
8. NEC	344
9. Sanyo	317
10. National Semiconductor	291

Source: Dataquest (June 1992)

**Table 10**  
1991 Asia/Pacific-ROW Semiconductor Market  
Summary, Growth and Revenue

	1991	
	Growth (%)	(\$M)
ICs	28	7,608
MOS Memory	27	1,974
MOS Micro	54	2,197
MOS Logic	25	1,114
Digital Bipolar	-7	369
Analog	18	1,954
Discrete	16	1,386
Optoelectronic	0	200
Total	25	9,194

Source: Dataquest (June 1992)

# Final Worldwide Semiconductor Market Share

## Introduction

This document contains detailed information on Dataquest's view of the semiconductor market. Included in this document are the following:

- 1989-1991 market share estimates
- 1989-1991 market share rankings

Analyses of market share by company provide insight into high-technology markets and reinforce estimates of consumption, production, and company revenue.

Worldwide market share estimates combine data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. market consumption or revenue are based on the average exchange rate for the given year. Refer to the section entitled "Exchange Rates" for more information regarding these average rates. As a rule, Dataquest's estimates are calculated in local currencies and then converted to U.S. dollars.

More detailed data on this market may be requested through Dataquest's client inquiry service. Qualitative analysis of these data is provided in the *Dataquest Perspectives* located in the binder of the same name.

## Segmentation

This section outlines the market segments that are specific to this document. Dataquest's objective is to provide data along lines of segmentation that are logical, appropriate to the industry in question, and immediately useful to clients.

For a detailed explanation of Dataquest's market segmentation, refer to the *Dataquest Research and Forecast Methodology* document located in the Dataquest binder. For a complete listing of all market segments tracked by Dataquest, please refer to the *Dataquest High-Technology Guide: Segmentation and Glossary*.

Dataquest defines the semiconductor industry as the group of competing companies primarily engaged in manufacturing semiconductors and related solid-state devices. Important products of the semiconductor industry include integrated circuits, discrete devices, and optoelectronic devices.

For market share purposes, Dataquest defines the semiconductor market according to the following functional segmentation scheme:

Total Semiconductor  
Total Integrated Circuit  
  Bipolar Digital IC  
    Bipolar Digital Memory  
    Bipolar Digital Microcomponent  
    Bipolar Digital Logic  
  MOS Digital IC  
    MOS Digital Memory  
    MOS Digital Microcomponent  
    MOS Digital Logic  
Analog IC  
  Monolithic Analog  
  Hybrid Analog  
Discrete Semiconductor  
Optoelectronic Semiconductor

## Definitions

This section lists the definitions that are used by Dataquest to present the data in this document. Complete definitions for all terms associated with Dataquest's segmentation of the high-technology marketplace can be found in the *Dataquest High-Technology Guide: Segmentation and Glossary*.

## Product Definitions

Total Semiconductor (Total IC + Discrete + Optoelectronic). Any active semiconductor product that contains semiconducting material (such as silicon, germanium, or gallium arsenide) and reacts dynamically to an input signal, either by modifying its shape or adding energy to it. This definition excludes stand-alone passive components, such as capacitors, resistors, inductors, oscillators, crystals, transformers, and relays.

**Total Integrated Circuit (Bipolar Digital IC + MOS Digital IC + Monolithic Analog + Hybrid Analog).** An IC is defined as a large number of passive and/or active discrete semiconductor circuits integrated into a single package. A monolithic IC is one in which discrete circuits are integrated onto a single dice, while a hybrid IC is one in which discrete circuits are integrated onto a small number of die.

**Bipolar Digital IC (Bipolar Digital Memory + Bipolar Digital Microcomponent + Bipolar Digital Logic).** A bipolar digital IC is defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, 100 percent of the die area is manufactured using bipolar semiconductor technology. A digital function is one in which data carrying signals vary in discrete values.

**Bipolar Digital Memory.** Defined as a bipolar digital semiconductor product in which binary data are stored and electronically retrieved. Includes ECL random-access memory (RAM), read-only memory (ROM), programmable ROM (PROM), last-in/first-out (LIFO) memory, first-in/first-out (FIFO) memory.

**Bipolar Digital Microcomponent.** Defined as a bipolar digital semiconductor product that contains a data processing unit or serves as an interface to such a unit. Includes both complex-instruction-set computing (CISC) and reduced-instruction-set computing (RISC) processor architectures. Includes bipolar digital microprocessor (MPU), bipolar digital microcontroller (MCU), and bipolar digital microperipheral (MPR), where applicable.

**Bipolar Digital Logic (Bipolar Application-Specific IC + Bipolar Digital Standard Logic + Other Bipolar Logic).** Defined as a bipolar digital semiconductor product in which more than 50 percent of the die area performs logic functions. Excludes bipolar digital microcomponent ICs.

**MOS Digital IC (MOS Digital Memory + MOS Digital Microcomponent + MOS Digital Logic).** Defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, where any portion of the die area is manufactured using metal oxide semiconductor (MOS) technology.

A digital function is one in which data carrying signals vary in discrete values. Includes mixed technology manufacturing, such as BiMOS and BiCMOS, where there is some MOS technology employed.

**MOS Digital Memory IC (DRAM + SRAM + EPROM + Other Nonvolatile MOS Digital Memory + Other MOS Digital Memory).** Defined as a MOS digital IC in which binary data are stored and electronically retrieved.

**MOS Digital Microcomponent (MOS Digital Microprocessor + MOS Digital Microcontroller + MOS Digital Microperipheral).** Defined as a MOS digital IC that contains a data processing unit or serves as an interface to such a unit. Includes both CISC and RISC.

**MOS Digital Logic (MOS Digital Application-Specific IC + MOS Digital Standard Logic + Other MOS Logic).** Defined as a MOS digital semiconductor product in which more than 50 percent of the die area performs logic functions. Excludes MOS digital microcomponent ICs.

**Analog IC (Monolithic Analog + Hybrid Analog).**

**Monolithic Analog.** A monolithic analog IC is a semiconductor product associated with electrical signal processing, power control, or electrical drive capability. Some of its inputs or outputs can be defined in terms of continuously or linearly variable voltages, currents, or frequencies. Includes all monolithic analog ICs manufactured using bipolar, MOS, or BiCMOS technologies. A monolithic IC is a single dice contained in a single package.

**Hybrid Analog.** A hybrid analog IC is a semiconductor product that consists of more than one dice contained in a single package. A hybrid IC may perform 100 percent linear, 100 percent digital, or mixed-signal (both linear and digital) functions. Note that hybrid digital ICs are reported in this category, and not under monolithic digital ICs. Includes all hybrid ICs manufactured using bipolar, MOS, or BiCMOS technologies. Only those hybrids are included that are made in the division or other organization whose primary product is semiconductors. Several major manufacturers also manufacture hybrids in other divisions; where we have identified these manufacturers, they are excluded.

Total Discrete (Transistor + Diode + Thyristor + Other Discrete). Defined as a unit building block performing a fundamental semiconductor function.

Total Optoelectronic (LED Lamp/Display + Optocoupler + CCD + Laser Diode + Photosensor + Solar Cell). Defined as a semiconductor product in which photons induce the flow of electrons, or vice versa. Other functions may also be integrated into the product. This category does not include LCD, incandescent displays, fluorescent displays, cathode ray tubes (CRTs), or plasma displays.

Merchant versus Captive Consumption. Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. The data exclude completely captive suppliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

### Regional Definitions

North America: Includes United States and Canada

Europe: Western Europe

Japan: Japan

Asia-Pacific/Rest of World: All other countries

### Line Item Definitions

Factory revenue is defined as the amount of money received by a semiconductor vendor for its goods. Revenue from the sale of semiconductors sold either as finished goods, die, or wafers to another semiconductor vendor for resale is attributed to the semiconductor vendor that sells the product to a distributor or equipment manufacturer.

### Market Share Methodology

Dataquest utilizes both primary and secondary sources to produce market statistics data. In the fourth quarter of each year, Dataquest surveys all major participants within each industry. Selected companies are resurveyed during

the first quarter of the following year to verify final annual results. This primary research is supplemented with additional primary research and secondary research to verify market size, shipment totals, and pricing information. Sources of secondary data utilized by Dataquest include:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and CD-ROM data banks
- Articles in both the general and trade press
- Reports from financial analysts
- End-user surveys

Dataquest believes that the estimates presented in this document are the most accurate and meaningful statistics available.

Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Dataquest and those provided by other suppliers.

### Notes on Market Share

In the process of conducting data collection and preparing market statistics information, Dataquest will sometimes consolidate or revise the numbers of a particular company, model, series, or industry. In this section, any such changes contained within this document are outlined for your reference.

### Notes to Market Share Tables

1. AAB-HAFO was formerly known as ASEA Brown Boveri.
2. ABB-IXYS was formerly the Germany-based power semiconductor division of ASEA Brown Boveri.
3. Allegro MicroSystems was formerly known as Sprague Technologies.
4. Analog Devices revenue includes Precision Monolithics revenue from 1991 forward.
5. Appian Technology was formerly known as ZyMOS.
6. In 1989, AT&T revenue previously classified as MOS Logic was reclassified as Analog.
7. Ericsson was known as Rifa prior to March 1, 1988.
8. GEC Plessey revenue includes MEDL and Plessey revenue from 1990 forward.
9. Harris revenue includes GE Solid State revenue from 1989 forward.
10. Inmos revenue is included in SGS-Thomson revenue from 1989 forward.
11. Macronix revenue is included under Asia/Pacific Companies from 1989 forward.
12. Other North American Companies and Other Asia/Pacific Companies revenue has been restated to reflect the fewer number of companies published in 1991.
13. Philips revenue includes Signetics revenue.
14. Vertex (formerly known as Integrated CMOS Systems) revenue is included in Toshiba revenue from 1991 forward.

### Exchange Rates

Dataquest uses an average annual exchange rate in converting revenue to U.S. dollar amounts. The following outlines these rates for 1989 through 1991.

	1989	1990	1991
Japan (Yen/U.S.\$)	138	144	136
France (Franc/U.S.\$)	6.39	5.44	5.64
Germany (Deutsche Mark/U.S.\$)	1.88	1.62	1.66
United Kingdom (U.S.\$/Pound Sterling)	1.50	1.79	1.77

## Section 1: Final 1991 Worldwide Semiconductor Market Share

Table 1-1

Each Company's Factory Revenue from Shipments of Semiconductors to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	54,339	54,545	59,694	100.0	100.0	100.0
North American Companies	19,515	21,047	22,940	35.9	38.6	38.4
Actel	7	21	37	.0	.0	.1
Advanced Micro Devices	1,100	1,053	1,226	2.0	1.9	2.1
Allegro MicroSystems	137	116	104	.3	.2	.2
Altera	59	78	107	.1	.1	.2
Analog Devices	357	381	464	.7	.7	.8
Appian Technology	37	50	15	.1	.1	.0
Applied Micro Circuits Corp.	22	28	38	.0	.1	.1
AT&T	753	737	713	1.4	1.4	1.2
Atmel	94	123	120	.2	.2	.2
Brooktree	52	70	84	.1	.1	.1
Burr-Brown	141	145	152	.3	.3	.3
Catalyst	31	36	32	.1	.1	.1
Cherry Semiconductor	32	36	37	.1	.1	.1
Chips & Technologies	240	265	181	.4	.5	.3
Cirrus Logic	29	130	152	.1	.2	.3
Comlinear	10	13	14	.0	.0	.0
Crystal	12	15	22	.0	.0	.0
Cypress Semiconductor	196	223	281	.4	.4	.5
Dallas Semiconductor	13	17	75	.0	.0	.1
Elantec	12	13	16	.0	.0	.0
Exar	49	75	107	.1	.1	.2
General Instrument	170	214	200	.3	.4	.3
Gennum	20	18	23	.0	.0	.0
Gould AMI	68	52	54	.1	.1	.1
Harris	830	800	623	1.5	1.5	1.0
Hewlett Packard	235	445	442	.4	.8	.7
Honeywell	56	49	45	.1	.1	.1
Hughes	37	44	40	.1	.1	.1
IMI	15	15	17	.0	.0	.0
Integrated Device Technology	204	199	204	.4	.4	.3
Intel	2,430	3,171	4,019	4.5	5.8	6.7
Int'l Microelectronic Prod.	46	40	32	.1	.1	.1
International Rectifier	190	225	238	.3	.4	.4
ITT	390	371	340	.7	.7	.6
Kulite	25	28	26	.0	.1	.0

(Continued)



Table 1-1 (Continued)

Each Company's Factory Revenue from Shipments of Semiconductors to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Lattice	31	62	68	.1	.1	.1
Linear Technology	70	83	107	.1	.2	.2
LSI Logic	512	598	670	.9	1.1	1.1
Maxim	43	65	80	.1	.1	.1
Microchip Technology	124	85	81	.2	.2	.1
Micro Linear	28	45	36	.1	.1	.1
Micron Technology	395	286	455	.7	.5	.8
Micro Power Systems	21	24	26	.0	.0	.0
Microsemi	NA	50	71	NA	.1	.1
Mitel	54	47	50	.1	.1	.1
MOSel	20	31	75	.0	.1	.1
Motorola	3,183	3,539	3,802	5.9	6.5	6.4
NCR	120	145	145	.2	.3	.2
National Semiconductor	1,552	1,653	1,602	2.9	3.0	2.7
Optek	77	66	52	.1	.1	.1
Performance Semiconductor	32	51	54	.1	.1	.1
Powerex	85	92	78	.2	.2	.1
Precision Monolithics	88	91	0	.2	.2	.0
Quality Technologies	38	34	34	.1	.1	.1
Raytheon	96	84	85	.2	.2	.1
Rockwell	165	200	185	.3	.4	.3
SEEQ Technology	53	45	47	.1	.1	.1
Semtech	NA	18	27	NA	.0	.0
Sierra Semiconductor	55	61	86	.1	.1	.1
Silicon General	36	36	32	.1	.1	.1
Siliconix	121	116	140	.2	.2	.2
Silicon Systems	112	165	184	.2	.3	.3
Sipex	22	21	21	.0	.0	.0
Solitron	37	33	30	.1	.1	.1
Standard Microsystems	42	49	45	.1	.1	.1
Supertex	23	27	27	.0	.0	.0
Tektronix	NA	40	70	NA	.1	.1
Teledyne	23	25	24	.0	.0	.0
Texas Instruments	2,787	2,574	2,738	5.1	4.7	4.6
TRW	27	28	28	.0	.1	.0
Unitrode	109	104	80	.2	.2	.1
Universal	13	14	14	.0	.0	.0
Vitellic	66	64	85	.1	.1	.1
VLSI Technology	286	324	414	.5	.6	.7
VTC	44	40	20	.1	.1	.0

(Continued)

Table 1-1 (Continued)

Each Company's Factory Revenue from Shipments of Semiconductors to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
WaferScale Integration	35	33	33	.1	.1	.1
Weitek	49	58	39	.1	.1	.1
Western Digital	135	148	209	.2	.3	.4
Xicor	90	71	94	.2	.1	.2
Xilinx	44	84	130	.1	.2	.2
Zilog	99	100	110	.2	.2	.2
Other North American Companies	374	142	177	.6	.3	.3
Japanese Companies	27,510	25,278	27,684	50.6	46.3	46.4
Fuji Electric	310	319	319	.6	.6	.5
Fujitsu	2,770	2,599	2,705	5.1	4.8	4.5
Hitachi	3,622	3,516	3,765	6.7	6.4	6.3
Matsushita	1,804	1,826	2,037	3.3	3.3	3.4
Mitsubishi	2,500	2,108	2,303	4.6	3.9	3.9
NEC	4,489	4,322	4,774	8.3	7.9	8.0
New JRC	171	140	151	.3	.3	.3
NMB Semiconductor	127	96	60	.2	.2	.1
Oki	1,083	954	981	2.0	1.7	1.6
Ricoh	84	89	97	.2	.2	.2
Rohm	723	759	934	1.3	1.4	1.6
Sanken	381	399	451	.7	.7	.8
Sanyo	1,197	1,196	1,362	2.2	2.2	2.3
Seiko Epson	359	196	220	.7	.4	.4
Sharp	1,107	1,194	1,318	2.0	2.2	2.2
Shindengen Electric	163	159	184	.3	.3	.3
Sony	996	1,010	1,196	1.8	1.9	2.0
Toko	50	60	64	.1	.1	.1
Toshiba	4,310	4,202	4,579	7.9	7.7	7.7
Yamaha	133	134	158	.2	.2	.3
Other Japanese Companies	1,131	0	26	2.1	.0	.0
European Companies	5,300	6,108	6,336	9.8	11.2	10.6
ABB-HAFO	37	42	38	.1	.1	.1
ABB-IXYS	50	58	54	.1	.1	.1
Austria Mikro Systeme	56	59	70	.1	.1	.1
Ericsson	54	56	74	.1	.1	.1
Eupec	NA	96	93	NA	.2	.2
European Silicon Structures	18	27	28	.0	.0	.0
Eurosil	30	39	29	.1	.1	.0
Fagor	29	30	29	.1	.1	.0

(Continued)

Table 1-1 (Continued)

Each Company's Factory Revenue from Shipments of Semiconductors to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
GEC Plessey	0	390	392	.0	.7	.7
Matra MHS	85	100	104	.2	.2	.2
MEDL	60	0	0	.1	.0	.0
Mietec	52	92	105	.1	.2	.2
Philips	1,643	1,955	2,022	3.0	3.6	3.4
Plessey	240	0	0	.4	.0	.0
Semikron	95	106	108	.2	.2	.2
SGS-Thomson	1,271	1,441	1,436	2.3	2.6	2.4
Siemens	1,154	1,204	1,263	2.1	2.2	2.1
STC	19	24	18	.0	.0	.0
TAG	22	25	30	.0	.0	.1
Telefunken Electronic	299	295	300	.6	.5	.5
TMS	45	45	51	.1	.1	.1
Zetex	NA	24	26	NA	.0	.0
Other European Companies	41	0	66	.1	.0	.1
Asia/Pacific Companies	2,014	2,112	2,734	3.7	3.9	4.6
Daewoo	10	12	20	.0	.0	.0
Dongsung Semiconductor	NA	NA	30	NA	NA	.1
Goldstar	148	163	307	.3	.3	.5
Hualon Microelectronics Corp.	NA	50	71	NA	.1	.1
Hyundai	210	115	248	.4	.2	.4
Korean Electronic Co.	105	114	136	.2	.2	.2
Macronix	31	7	31	.1	.0	.1
Samsung	1,260	1,315	1,473	2.3	2.4	2.5
Silicon Integrated Systems	NA	33	28	NA	.1	.0
United Microelectronics	210	150	200	.4	.3	.3
Winbond Electronics	NA	50	84	NA	.1	.1
Other Asia/Pacific Companies	40	103	106	.1	.2	.2

NA = Not available

Source: Dataquest (June 1992)

Table 1-2

Each Company's Factory Revenue from Shipments of Integrated Circuits to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	44,613	44,459	48,855	100.0	100.0	100.0
North American Companies	17,000	18,450	20,572	38.1	41.5	42.1
Actel	7	21	37	.0	.0	.1
Advanced Micro Devices	1,100	1,053	1,226	2.5	2.4	2.5
Allegro MicroSystems	114	98	93	.3	.2	.2
Altera	59	78	107	.1	.2	.2
Analog Devices	357	380	464	.8	.9	.9
Appian Technology	37	50	15	.1	.1	.0
Applied Micro Circuits Corp.	22	28	38	.0	.1	.1
AT&T	596	593	681	1.3	1.3	1.4
Atmel	94	123	120	.2	.3	.2
Brooktree	52	70	84	.1	.2	.2
Burr-Brown	141	145	152	.3	.3	.3
Catalyst	31	36	32	.1	.1	.1
Cherry Semiconductor	32	36	37	.1	.1	.1
Chips & Technologies	240	265	181	.5	.6	.4
Cirrus Logic	29	130	152	.1	.3	.3
Comlinear	10	13	14	.0	.0	.0
Crystal	12	15	22	.0	.0	.0
Cypress Semiconductor	196	223	281	.4	.5	.6
Dallas Semiconductor	13	17	75	.0	.0	.2
Elantec	12	13	16	.0	.0	.0
Exar	49	75	107	.1	.2	.2
Gennum	20	18	23	.0	.0	.0
Gould AMI	68	52	54	.2	.1	.1
Harris	692	655	507	1.6	1.5	1.0
Hewlett Packard	NA	200	206	NA	.4	.4
Honeywell	25	24	20	.1	.1	.0
Hughes	37	42	40	.1	.1	.1
IMI	15	15	17	.0	.0	.0
Integrated Device Technology	204	199	204	.5	.4	.4
Intel	2,430	3,171	4,019	5.4	7.1	8.2
Int'l Microelectronic Prod.	46	40	32	.1	.1	.1
International Rectifier	3	1	1	.0	.0	.0
ITT	235	210	230	.5	.5	.5
Kulite	25	28	26	.1	.1	.1
Lattice	31	62	68	.1	.1	.1
Linear Technology	70	83	107	.2	.2	.2
LSI Logic	512	598	670	1.1	1.3	1.4

(Continued)

Table 1-2 (Continued)

Each Company's Factory Revenue from Shipments of Integrated Circuits to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Maxim	43	65	80	.1	.1	.2
Microchip Technology	124	85	81	.3	.2	.2
Micro Linear	28	45	36	.1	.1	.1
Micron Technology	395	286	455	.9	.6	.9
Micro Power Systems	21	24	26	.0	.1	.1
Mitel	54	47	50	.1	.1	.1
MOSel	20	31	75	.0	.1	.2
Motorola	2,392	2,714	2,980	5.4	6.1	6.1
NCR	120	145	145	.3	.3	.3
National Semiconductor	1,482	1,583	1,542	3.3	3.6	3.2
Performance Semiconductor	32	51	54	.1	.1	.1
Precision Monolithics	88	91	0	.2	.2	.0
Raytheon	82	74	77	.2	.2	.2
Rockwell	165	200	185	.4	.4	.4
SEEQ Technology	53	45	47	.1	.1	.1
Semtech	NA	2	6	NA	.0	.0
Sierra Semiconductor	55	61	86	.1	.1	.2
Silicon General	36 <sup>a</sup>	36	32	.1	.1	.1
Siliconix	54	54	64	.1	.1	.1
Silicon Systems	112	165	184	.3	.4	.4
Sipex	22	21	21	.0	.0	.0
Solitron	10	9	9	.0	.0	.0
Standard Microsystems	42	49	45	.1	.1	.1
Supertex	15	19	17	.0	.0	.0
Tektronix	NA	35	65	NA	.1	.1
Teledyne	23	22	21	.1	.0	.0
Texas Instruments	2,691	2,488	2,652	6.0	5.6	5.4
TRW	27	28	28	.1	.1	.1
Unitrode	50	50	41	.1	.1	.1
Universal	13	14	14	.0	.0	.0
Vitelc	66	64	85	.1	.1	.2
VLSI Technology	286	324	414	.6	.7	.8
VTC	44	40	20	.1	.1	.0
WaferScale Integration	35	33	33	.1	.1	.1
Weitek	49	57	39	.1	.1	.1
Western Digital	135	148	209	.3	.3	.4
Xicor	90	71	94	.2	.2	.2
Xilinx	44	84	130	.1	.2	.3
Zilog	99	100	110	.2	.2	.2
Other North American Companies	287	130	162	.6	.3	.3

(Continued)

Table 1-2 (Continued)

Each Company's Factory Revenue from Shipments of Integrated Circuits to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Japanese Companies	22,001	19,801	21,396	49.3	44.5	43.8
Fuji Electric	66	70	55	.1	.2	.1
Fujitsu	2,563	2,384	2,426	5.7	5.4	5.0
Hitachi	2,966	2,878	3,099	6.6	6.5	6.3
Matsushita	1,203	1,206	1,340	2.7	2.7	2.7
Mitsubishi	2,136	1,768	1,953	4.8	4.0	4.0
NEC	3,893	3,735	4,109	8.7	8.4	8.4
New JRC	154	123	134	.3	.3	.3
NMB Semiconductor	127	96	60	.3	.2	.1
Oki	1,044	917	942	2.3	2.1	1.9
Ricoh	84	89	97	.2	.2	.2
Rohm	333	343	438	.7	.8	.9
Sanken	153	159	171	.3	.4	.4
Sanyo	862	850	919	1.9	1.9	1.9
Seiko Epson	359	196	220	.8	.4	.5
Sharp	815	891	956	1.8	2.0	2.0
Shindengen Electric	33	26	50	.1	.1	.1
Sony	679	699	826	1.5	1.6	1.7
Toko	45	54	33	.1	.1	.1
Toshiba	3,329	3,183	3,409	7.5	7.2	7.0
Yamaha	133	134	158	.3	.3	.3
Other Japanese Companies	1,024	0	1	2.3	.0	.0
European Companies	3,772	4,302	4,414	8.5	9.7	9.0
ABB-HAFO	23	24	24	.1	.1	.0
Austria Mikro Systeme	56	59	70	.1	.1	.1
Ericsson	54	56	74	.1	.1	.2
European Silicon Structures	18	27	28	.0	.1	.1
Eurosil	30	39	29	.1	.1	.1
GEC Plessey	0	354	357	.0	.8	.7
Matra MHS	85	100	104	.2	.2	.2
MEDL	39	0	0	.1	.0	.0
Mietec	52	92	105	.1	.2	.2
Philips	1,177	1,417	1,455	2.6	3.2	3.0
Plessey	240	0	0	.5	.0	.0
SGS-Thomson	989	1,126	1,137	2.2	2.5	2.3
Siemens	807	817	829	1.8	1.8	1.7
STC	17	22	16	.0	.0	.0
Telefunken Electronic	126	141	137	.3	.3	.3

(Continued)

Table 1-2 (Continued)

Each Company's Factory Revenue from Shipments of Integrated Circuits to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
TMS	33	28	33	.1	.1	.1
Other European Companies	26	0	16	.1	.0	.0
Asia/Pacific Companies	1,840	1,906	2,473	4.1	4.3	5.1
Daewoo	10	12	20	.0	.0	.0
Goldstar	147	163	307	.3	.4	.6
Hualon Microelectronics Corp.	NA	50	71	NA	.1	.1
Hyundai	210	115	248	.5	.3	.5
Korean Electronic Co.	24	28	33	.1	.1	.1
Macronix	31	7	31	.1	.0	.1
Samsung	1,182	1,238	1,381	2.6	2.8	2.8
Silicon Integrated Systems	NA	33	28	NA	.1	.1
United Microelectronics	210	150	200	.5	.3	.4
Winbond Electronics	NA	50	84	NA	.1	.2
Other Asia/Pacific Companies	26	60	70	.1	.1	.1

NA = Not available

Source: Dataquest (June 1992)

**Table 1-3**  
**Each Company's Factory Revenue from Shipments of Bipolar Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	4,314	4,173	3,628	100.0	100.0	100.0
North American Companies	2,204	2,134	1,806	51.1	51.1	49.8
Advanced Micro Devices	474	407	300	11.0	9.8	8.3
Applied Micro Circuits Corp.	20	24	32	.5	.6	.9
AT&T	56	59	48	1.3	1.4	1.3
Atmel	8	14	1	.2	.3	.0
Chips & Technologies	24	25	16	.6	.6	.4
Harris	50	60	35	1.2	1.4	1.0
Integrated Device Technology	0	0	3	.0	.0	.1
Intel	10	5	4	.2	.1	.1
Motorola	369	406	380	8.6	9.7	10.5
National Semiconductor	441	405	324	10.2	9.7	8.9
Raytheon	55	54	53	1.3	1.3	1.5
Teledyne	3	3	3	.1	.1	.1
Texas Instruments	671	663	583	15.6	15.9	16.1
TRW	7	8	7	.2	.2	.2
Other North American Companies	16	1	17	.4	.0	.5
Japanese Companies	1,612	1,627	1,454	37.4	39.0	40.1
Fujitsu	590	634	509	13.7	15.2	14.0
Hitachi	447	452	461	10.4	10.8	12.7
Matsushita	13	12	13	.3	.3	.4
Mitsubishi	122	92	81	2.8	2.2	2.2
NEC	245	240	244	5.7	5.8	6.7
New JRC	1	1	1	.0	.0	.0
Oki	46	41	39	1.1	1.0	1.1
Rohm	1	1	0	.0	.0	.0
Sanyo	56	59	0	1.3	1.4	.0
Sony	0	0	1	.0	.0	.0
Toshiba	91	95	105	2.1	2.3	2.9
European Companies	466	386	346	10.8	9.2	9.5
GEC Plessey	0	66	41	.0	1.6	1.1
Philips	270	250	245	6.3	6.0	6.8
Plessey	122	0	0	2.8	.0	.0
SGS-Thomson	7	9	1	.2	.2	.0
Siemens	54	43	41	1.3	1.0	1.1
STC	4	11	7	.1	.3	.2

(Continued)



Table 1-3 (Continued)

Each Company's Factory Revenue from Shipments of Bipolar Digital ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Telefunken Electronic	5	7	7	.1	.2	.2
Other European Companies	4	0	4	.1	.0	.1
Asia/Pacific Companies	32	26	22	.7	.6	.6
Goldstar	32	26	22	.7	.6	.6

Source: Dataquest (June 1992)

**Table 1-4**  
**Each Company's Factory Revenue from Shipments of TTL/Other Bipolar Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	3,204	2,968	2,543	100.0	100.0	100.0
North American Companies	1,777	1,653	1,449	55.5	55.7	57.0
Advanced Micro Devices	401	306	294	12.5	10.3	11.6
AT&T	44	46	29	1.4	1.5	1.1
Chips & Technologies	24	25	16	.7	.8	.6
Harris	50	60	35	1.6	2.0	1.4
Intel	10	5	4	.3	.2	.2
Motorola	184	174	156	5.7	5.9	6.1
National Semiconductor	343	319	271	10.7	10.7	10.7
Raytheon	47	52	50	1.5	1.8	2.0
Teledyne	3	3	3	.1	.1	.1
Texas Instruments	671	663	583	20.9	22.3	22.9
Other North American Companies	0	0	8	.0	.0	.3
Japanese Companies	1,028	1,005	812	32.1	33.9	31.9
Fujitsu	252	272	201	7.9	9.2	7.9
Hitachi	308	308	250	9.6	10.4	9.8
Matsushita	9	8	8	.3	.3	.3
Mitsubishi	122	92	81	3.8	3.1	3.2
NEC	163	160	161	5.1	5.4	6.3
New JRC	1	1	1	.0	.0	.0
Oki	41	37	35	1.3	1.2	1.4
Rohm	1	1	0	.0	.0	.0
Sanyo	56	59	0	1.7	2.0	.0
Toshiba	75	67	75	2.3	2.3	2.9
European Companies	367	284	260	11.5	9.6	10.2
GEC Plessey	0	20	5	.0	.7	.2
Philips	254	236	229	7.9	8.0	9.0
Plessey	82	0	0	2.6	.0	.0
SGS-Thomson	7	9	1	.2	.3	.0
Siemens	16	12	14	.5	.4	.6
Telefunken Electronic	5	7	7	.2	.2	.3
Other European Companies	3	0	4	.1	.0	.2
Asia/Pacific Companies	32	26	22	1.0	.9	.9
Goldstar	32	26	22	1.0	.9	.9

Source: Dataquest (June 1992)

Table 1-5

Each Company's Factory Revenue from Shipments of ECL Bipolar Digital ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	1,110	1,205	1,085	100.0	100.0	100.0
North American Companies	427	481	357	38.5	39.9	32.9
Advanced Micro Devices	73	101	6	6.6	8.4	.6
Applied Micro Circuits Corp.	20	24	32	1.8	2.0	2.9
AT&T	12	13	19	1.1	1.1	1.8
Atmel	8	14	1	.7	1.2	.1
Integrated Device Technology	0	0	3	.0	.0	.3
Motorola	185	232	224	16.7	19.3	20.6
National Semiconductor	98	86	53	8.8	7.1	4.9
Raytheon	8	2	3	.7	.2	.3
TRW	7	8	7	.6	.7	.6
Other North American Companies	16	1	9	1.4	.1	.8
Japanese Companies	584	622	642	52.6	51.6	59.2
Fujitsu	338	362	308	30.5	30.0	28.4
Hitachi	139	144	211	12.5	12.0	19.4
Matsushita	4	4	5	.4	.3	.5
NEC	82	80	83	7.4	6.6	7.6
Oki	5	4	4	.5	.3	.4
Sony	0	0	1	.0	.0	.1
Toshiba	16	28	30	1.4	2.3	2.8
European Companies	99	102	86	8.9	8.5	7.9
GEC Plessey	0	46	36	.0	3.8	3.3
Philips	16	14	16	1.4	1.2	1.5
Plessey	40	0	0	3.6	.0	.0
Siemens	38	31	27	3.4	2.6	2.5
STC	4	11	7	.4	.9	.6
Other European Companies	1	0	0	.1	.0	.0

Source: Dataquest (June 1992)

Table 1-6

Each Company's Factory Revenue from Shipments of Bipolar Memory ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	460	431	356	100.0	100.0	100.0
North American Companies	160	126	89	34.8	29.2	25.0
Advanced Micro Devices	85	65	52	18.5	15.1	14.6
Harris	0	5	2	.0	1.2	.6
Integrated Device Technology	0	0	3	.0	.0	.8
Motorola	4	3	3	.9	.7	.8
National Semiconductor	49	25	13	10.7	5.8	3.7
Raytheon	12	18	8	2.6	4.2	2.2
Texas Instruments	10	10	3	2.2	2.3	.8
Other North American Companies	0	0	5	.0	.0	1.4
Japanese Companies	253	259	231	55.0	60.1	64.9
Fujitsu	135	144	113	29.3	33.4	31.7
Hitachi	97	95	99	21.1	22.0	27.8
NEC	21	20	19	4.6	4.6	5.3
European Companies	47	46	36	10.2	10.7	10.1
Philips	47	45	36	10.2	10.4	10.1
SGS-Thomson	0	1	0	.0	.2	.0

Source: Dataquest (June 1992)

**Table 1-7**  
**Each Company's Factory Revenue from Shipments of Bipolar Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	3,854	3,633	3,179	100.0	100.0	100.0
North American Companies	2,044	1,900	1,624	53.0	52.3	51.1
Advanced Micro Devices	389	302	227	10.1	8.3	7.1
Applied Micro Circuits Corp.	20	24	32	.5	.7	1.0
AT&T	56	59	48	1.5	1.6	1.5
Atmel	8	14	1	.2	.4	.0
Chips & Technologies	24	25	16	.6	.7	.5
Harris	50	55	33	1.3	1.5	1.0
Intel	10	5	4	.3	.1	.1
Motorola	365	403	377	9.5	11.1	11.9
National Semiconductor	392	313	256	10.2	8.6	8.1
Raytheon	43	36	45	1.1	1.0	1.4
Teledyne	3	3	3	.1	.1	.1
Texas Instruments	661	653	570	17.2	18.0	17.9
TRW	7	8	7	.2	.2	.2
Other North American Companies	16	0	5	.4	.0	.2
Japanese Companies	1,359	1,368	1,223	35.3	37.7	38.5
Fujitsu	455	490	396	11.8	13.5	12.5
Hitachi	350	357	362	9.1	9.8	11.4
Matsushita	13	12	13	.3	.3	.4
Mitsubishi	122	92	81	3.2	2.5	2.5
NEC	224	220	225	5.8	6.1	7.1
New JRC	1	1	1	.0	.0	.0
Oki	46	41	39	1.2	1.1	1.2
Rohm	1	1	0	.0	.0	.0
Sanyo	56	59	0	1.5	1.6	.0
Sony	0	0	1	.0	.0	.0
Toshiba	91	95	105	2.4	2.6	3.3
European Companies	419	339	310	10.9	9.3	9.8
GEC Plessey	0	66	41	.0	1.8	1.3
Philips	223	204	209	5.8	5.6	6.6
Plessey	122	0	0	3.2	.0	.0
SGS-Thomson	7	8	1	.2	.2	.0
Siemens	54	43	41	1.4	1.2	1.3
STC	4	11	7	.1	.3	.2
Telefunken Electronic	5	7	7	.1	.2	.2
Other European Companies	4	0	4	.1	.0	.1

(Continued)

Table 1-7 (Continued)

Each Company's Factory Revenue from Shipments of Bipolar Logic ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Asia/Pacific Companies	32	26	22	.8	.7	.7
Goldstar	32	26	22	.8	.7	.7

Source: Dataquest (June 1992)

**Table 1-8**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	31,140	30,152	34,315	100.0	100.0	100.0
North American Companies	10,940	12,030	14,377	35.1	39.9	41.9
Actel	7	21	37	.0	.1	.1
Advanced Micro Devices	549	570	832	1.8	1.9	2.4
Allegro MicroSystems	16	2	2	.1	.0	.0
Altera	59	78	107	.2	.3	.3
Analog Devices	20	20	20	.1	.1	.1
Appian Technology	37	50	15	.1	.2	.0
Applied Micro Circuits Corp.	2	4	6	.0	.0	.0
AT&T	291	337	391	.9	1.1	1.1
Amel	73	98	118	.2	.3	.3
Catalyst	31	35	32	.1	.1	.1
Chips & Technologies	216	240	165	.7	.8	.5
Cirrus Logic	29	129	151	.1	.4	.4
Cypress Semiconductor	196	223	281	.6	.7	.8
Dallas Semiconductor	10	14	62	.0	.0	.2
Exar	3	0	0	.0	.0	.0
Gould AMI	52	39	40	.2	.1	.1
Harris	362	335	246	1.2	1.1	.7
Hewlett Packard	NA	200	206	NA	.7	.6
Honeywell	4	4	0	.0	.0	.0
Hughes	37	34	32	.1	.1	.1
IMI	15	14	14	.0	.0	.0
Integrated Device Technology	203	196	198	.7	.7	.6
Intel	2,420	3,157	4,006	7.8	10.5	11.7
Int'l Microelectronic Prod.	33	28	26	.1	.1	.1
ITT	185	107	195	.6	.4	.6
Lattice	31	62	68	.1	.2	.2
LSI Logic	512	596	670	1.6	2.0	2.0
Microchip Technology	124	85	81	.4	.3	.2
Micron Technology	395	286	455	1.3	.9	1.3
MOSeI	20	31	75	.1	.1	.2
Motorola	1,587	1,826	2,144	5.1	6.1	6.2
NCR	94	115	117	.3	.4	.3
National Semiconductor	513	585	589	1.6	1.9	1.7
Performance Semiconductor	32	51	54	.1	.2	.2
Rockwell	42	40	20	.1	.1	.1
SEEQ Technology	53	45	39	.2	.1	.1
Sierra Semiconductor	27	6	7	.1	.0	.0

(Continued)

Table 1-8 (Continued)

Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Standard Microsystems	42	49	45	.1	.2	.1
Supertex	0	6	5	.0	.0	.0
Texas Instruments	1,603	1,367	1,630	5.1	4.5	4.8
TRW	5	6	7	.0	.0	.0
Universal	9	10	10	.0	.0	.0
Vitellic	66	64	85	.2	.2	.2
VLSI Technology	286	324	414	.9	1.1	1.2
VTC	17	7	0	.1	.0	.0
WaferScale Integration	35	33	33	.1	.1	.1
Weitek	49	57	39	.2	.2	.1
Western Digital	135	148	209	.4	.5	.6
Xicor	87	68	91	.3	.2	.3
Xilinx	44	84	130	.1	.3	.4
Zilog	99	100	110	.3	.3	.3
Other North American Companies	183	44	68	.6	.1	.2
Japanese Companies	16,535	14,389	15,615	53.1	47.7	45.5
Fuji Electric	26	25	24	.1	.1	.1
Fujitsu	1,822	1,602	1,738	5.9	5.3	5.1
Hitachi	2,210	2,113	2,280	7.1	7.0	6.6
Matsushita	832	798	915	2.7	2.6	2.7
Mitsubishi	1,628	1,263	1,395	5.2	4.2	4.1
NEC	3,271	3,118	3,443	10.5	10.3	10.0
New JRC	34	8	11	.1	.0	.0
NMB Semiconductor	127	96	60	.4	.3	.2
Oki	966	845	871	3.1	2.8	2.5
Ricoh	84	89	91	.3	.3	.3
Rohm	59	69	97	.2	.2	.3
Sanyo	339	324	320	1.1	1.1	.9
Seiko Epson	345	185	208	1.1	.6	.6
Sharp	756	826	890	2.4	2.7	2.6
Sony	346	348	431	1.1	1.2	1.3
Toshiba	2,729	2,553	2,692	8.8	8.5	7.8
Yamaha	121	127	148	.4	.4	.4
Other Japanese Companies	840	0	1	2.7	.0	.0
European Companies	2,028	2,082	2,130	6.5	6.9	6.2
ABB-HAFO	23	24	24	.1	.1	.1
Austria Mikro Systeme	47	37	39	.2	.1	.1
Ericsson	7	8	16	.0	.0	.0

(Continued)



Table 1-8 (Continued)

Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
European Silicon Structures	18	27	28	.1	.1	.1
Eurosil	30	39	22	.1	.1	.1
GEC Plessey	0	115	131	.0	.4	.4
Matra MHS	85	96	99	.3	.3	.3
MEDL	35	0	0	.1	.0	.0
Mietec	52	20	22	.2	.1	.1
Philips	385	514	546	1.2	1.7	1.6
Plessey	83	0	0	.3	.0	.0
SGS-Thomson	589	563	558	1.9	1.9	1.6
Siemens	601	592	607	1.9	2.0	1.8
STC	8	5	4	.0	.0	.0
Telefunken Electronic	20	23	12	.1	.1	.0
TMS	26	19	22	.1	.1	.1
Other European Companies	19	0	0	.1	.0	.0
<b>Asia/Pacific Companies</b>	<b>1,637</b>	<b>1,651</b>	<b>2,193</b>	<b>5.3</b>	<b>5.5</b>	<b>6.4</b>
Daewoo	0	1	6	.0	.0	.0
Goldstar	106	117	273	.3	.4	.8
Hualon Microelectronics Corp.	NA	49	70	NA	.2	.2
Hyundai	210	115	248	.7	.4	.7
Macronix	31	7	31	.1	.0	.1
Samsung	1,066	1,146	1,269	3.4	3.8	3.7
Silicon Integrated Systems	NA	33	28	NA	.1	.1
United Microelectronics	210	150	200	.7	.5	.6
Winbond Electronics	NA	32	68	NA	.1	.2
Other Asia/Pacific Companies	14	1	0	.0	.0	.0

NA = Not available

Source: Dataquest (June 1992)

Table 1-9

Each Company's Factory Revenue from Shipments of N/PMOS Digital ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	9,663	6,547	6,005	100.0	100.0	100.0
North American Companies	3,634	2,233	1,860	37.6	34.1	31.0
Advanced Micro Devices	327	252	158	3.4	3.8	2.6
Allegro MicroSystems	4	0	0	.0	.0	.0
AT&T	39	48	40	.4	.7	.7
Gould AMI	32	7	0	.3	.1	.0
Harris	13	2	0	.1	.0	.0
Hughes	1	1	1	.0	.0	.0
Intel	1,276	1,104	1,180	13.2	16.9	19.7
Int'l Microelectronic Prod.	6	4	4	.1	.1	.1
ITT	80	43	70	.8	.7	1.2
Microchip Technology	55	24	18	.6	.4	.3
Micron Technology	298	71	0	3.1	1.1	.0
Motorola	197	66	152	2.0	1.0	2.5
NCR	14	9	1	.1	.1	.0
National Semiconductor	54	68	37	.6	1.0	.6
Rockwell	42	40	20	.4	.6	.3
SEEQ Technology	11	5	4	.1	.1	.1
Standard Microsystems	10	9	5	.1	.1	.1
Texas Instruments	1,048	371	99	10.8	5.7	1.6
Xicor	68	53	36	.7	.8	.6
Zilog	55	56	35	.6	.9	.6
Other North American Companies	4	0	0	.0	.0	.0
Japanese Companies	4,846	3,616	3,492	50.2	55.2	58.2
Fujitsu	377	330	320	3.9	5.0	5.3
Hitachi	446	426	437	4.6	6.5	7.3
Matsushita	324	290	304	3.4	4.4	5.1
Mitsubishi	870	623	603	9.0	9.5	10.0
NEC	948	841	729	9.8	12.8	12.1
Oki	319	208	189	3.3	3.2	3.1
Ricoh	34	32	29	.4	.5	.5
Rohm	1	2	2	.0	.0	.0
Sanyo	74	28	16	.8	.4	.3
Sharp	193	209	230	2.0	3.2	3.8
Sony	49	37	41	.5	.6	.7
Toshiba	811	590	592	8.4	9.0	9.9
Yamaha	1	0	0	.0	.0	.0
Other Japanese Companies	399	0	0	4.1	.0	.0

(Continued)

**Table 1-9 (Continued)**  
**Each Company's Factory Revenue from Shipments of N/PMOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
European Companies	627	593	569	6.5	9.1	9.5
Austria Mikro Systeme	11	11	17	.1	.2	.3
GEC Plessey	0	15	11	.0	.2	.2
Mietec	7	7	3	.1	.1	.0
Philips	93	94	106	1.0	1.4	1.8
Plessey	12	0	0	.1	.0	.0
SGS-Thomson	228	204	183	2.4	3.1	3.0
Siemens	242	235	233	2.5	3.6	3.9
STC	2	0	0	.0	.0	.0
Telefunken Electronic	20	23	12	.2	.4	.2
TMS	5	4	4	.1	.1	.1
Other European Companies	7	0	0	.1	.0	.0
Asia/Pacific Companies	556	105	84	5.8	1.6	1.4
Goldstar	32	6	2	.3	.1	.0
Hualon Microelectronics Corp.	NA	0	10	NA	.0	.2
Hyundai	1	0	0	.0	.0	.0
Macronix	31	7	0	.3	.1	.0
Samsung	422	42	41	4.4	.6	.7
United Microelectronics	70	50	31	.7	.8	.5

NA = Not available

Source: Dataquest (June 1992)

**Table 1-10**  
**Each Company's Factory Revenue from Shipments of CMOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	20,905	23,179	27,749	10.0	100.0	100.0
North American Companies	7,197	9,694	12,353	34.4	41.8	44.5
Actel	7	21	37	.0	.1	.1
Advanced Micro Devices	222	318	674	1.1	1.4	2.4
Allegro MicroSystems	4	2	2	.0	.0	.0
Altera	59	78	107	.3	.3	.4
Analog Devices	20	20	20	.1	.1	.1
Appian Technology	37	50	15	.2	.2	.1
AT&T	252	289	343	1.2	1.2	1.2
Atmel	73	98	118	.3	.4	.4
Catalyst	31	35	32	.1	.2	.1
Chips & Technologies	216	240	165	1.0	1.0	.6
Cirrus Logic	29	129	151	.1	.6	.5
Cypress Semiconductor	195	222	271	.9	1.0	1.0
Dallas Semiconductor	10	14	62	.0	.1	.2
Exar	3	0	0	.0	.0	.0
Gould AMI	20	32	40	.1	.1	.1
Harris	340	318	231	1.6	1.4	.8
Hewlett Packard	NA	200	206	NA	.9	.7
Honeywell	4	4	0	.0	.0	.0
Hughes	36	33	31	.2	.1	.1
IMI	15	14	14	.1	.1	.1
Integrated Device Technology	202	191	191	1.0	.8	.7
Intel	1,144	2,053	2,826	5.5	8.9	10.2
Int'l Microelectronic Prod.	27	24	22	.1	.1	.1
ITT	105	64	125	.5	.3	.5
Lattice	31	62	68	.1	.3	.2
LSI Logic	507	591	665	2.4	2.5	2.4
Microchip Technology	69	61	63	.3	.3	.2
Micron Technology	97	215	455	.5	.9	1.6
MOSel	20	31	75	.1	.1	.3
Motorola	1,387	1,737	1,954	6.6	7.5	7.0
NCR	80	106	116	.4	.5	.4
National Semiconductor	429	483	501	2.1	2.1	1.8
Performance Semiconductor	32	51	54	.2	.2	.2
SEEQ Technology	42	40	35	.2	.2	.1
Sierra Semiconductor	27	6	7	.1	.0	.0
Standard Microsystems	32	40	40	.2	.2	.1
Supertex	0	6	5	.0	.0	.0

(Continued)

Table 1-10 (Continued)

Each Company's Factory Revenue from Shipments of CMOS Digital ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Texas Instruments	539	980	1,507	2.6	4.2	5.4
TRW	5	6	7	.0	.0	.0
Universal	9	10	10	.0	.0	.0
Vitelc	66	64	85	.3	.3	.3
VLSI Technology	286	324	414	1.4	1.4	1.5
VTC	17	7	0	.1	.0	.0
WaferScale Integration	35	33	33	.2	.1	.1
Weitek	49	57	39	.2	.2	.1
Western Digital	135	148	209	.6	.6	.8
Xicor	19	15	55	.1	.1	.2
Xilinx	44	84	130	.2	.4	.5
Zilog	44	44	75	.2	.2	.3
Other North American Companies	145	44	68	.7	.2	.2
Japanese Companies	11,276	10,467	11,741	53.9	45.2	42.3
Fuji Electric	23	22	22	.1	.1	.1
Fujitsu	1,342	1,182	1,311	6.4	5.1	4.7
Hitachi	1,665	1,591	1,728	8.0	6.9	6.2
Matsushita	508	508	611	2.4	2.2	2.2
Mitsubishi	758	640	792	3.6	2.8	2.9
NEC	2,242	2,188	2,600	10.7	9.4	9.4
New JRC	34	8	11	.2	.0	.0
NMB Semiconductor	127	96	60	.6	.4	.2
Oki	585	613	656	2.8	2.6	2.4
Ricoh	49	56	61	.2	.2	.2
Rohm	58	67	95	.3	.3	.3
Sanyo	265	296	301	1.3	1.3	1.1
Seiko Epson	345	185	208	1.7	.8	.7
Sharp	563	617	660	2.7	2.7	2.4
Sony	297	308	386	1.4	1.3	1.4
Toshiba	1,854	1,963	2,090	8.9	8.5	7.5
Yamaha	120	127	148	.6	.5	.5
Other Japanese Companies	441	0	1	2.1	.0	.0
European Companies	1,365	1,472	1,547	6.5	6.4	5.6
ABB-HAFO	23	24	24	.1	.1	.1
Austria Mikro Systeme	36	26	22	.2	.1	.1
Ericsson	7	8	16	.0	.0	.1
European Silicon Structures	18	27	28	.1	.1	.1
Eurosil	30	39	22	.1	.2	.1

(Continued)

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of CMOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
GEC Plessey	0	100	120	.0	.4	.4
Matra MHS	85	96	99	.4	.4	.4
MEDL	35	0	0	.2	.0	.0
Mietec	22	13	19	.1	.1	.1
Philips	292	420	440	1.4	1.8	1.6
Plessey	71	0	0	.3	.0	.0
SGS-Thomson	351	347	361	1.7	1.5	1.3
Siemens	359	357	374	1.7	1.5	1.3
STC	3	0	4	.0	.0	.0
TMS	21	15	18	.1	.1	.1
Other European Companies	12	0	0	.1	.0	.0
<b>Asia/Pacific Companies</b>	<b>1,067</b>	<b>1,546</b>	<b>2,108</b>	<b>5.1</b>	<b>6.7</b>	<b>7.6</b>
Daewoo	0	1	6	.0	.0	.0
Goldstar	74	111	271	.4	.5	1.0
Hualon Microelectronics Corp.	NA	49	60	NA	.2	.2
Hyundai	209	115	248	1.0	.5	.9
Macronix	0	0	31	.0	.0	.1
Samsung	644	1,104	1,228	3.1	4.8	4.4
Silicon Integrated Systems	NA	33	28	NA	.1	.1
United Microelectronics	140	100	169	.7	.4	.6
Winbond Electronics	NA	32	67	NA	.1	.2
Other Asia/Pacific Companies	0	1	0	.0	.0	.0

NA = Not available

Source: Dataquest (June 1992)

**Table 1-11**  
**Each Company's Factory Revenue from Shipments of BICMOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	572	426	561	100.0	100.0	100.0
North American Companies	109	103	164	19.1	24.2	29.2
Allegro MicroSystems	8	0	0	1.4	.0	.0
Applied Micro Circuits Corp.	2	4	6	.3	.9	1.1
AT&T	0	0	8	.0	.0	1.4
Cypress Semiconductor	1	1	10	.2	.2	1.8
Harris	9	15	15	1.6	3.5	2.7
Integrated Device Technology	1	5	7	.2	1.2	1.2
LSI Logic	5	5	5	.9	1.2	.9
Motorola	3	23	38	.5	5.4	6.8
National Semiconductor	30	34	51	5.2	8.0	9.1
Texas Instruments	16	16	24	2.8	3.8	4.3
Other North American Companies	34	0	0	5.9	.0	.0
Japanese Companies	413	306	382	72.2	71.8	68.1
Fuji Electric	3	3	2	.5	.7	.4
Fujitsu	103	90	107	18.0	21.1	19.1
Hitachi	99	96	115	17.3	22.5	20.5
NEC	81	89	114	14.2	20.9	20.3
Oki	62	24	26	10.8	5.6	4.6
Ricoh	1	1	1	.2	.2	.2
Sanyo	0	0	3	.0	.0	.5
Sony	0	3	4	.0	.7	.7
Toshiba	64	0	10	11.2	.0	1.8
European Companies	36	17	14	6.3	4.0	2.5
Mietec	23	0	0	4.0	.0	.0
SGS-Thomson	10	12	14	1.7	2.8	2.5
STC	3	5	0	.5	1.2	.0
Asia/Pacific Companies	14	0	1	2.4	.0	.2
Winbond Electronics	NA	0	1	NA	.0	.2
Other Asia/Pacific Companies	14	0	0	2.4	.0	.0

NA = Not available

Source: Dataquest (June 1992)

**Table 1-12**  
**Each Company's Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	15,405	12,128	12,841	100.0	100.0	100.0
North American Companies	3,651	2,977	3,298	23.7	24.5	25.7
Advanced Micro Devices	258	253	270	1.7	2.1	2.1
AT&T	13	13	4	.1	.1	.0
Armel	47	54	78	.3	.4	.6
Catalyst	31	35	32	.2	.3	.2
Cypress Semiconductor	149	166	186	1.0	1.4	1.4
Dallas Semiconductor	10	14	21	.1	.1	.2
Gould AMI	25	14	11	.2	.1	.1
Harris	37	24	23	.2	.2	.2
Honeywell	2	2	0	.0	.0	.0
Integrated Device Technology	158	132	128	1.0	1.1	1.0
Intel	433	371	395	2.8	3.1	3.1
Int'l Microelectronic Prod.	17	8	6	.1	.1	.0
ITT	10	0	10	.1	.0	.1
Microchip Technology	94	60	57	.6	.5	.4
Micron Technology	395	286	455	2.6	2.4	3.5
MOSel	20	31	75	.1	.3	.6
Motorola	407	395	412	2.6	3.3	3.2
NCR	8	4	3	.1	.0	.0
National Semiconductor	132	137	112	.9	1.1	.9
Performance Semiconductor	16	19	18	.1	.2	.1
SEEQ Technology	40	33	33	.3	.3	.3
Texas Instruments	1,095	741	738	7.1	6.1	5.7
Vitellic	66	64	85	.4	.5	.7
VLSI Technology	23	8	0	.1	.1	.0
WaferScale Integration	28	27	23	.2	.2	.2
Xicor	87	68	91	.6	.6	.7
Other North American Companies	50	18	32	.3	.1	.2
Japanese Companies	9,678	7,095	7,141	62.8	58.5	55.6
Fujitsu	1,188	913	909	7.7	7.5	7.1
Hitachi	1,396	1,224	1,330	9.1	10.1	10.4
Matsushita	362	265	217	2.3	2.2	1.7
Mitsubishi	1,117	745	762	7.3	6.1	5.9
NEC	1,594	1,233	1,242	10.3	10.2	9.7
NMB Semiconductor	127	96	60	.8	.8	.5
Oki	441	350	380	2.9	2.9	3.0
Ricoh	28	26	8	.2	.2	.1

(Continued)



**Table 1-12 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Rohm	5	13	28	.0	.1	.2
Sanyo	118	86	82	.8	.7	.6
Seiko Epson	137	55	37	.9	.5	.3
Sharp	434	454	476	2.8	3.7	3.7
Sony	215	204	183	1.4	1.7	1.4
Toshiba	1,681	1,431	1,425	10.9	11.8	11.1
Yamaha	0	0	2	.0	.0	.0
Other Japanese Companies	835	0	0	5.4	.0	.0
<b>European Companies</b>	<b>716</b>	<b>731</b>	<b>682</b>	<b>4.6</b>	<b>6.0</b>	<b>5.3</b>
Eurosil	0	0	1	.0	.0	.0
GEC Plessey	0	8	0	.0	.1	.0
Matra MHS	31	37	35	.2	.3	.3
MEDL	7	0	0	.0	.0	.0
Philips	60	96	75	.4	.8	.6
Plessey	3	0	0	.0	.0	.0
SGS-Thomson	239	278	273	1.6	2.3	2.1
Siemens	376	312	298	2.4	2.6	2.3
<b>Asia/Pacific Companies</b>	<b>1,360</b>	<b>1,325</b>	<b>1,720</b>	<b>8.8</b>	<b>10.9</b>	<b>13.4</b>
Goldstar	82	96	249	.5	.8	1.9
Hualon Microelectronics Corp.	NA	39	27	NA	.3	.2
Hyundai	210	115	248	1.4	.9	1.9
Macronix	31	7	31	.2	.1	.2
Samsung	935	971	1,066	6.1	8.0	8.3
Silicon Integrated Systems	NA	17	15	NA	.1	.1
United Microelectronics	102	66	58	.7	.5	.5
Winbond Electronics	NA	14	26	NA	.1	.2

NA = Not available

Source: Dataquest (June 1992)

**Table 1-13**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	7,808	9,584	11,774	100.0	100.0	100.0
North American Companies	4,367	5,743	7,256	55.9	59.9	61.6
Advanced Micro Devices	172	178	395	2.2	1.9	3.4
Analog Devices	20	20	20	.3	.2	.2
Appian Technology	30	38	8	.4	.4	.1
AT&T	21	21	33	.3	.2	.3
Atmel	0	0	2	.0	.0	.0
Chips & Technologies	216	240	165	2.8	2.5	1.4
Cirrus Logic	29	129	151	.4	1.3	1.3
Cypress Semiconductor	11	15	48	.1	.2	.4
Dallas Semiconductor	0	0	41	.0	.0	.3
Harris	115	110	65	1.5	1.1	.6
Hughes	2	2	2	.0	.0	.0
Integrated Device Technology	13	20	20	.2	.2	.2
Intel	1,929	2,726	3,578	24.7	28.4	30.4
ITT	25	28	35	.3	.3	.3
LSI Logic	67	93	115	.9	1.0	1.0
Microchip Technology	18	16	15	.2	.2	.1
Motorola	767	970	1,171	9.8	10.1	9.9
NCR	22	31	39	.3	.3	.3
National Semiconductor	169	242	286	2.2	2.5	2.4
Performance Semiconductor	13	24	28	.2	.3	.2
Rockwell	42	40	20	.5	.4	.2
SEEQ Technology	0	12	6	.0	.1	.1
Sierra Semiconductor	1	1	1	.0	.0	.0
Standard Microsystems	34	40	40	.4	.4	.3
Supertex	0	0	2	.0	.0	.0
Texas Instruments	252	320	419	3.2	3.3	3.6
TRW	5	6	7	.1	.1	.1
VLSI Technology	94	105	165	1.2	1.1	1.4
WaferScale Integration	2	2	7	.0	.0	.1
Weitek	49	57	39	.6	.6	.3
Western Digital	135	148	209	1.7	1.5	1.8
Zilog	99	100	110	1.3	1.0	.9
Other North American Companies	15	9	14	.2	.1	.1
Japanese Companies	2,955	3,236	3,824	37.8	33.8	32.5
Fuji Electric	0	1	1	.0	.0	.0
Fujitsu	197	213	244	2.5	2.2	2.1

(Continued)

Table 1-13 (Continued)

Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Hitachi	505	546	583	6.5	5.7	5.0
Matsushita	218	250	321	2.8	2.6	2.7
Mitsubishi	431	441	543	5.5	4.6	4.6
NEC	841	981	1,149	10.8	10.2	9.8
Oki	142	131	137	1.8	1.4	1.2
Ricoh	21	22	62	.3	.2	.5
Rohm	17	17	23	.2	.2	.2
Sanyo	63	71	69	.8	.7	.6
Seiko Epson	11	10	16	.1	.1	.1
Sharp	104	124	134	1.3	1.3	1.1
Sony	43	43	88	.6	.4	.7
Toshiba	361	386	454	4.6	4.0	3.9
Other Japanese Companies	1	0	0	.0	.0	.0
<b>European Companies</b>	<b>433</b>	<b>538</b>	<b>567</b>	<b>5.5</b>	<b>5.6</b>	<b>4.8</b>
Eurosil	2	4	0	.0	.0	.0
GEC Plessey	0	8	5	.0	.1	.0
Matra MHS	28	33	37	.4	.3	.3
MEDL	3	0	0	.0	.0	.0
Philips	131	192	212	1.7	2.0	1.8
Plessey	3	0	0	.0	.0	.0
SGS-Thomson	161	175	167	2.1	1.8	1.4
Siemens	92	116	134	1.2	1.2	1.1
TMS	13	10	12	.2	.1	.1
<b>Asia/Pacific Companies</b>	<b>53</b>	<b>67</b>	<b>127</b>	<b>.7</b>	<b>.7</b>	<b>1.1</b>
Goldstar	2	3	11	.0	.0	.1
Hualon Microelectronics Corp.	NA	0	9	NA	.0	.1
Samsung	8	22	27	.1	.2	.2
Silicon Integrated Systems	NA	3	4	NA	.0	.0
United Microelectronics	43	39	62	.6	.4	.5
Winbond Electronics	NA	0	14	NA	.0	.1

NA = Not available

Source: Dataquest (June 1992)

Table 1-14

Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	7,927	8,440	9,700	100.0	100.0	100.0
North American Companies	2,922	3,310	3,823	36.9	39.2	39.4
Actel	7	21	37	.1	.2	.4
Advanced Micro Devices	119	139	167	1.5	1.6	1.7
Allegro MicroSystems	16	2	2	.2	.0	.0
Altera	59	78	107	.7	.9	1.1
Appian Technology	7	12	7	.1	.1	.1
Applied Micro Circuits Corp.	2	4	6	.0	.0	.1
AT&T	257	303	354	3.2	3.6	3.6
Atmel	26	44	38	.3	.5	.4
Cypress Semiconductor	36	42	47	.5	.5	.5
Exar	3	0	0	.0	.0	.0
Gould AMI	27	25	29	.3	.3	.3
Harris	210	201	158	2.6	2.4	1.6
Hewlett Packard	NA	200	206	NA	2.4	2.1
Honeywell	2	2	0	.0	.0	.0
Hughes	35	32	30	.4	.4	.3
IMI	15	14	14	.2	.2	.1
Integrated Device Technology	32	44	50	.4	.5	.5
Intel	58	60	33	.7	.7	.3
Int'l Microelectronic Prod.	16	20	20	.2	.2	.2
ITT	150	79	150	1.9	.9	1.5
Lattice	31	62	68	.4	.7	.7
LSI Logic	445	503	555	5.6	6.0	5.7
Microchip Technology	12	9	9	.2	.1	.1
Motorola	413	461	561	5.2	5.5	5.8
NCR	64	80	75	.8	.9	.8
National Semiconductor	212	206	191	2.7	2.4	2.0
Performance Semiconductor	3	8	8	.0	.1	.1
SEEQ Technology	13	0	0	.2	.0	.0
Sierra Semiconductor	26	5	6	.3	.1	.1
Standard Microsystems	8	9	5	.1	.1	.1
Supertex	0	6	3	.0	.1	.0
Texas Instruments	256	306	473	3.2	3.6	4.9
Universal	9	10	10	.1	.1	.1
VLSI Technology	169	211	249	2.1	2.5	2.6
VTC	17	7	0	.2	.1	.0
WaferScale Integration	5	4	3	.1	.0	.0
Xilinx	44	84	130	.6	1.0	1.3
Other North American Companies	118	17	22	1.5	.2	.2

(Continued)

Table 1-14 (Continued)

Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Japanese Companies	3,902	4,058	4,650	49.2	48.1	47.9
Fuji Electric	26	24	23	.3	.3	.2
Fujitsu	437	476	585	5.5	5.6	6.0
Hitachi	309	343	367	3.9	4.1	3.8
Matsushita	252	283	377	3.2	3.4	3.9
Mitsubishi	80	77	90	1.0	.9	.9
NEC	836	904	1,052	10.5	10.7	10.8
New JRC	34	8	11	.4	.1	.1
Oki	383	364	354	4.8	4.3	3.6
Ricoh	35	41	21	.4	.5	.2
Rohm	37	39	46	.5	.5	.5
Sanyo	158	167	169	2.0	2.0	1.7
Seiko Epson	197	120	155	2.5	1.4	1.6
Sharp	218	248	280	2.8	2.9	2.9
Sony	88	101	160	1.1	1.2	1.6
Toshiba	687	736	813	8.7	8.7	8.4
Yamaha	121	127	146	1.5	1.5	1.5
Other Japanese Companies	4	0	1	.1	.0	.0
European Companies	879	813	881	11.1	9.6	9.1
ABB-HAFO	23	24	24	.3	.3	.2
Austria Mikro Systeme	47	37	39	.6	.4	.4
Ericsson	7	8	16	.1	.1	.2
European Silicon Structures	18	27	28	.2	.3	.3
Eurosil	28	35	21	.4	.4	.2
GEC Plessey	0	99	126	.0	1.2	1.3
Matra MHS	26	26	27	.3	.3	.3
MEDL	25	0	0	.3	.0	.0
Mietec	52	20	22	.7	.2	.2
Philips	194	226	259	2.4	2.7	2.7
Plessey	77	0	0	1.0	.0	.0
SGS-Thomson	189	110	118	2.4	1.3	1.2
Siemens	133	164	175	1.7	1.9	1.8
STC	8	5	4	.1	.1	.0
Telefunken Electronic	20	23	12	.3	.3	.1
TMS	13	9	10	.2	.1	.1
Other European Companies	19	0	0	.2	.0	.0

(Continued)

Table 1-14 (Continued)

Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Asia/Pacific Companies	224	259	346	2.8	3.1	3.6
Daewoo	0	1	6	.0	.0	.1
Goldstar	22	18	13	.3	.2	.1
Hualon Microelectronics Corp.	NA	10	34	NA	.1	.4
Samsung	123	153	176	1.6	1.8	1.8
Silicon Integrated Systems	NA	13	9	NA	.2	.1
United Microelectronics	65	45	80	.8	.5	.8
Winbond Electronics	NA	18	28	NA	.2	.3
Other Asia/Pacific Companies	14	1	0	.2	.0	.0

NA = Not available

Source: Dataquest (June 1992)

**Table 1-15**  
**Each Company's Factory Revenue from Shipments of Analog ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	9,159	10,134	10,912	100.0	100.0	100.0
North American Companies	3,856	4,286	4,389	42.1	42.3	40.2
Advanced Micro Devices	77	76	94	.8	.7	.9
Allegro MicroSystems	98	96	91	1.1	.9	.8
Analog Devices	337	360	444	3.7	3.6	4.1
AT&T	249	197	242	2.7	1.9	2.2
Atmel	13	11	1	.1	.1	.0
Brooktree	52	70	84	.6	.7	.8
Burr-Brown	141	145	152	1.5	1.4	1.4
Catalyst	0	1	0	.0	.0	.0
Cherry Semiconductor	32	36	37	.3	.4	.3
Cirrus Logic	0	1	1	.0	.0	.0
Comlinear	10	13	14	.1	.1	.1
Crystal	12	15	22	.1	.1	.2
Dallas Semiconductor	3	3	13	.0	.0	.1
Elantec	12	13	16	.1	.1	.1
Exar	46	75	107	.5	.7	1.0
Gennum	20	18	23	.2	.2	.2
Gould AMI	16	13	14	.2	.1	.1
Harris	280	260	226	3.1	2.6	2.1
Honeywell	21	20	20	.2	.2	.2
Hughes	0	8	8	.0	.1	.1
IMI	0	1	3	.0	.0	.0
Integrated Device Technology	1	3	3	.0	.0	.0
Intel	0	9	9	.0	.1	.1
Int'l Microelectronic Prod.	13	12	6	.1	.1	.1
International Rectifier	3	1	1	.0	.0	.0
ITT	50	103	35	.5	1.0	.3
Kulite	25	28	26	.3	.3	.2
Linear Technology	70	83	107	.8	.8	1.0
LSI Logic	0	2	0	.0	.0	.0
Maxim	43	65	80	.5	.6	.7
Micro Linear	28	45	36	.3	.4	.3
Micro Power Systems	21	24	26	.2	.2	.2
Mitel	54	47	50	.6	.5	.5
Motorola	436	482	456	4.8	4.8	4.2
NCR	26	30	28	.3	.3	.3
National Semiconductor	528	593	629	5.8	5.9	5.8
Precision Monolithics	88	91	0	1.0	.9	.0

(Continued)

Table 1-15 (Continued)

Each Company's Factory Revenue from Shipments of Analog ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Raytheon	27	20	24	.3	.2	.2
Rockwell	123	160	165	1.3	1.6	1.5
SEEQ Technology	0	0	8	.0	.0	.1
Semtech	NA	2	6	NA	.0	.1
Sierra Semiconductor	28	55	79	.3	.5	.7
Silicon General	36	36	32	.4	.4	.3
Siliconix	54	54	64	.6	.5	.6
Silicon Systems	112	165	184	1.2	1.6	1.7
Sipex	22	21	21	.2	.2	.2
Solitron	10	9	9	.1	.1	.1
Supertex	15	13	12	.2	.1	.1
Tektronix	NA	35	65	NA	.3	.6
Teledyne	20	19	18	.2	.2	.2
Texas Instruments	417	458	439	4.6	4.5	4.0
TRW	15	14	14	.2	.1	.1
Unitrode	50	50	41	.5	.5	.4
Universal	4	4	4	.0	.0	.0
VTC	27	33	20	.3	.3	.2
Xicor	3	3	3	.0	.0	.0
Other North American Companies	88	85	77	1.0	.8	.7
Japanese Companies	3,854	3,785	4,327	42.1	37.3	39.7
Fuji Electric	40	45	31	.4	.4	.3
Fujitsu	151	148	179	1.6	1.5	1.6
Hitachi	309	313	358	3.4	3.1	3.3
Matsushita	358	396	412	3.9	3.9	3.8
Mitsubishi	386	413	477	4.2	4.1	4.4
NEC	377	377	422	4.1	3.7	3.9
New JRC	119	114	122	1.3	1.1	1.1
Oki	32	31	32	.3	.3	.3
Ricoh	0	0	6	.0	.0	.1
Rohm	273	273	341	3.0	2.7	3.1
Sanken	153	159	171	1.7	1.6	1.6
Sanyo	467	467	599	5.1	4.6	5.5
Seiko Epson	14	11	12	.2	.1	.1
Sharp	59	65	66	.6	.6	.6
Shindengen Electric	33	26	50	.4	.3	.5
Sony	333	351	394	3.6	3.5	3.6
Toko	45	54	33	.5	.5	.3
Toshiba	509	535	612	5.6	5.3	5.6

(Continued)



**Table 1-15 (Continued)**  
**Each Company's Factory Revenue from Shipments of Analog ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Yamaha	12	7	10	.1	.1	.1
Other Japanese Companies	184	0	0	2.0	.0	.0
<b>European Companies</b>	<b>1,278</b>	<b>1,834</b>	<b>1,938</b>	<b>14.0</b>	<b>18.1</b>	<b>17.8</b>
Austria Mikro Systeme	9	22	31	.1	.2	.3
Ericsson	47	48	58	.5	.5	.5
Eurosil	0	0	7	.0	.0	.1
GEC Plessey	0	173	185	.0	1.7	1.7
Matra MHS	0	4	5	.0	.0	.0
MEDL	4	0	0	.0	.0	.0
Mietec	0	72	83	.0	.7	.8
Philips	522	653	664	5.7	6.4	6.1
Plessey	35	0	0	.4	.0	.0
SGS-Thomson	393	554	578	4.3	5.5	5.3
Siemens	152	182	181	1.7	1.8	1.7
STC	5	6	5	.1	.1	.0
Telefunken Electronic	101	111	118	1.1	1.1	1.1
TMS	7	9	11	.1	.1	.1
Other European Companies	3	0	12	.0	.0	.1
<b>Asia/Pacific Companies</b>	<b>171</b>	<b>229</b>	<b>258</b>	<b>1.9</b>	<b>2.3</b>	<b>2.4</b>
Daewoo	10	11	14	.1	.1	.1
Goldstar	9	20	12	.1	.2	.1
Hualon Microelectronics Corp.	NA	1	1	NA	.0	.0
Korean Electronic Co.	24	28	33	.3	.3	.3
Samsung	116	92	112	1.3	.9	1.0
Winbond Electronics	NA	18	16	NA	.2	.1
Other Asia/Pacific Companies	12	59	70	.1	.6	.6

NA = Not available

Source: Dataquest (June 1992)

Table 1-16

Each Company's Factory Revenue from Shipments of Discrete Semiconductors to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	7,320	7,674	8,035	100.0	100.0	100.0
North American Companies	2,091	2,174	1,919	28.6	28.3	23.9
Allegro MicroSystems	23	17	11	.3	.2	.1
Analog Devices	0	1	0	.0	.0	.0
AT&T	147	130	0	2.0	1.7	.0
General Instrument	170	214	200	2.3	2.8	2.5
Harris	120	130	107	1.6	1.7	1.3
Hewlett Packard	56	56	45	.8	.7	.6
International Rectifier	187	224	237	2.6	2.9	2.9
ITT	155	161	110	2.1	2.1	1.4
Microsemi	NA	50	71	NA	.7	.9
Motorola	766	799	794	10.5	10.4	9.9
National Semiconductor	70	70	60	1.0	.9	.7
Powerex	85	92	78	1.2	1.2	1.0
Raytheon	14	10	8	.2	.1	.1
Semtech	NA	16	21	NA	.2	.3
Siliconix	67	62	76	.9	.8	.9
Solitron	27	24	21	.4	.3	.3
Supertex	8	8	10	.1	.1	.1
Teledyne	0	3	3	.0	.0	.0
Texas Instruments	60	53	28	.8	.7	.3
Unitrode	59	54	39	.8	.7	.5
Other North American Companies	77	0	0	1.1	.0	.0
Japanese Companies	3,778	3,783	4,296	51.6	49.3	53.5
Fuji Electric	243	248	263	3.3	3.2	3.3
Fujitsu	100	107	152	1.4	1.4	1.9
Hitachi	594	575	598	8.1	7.5	7.4
Matsushita	314	339	379	4.3	4.4	4.7
Mitsubishi	337	311	325	4.6	4.1	4.0
NEC	489	479	544	6.7	6.2	6.8
New JRC	4	4	3	.1	.1	.0
Oki	9	9	9	.1	.1	.1
Rohm	297	314	374	4.1	4.1	4.7
Sanken	211	221	259	2.9	2.9	3.2
Sanyo	199	197	250	2.7	2.6	3.1
Shindengen Electric	130	133	134	1.8	1.7	1.7
Sony	89	76	91	1.2	1.0	1.1
Toko	5	6	31	.1	.1	.4

(Continued)

**Table 1-16 (Continued)**  
**Each Company's Factory Revenue from Shipments of Discrete Semiconductors to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Toshiba	724	764	884	9.9	10.0	11.0
Other Japanese Companies	33	0	0	.5	.0	.0
<b>European Companies</b>	<b>1,284</b>	<b>1,539</b>	<b>1,588</b>	<b>17.5</b>	<b>20.1</b>	<b>19.8</b>
ABB-HAFO	5	8	6	.1	.1	.1
ABB-DXYS	50	58	54	.7	.8	.7
Eupec	NA	96	93	NA	1.3	1.2
Fagor	29	30	29	.4	.4	.4
GEC Plessey	0	36	35	.0	.5	.4
MEDL	21	0	0	.3	.0	.0
Philips	442	507	531	6.0	6.6	6.6
Semikron	95	106	108	1.3	1.4	1.3
SGS-Thomson	282	315	299	3.9	4.1	3.7
Siemens	232	256	245	3.2	3.3	3.0
STC	2	2	2	.0	.0	.0
TAG	22	25	30	.3	.3	.4
Telefunken Electronic	95	76	89	1.3	1.0	1.1
TMS	2	1	1	.0	.0	.0
Zetex	NA	23	25	NA	.3	.3
Other European Companies	7	0	41	.1	.0	.5
<b>Asia/Pacific Companies</b>	<b>167</b>	<b>178</b>	<b>232</b>	<b>2.3</b>	<b>2.3</b>	<b>2.9</b>
Dongsung Semiconductor	NA	NA	30	NA	NA	.4
Goldstar	1	0	0	.0	.0	.0
Korean Electronic Co.	74	79	95	1.0	1.0	1.2
Samsung	78	77	92	1.1	1.0	1.1
Other Asia/Pacific Companies	14	22	15	.2	.3	.2

NA = Not available

Source: Dataquest (June 1992)

**Table 1-17**  
**Each Company's Factory Revenue from Shipments of Optoelectronic Semiconductors to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Total Market	2,406	2,412	2,804	100.0	100.0	100.0
North American Companies	424	423	449	17.6	17.5	16.0
Allegro MicroSystems	0	1	0	.0	.0	.0
AT&T	10	14	32	.4	.6	1.1
Harris	18	15	9	.7	.6	.3
Hewlett Packard	179	189	191	7.4	7.8	6.8
Honeywell	31	25	25	1.3	1.0	.9
Hughes	0	2	0	.0	.1	.0
Motorola	25	26	28	1.0	1.1	1.0
Optek	77	66	52	3.2	2.7	1.9
Quality Technologies	38	34	34	1.6	1.4	1.2
Tektronix	NA	5	5	NA	.2	.2
Texas Instruments	36	33	58	1.5	1.4	2.1
Weitek	0	1	0	.0	.0	.0
Other North American Companies	10	12	15	.4	.5	.5
Japanese Companies	1,731	1,694	1,992	71.9	70.2	71.0
Fuji Electric	1	1	1	.0	.0	.0
Fujitsu	107	108	127	4.4	4.5	4.5
Hitachi	62	63	68	2.6	2.6	2.4
Matsushita	287	281	318	11.9	11.7	11.3
Mitsubishi	27	29	25	1.1	1.2	.9
NEC	107	108	121	4.4	4.5	4.3
New JRC	13	13	14	.5	.5	.5
Oki	30	28	30	1.2	1.2	1.1
Rohm	93	102	122	3.9	4.2	4.4
Sanken	17	19	21	.7	.8	.7
Sanyo	136	149	193	5.7	6.2	6.9
Sharp	292	303	362	12.1	12.6	12.9
Sony	228	235	279	9.5	9.7	10.0
Toshiba	257	255	286	10.7	10.6	10.2
Other Japanese Companies	74	0	25	3.1	.0	.9
European Companies	244	267	334	10.1	11.1	11.9
ABB-HAFO	9	10	8	.4	.4	.3
Philips	24	31	36	1.0	1.3	1.3
Siemens	115	131	189	4.8	5.4	6.7
Telefunken Electronic	78	78	74	3.2	3.2	2.6
TMS	10	16	17	.4	.7	.6

(Continued)

Table 1-17 (Continued)

Each Company's Factory Revenue from Shipments of Optoelectronic Semiconductors to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1989	1990	1991	1989	1990	1991
Zetex	NA	1	1	NA	.0	.0
Other European Companies	8	0	9	.3	.0	.3
Asia/Pacific Companies	7	28	29	.3	1.2	1.0
Korean Electronic Co.	7	7	8	.3	.3	.3
Other Asia/Pacific Companies	0	21	21	.0	.9	.7

NA = Not available

Source: Dataquest (June 1992)

## Section 2: Final 1991 Worldwide Semiconductor Market Share Rankings

Table 2-1

Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World  
(Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	NEC	4,322	4,774	10	8.0
2	2	Toshiba	4,202	4,579	9	7.7
3	5	Intel	3,171	4,019	27	6.7
4	3	Motorola	3,539	3,802	7	6.4
5	4	Hitachi	3,516	3,765	7	6.3
6	7	Texas Instruments	2,574	2,738	6	4.6
7	6	Fujitsu	2,599	2,705	4	4.5
8	8	Mitsubishi	2,108	2,303	9	3.9
9	10	Matsushita	1,826	2,037	12	3.4
10	9	Philips	1,955	2,022	3	3.4
11	11	National Semiconductor	1,653	1,602	-3	2.7
12	13	Samsung	1,315	1,473	12	2.5
13	12	SGS-Thomson	1,441	1,436	-0	2.4
14	15	Sanyo	1,196	1,362	14	2.3
15	16	Sharp	1,194	1,318	10	2.2
16	14	Siemens	1,204	1,263	5	2.1
17	17	Advanced Micro Devices	1,053	1,226	16	2.1
18	18	Sony	1,010	1,196	18	2.0
19	19	Oki	954	981	3	1.6
20	21	Rohm	759	934	23	1.6
21	22	AT&T	737	713	-3	1.2
22	23	LSI Logic	598	670	12	1.1
23	20	Harris	800	623	-22	1.0
24	27	Analog Devices	381	464	22	.8
25	32	Micron Technology	286	455	59	.8
26	25	Sanken	399	451	13	.8
27	24	Hewlett Packard	445	442	-1	.7
28	29	VLSI Technology	324	414	28	.7
29	26	GEC Plessey	390	392	1	.7
30	28	ITT	371	340	-8	.6
31	30	Fuji Electric	319	319	0	.5
32	41	Goldstar	163	307	88	.5
33	31	Telefunken Electronic	295	300	2	.5
34	35	Cypress Semiconductor	223	281	26	.5
35	53	Hyundai	115	248	116	.4
36	34	International Rectifier	225	238	6	.4

(Continued)

**Table 2-1 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World**  
**(Millions of U.S. Dollars)**

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
37	39	Seiko Epson	196	220	12	.4
38	44	Western Digital	148	209	41	.4
39	38	Integrated Device Technology	199	204	3	.3
40	36	General Instrument	214	200	-7	.3
40	43	United Microelectronics	150	200	33	.3
		All Others	5,976	6,469	8	10.8
		North American Companies	21,047	22,940	9	38.4
		Japanese Companies	25,278	27,684	10	46.4
		European Companies	6,108	6,336	4	10.6
		Asia/Pacific Companies	2,112	2,734	29	4.6
		Total Market	54,545	59,694	9	100.0

Source: Dataquest (June 1992)

**Table 2-2**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World**  
**(Millions of U.S. Dollars)**

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	NEC	3,735	4,109	10	8.4
2	3	Intel	3,171	4,019	27	8.2
3	2	Toshiba	3,183	3,409	7	7.0
4	4	Hitachi	2,878	3,099	8	6.3
5	5	Motorola	2,714	2,980	10	6.1
6	6	Texas Instruments	2,488	2,652	7	5.4
7	7	Fujitsu	2,384	2,426	2	5.0
8	8	Mitsubishi	1,768	1,953	10	4.0
9	9	National Semiconductor	1,583	1,542	-3	3.2
10	10	Philips	1,417	1,455	3	3.0
11	11	Samsung	1,238	1,381	12	2.8
12	12	Matsushita	1,206	1,340	11	2.7
13	14	Advanced Micro Devices	1,053	1,226	16	2.5
14	13	SGS-Thomson	1,126	1,137	1	2.3
15	16	Sharp	891	956	7	2.0
16	15	Oki	917	942	3	1.9
17	17	Sanyo	850	919	8	1.9
18	18	Siemens	817	829	1	1.7
19	19	Sony	699	826	18	1.7
20	22	AT&T	593	681	15	1.4
21	21	LSI Logic	598	670	12	1.4
22	20	Harris	655	507	-23	1.0
23	23	Analog Devices	380	464	22	.9
24	27	Micron Technology	286	455	59	.9
25	25	Rohm	343	438	28	.9
26	26	VLSI Technology	324	414	28	.8
27	24	GEC Plessey	354	357	1	.7
28	36	Goldstar	163	307	88	.6
29	29	Cypress Semiconductor	223	281	26	.6
30	47	Hyundai	115	248	116	.5
31	30	ITT	210	230	10	.5
32	34	Seiko Epson	196	220	12	.5
33	39	Western Digital	148	209	41	.4
34	32	Hewlett Packard	200	206	3	.4
35	33	Integrated Device Technology	199	204	3	.4
36	38	United Microelectronics	150	200	33	.4
37	31	Rockwell	200	185	-8	.4
38	35	Silicon Systems	165	184	12	.4

(Continued)



Table 2-2 (Continued)  
 Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World  
 (Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
39	28	Chips & Technologies	265	181	-32	.4
40	37	Sanken	159	171	8	.4
		All Others	4,415	4,843	10	9.9
		North American Companies	18,450	20,572	12	42.1
		Japanese Companies	19,801	21,396	8	43.8
		European Companies	4,302	4,414	3	9.0
		Asia/Pacific Companies	1,906	2,473	30	5.1
		Total Market	44,459	48,855	10	100.0

Source: Dataquest (June 1992)

**Table 2-3**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Digital ICs to the World**  
**(Millions of U.S. Dollars)**

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	Texas Instruments	663	583	-12	16.1
2	2	Fujitsu	634	509	-20	14.0
3	3	Hitachi	452	461	2	12.7
4	5	Motorola	406	380	-6	10.5
5	6	National Semiconductor	405	324	-20	8.9
6	4	Advanced Micro Devices	407	300	-26	8.3
7	7	Philips	250	245	-2	6.8
8	8	NEC	240	244	2	6.7
9	9	Toshiba	95	105	11	2.9
10	10	Mitsubishi	92	81	-12	2.2
11	15	Raytheon	54	53	-2	1.5
12	14	AT&T	59	48	-19	1.3
13	11	GEC Plessey	66	41	-38	1.1
13	16	Siemens	43	41	-5	1.1
15	17	Oki	41	39	-5	1.1
16	12	Harris	60	35	-42	1.0
17	20	Applied Micro Circuits Corp.	24	32	33	.9
18	18	Goldstar	26	22	-15	.6
19	19	Chips & Technologies	25	16	-36	.4
20	22	Matsushita	12	13	8	.4
		All Others	119	56	-53	.6
		North American Companies	2,134	1,806	-15	49.8
		Japanese Companies	1,627	1,454	-11	40.1
		European Companies	386	346	-10	9.5
		Asia/Pacific Companies	26	22	-15	.6
		Total Market	4,173	3,628	-13	100.0

Source: Dataquest (June 1992)

**Table 2-4**  
**Top 10 Companies' Factory Revenue from Shipments of Bipolar Memory ICs to the World**  
**(Millions of U.S. Dollars)**

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	Fujitsu	144	113	-22	31.7
2	2	Hitachi	95	99	4	27.8
3	3	Advanced Micro Devices	65	52	-20	14.6
4	4	Philips	45	36	-20	10.1
5	6	NEC	20	19	-5	5.3
6	5	National Semiconductor	25	13	-48	3.7
7	7	Raytheon	18	8	-56	2.2
8	8	Texas Instruments	10	3	-70	.8
8	10	Motorola	3	3	0	.8
8	NM	Integrated Device Technology	0	3	NM	.8
		All Others	6	7	17	2.0
		North American Companies	126	89	-29	25.0
		Japanese Companies	259	231	-11	64.9
		European Companies	46	36	-22	10.1
		Asia/Pacific Companies	0	0	0	.0
		Total Market	431	356	-17	100.0

NM = Not meaningful

Source: Dataquest (June 1992)

**Table 2-5**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Logic ICs to the World**  
 (Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	Texas Instruments	653	570	-13	17.9
2	2	Fujitsu	490	396	-19	12.5
3	3	Motorola	403	377	-6	11.9
4	4	Hitachi	357	362	1	11.4
5	5	National Semiconductor	313	256	-18	8.1
6	6	Advanced Micro Devices	302	227	-25	7.1
7	7	NEC	220	225	2	7.1
8	8	Philips	204	209	2	6.6
9	9	Toshiba	95	105	11	3.3
10	10	Mitsubishi	92	81	-12	2.5
11	13	AT&T	59	48	-19	1.5
12	17	Raytheon	36	45	25	1.4
13	11	GEC Plessey	66	41	-38	1.3
13	15	Siemens	43	41	-5	1.3
15	16	Oki	41	39	-5	1.2
16	14	Harris	55	33	-40	1.0
17	20	Applied Micro Circuits Corp.	24	32	33	1.0
18	18	Goldstar	26	22	-15	.7
19	19	Chips & Technologies	25	16	-36	.5
20	22	Matsushita	12	13	8	.4
		All Others	117	41	-65	1.3
		North American Companies	1,900	1,624	-15	51.1
		Japanese Companies	1,368	1,223	-11	38.5
		European Companies	339	310	-9	9.8
		Asia/Pacific Companies	26	22	-15	.7
		Total Market	3,633	3,179	-12	100.0

Source: Dataquest (June 1992)

**Table 2-6**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital ICs to the World**  
 (Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	Intel	3,157	4,006	27	11.7
2	2	NEC	3,118	3,443	10	10.0
3	3	Toshiba	2,553	2,692	5	7.8
4	4	Hitachi	2,113	2,280	8	6.6
5	5	Motorola	1,826	2,144	17	6.2
6	6	Fujitsu	1,602	1,738	8	5.1
7	7	Texas Instruments	1,367	1,630	19	4.8
8	8	Mitsubishi	1,263	1,395	10	4.1
9	9	Samsung	1,146	1,269	11	3.7
10	12	Matsushita	798	915	15	2.7
11	11	Sharp	826	890	8	2.6
12	10	Oki	845	871	3	2.5
13	16	Advanced Micro Devices	570	832	46	2.4
14	13	LSI Logic	596	670	12	2.0
15	14	Siemens	592	607	3	1.8
16	15	National Semiconductor	585	589	1	1.7
17	17	SGS-Thomson	563	558	-1	1.6
18	18	Philips	514	546	6	1.6
19	24	Micron Technology	286	455	59	1.3
20	19	Sony	348	431	24	1.3
21	22	VLSI Technology	324	414	28	1.2
22	20	AT&T	337	391	16	1.1
23	23	Sanyo	324	320	-1	.9
24	26	Cypress Semiconductor	223	281	26	.8
25	34	Goldstar	117	273	133	.8
26	36	Hyundai	115	248	116	.7
27	21	Harris	335	246	-27	.7
28	31	Western Digital	148	209	41	.6
29	29	Seiko Epson	185	208	12	.6
30	27	Hewlett Packard	200	206	3	.6
31	30	United Microelectronics	150	200	33	.6
32	28	Integrated Device Technology	196	198	1	.6
33	38	ITT	107	195	82	.6
34	25	Chips & Technologies	240	165	-31	.5
35	32	Cirrus Logic	129	151	17	.4
36	33	Yamaha	127	148	17	.4
37	37	GEC Plessey	115	131	14	.4
38	45	Xilinx	84	130	55	.4

(Continued)

Table 2-6 (Continued)  
 Top 40 Companies' Factory Revenue from Shipments of MOS Digital ICs to the World  
 (Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
39	40	Atmel	98	118	20	3
40	35	NCR	115	117	2	3
		All Others	1,815	2,005	10	5.8
		North American Companies	12,030	14,377	20	41.9
		Japanese Companies	14,389	15,615	9	45.5
		European Companies	2,082	2,130	2	6.2
		Asia/Pacific Companies	1,651	2,193	33	6.4
		Total Market	30,152	34,315	14	100.0

Source: Dataquest (June 1992)

**Table 2-7**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	Toshiba	1,431	1,425	-0	11.1
2	3	Hitachi	1,224	1,330	9	10.4
3	2	NEC	1,233	1,242	1	9.7
4	4	Samsung	971	1,066	10	8.3
5	5	Fujitsu	913	909	-0	7.1
6	6	Mitsubishi	745	762	2	5.9
7	7	Texas Instruments	741	738	-0	5.7
8	8	Sharp	454	476	5	3.7
9	13	Micron Technology	286	455	59	3.5
10	9	Motorola	395	412	4	3.2
11	10	Intel	371	395	6	3.1
12	11	Oki	350	380	9	3.0
13	12	Siemens	312	298	-4	2.3
14	14	SGS-Thomson	278	273	-2	2.1
15	16	Advanced Micro Devices	253	270	7	2.1
16	24	Goldstar	96	249	159	1.9
17	21	Hyundai	115	248	116	1.9
18	15	Matsushita	265	217	-18	1.7
19	18	Cypress Semiconductor	166	186	12	1.4
20	17	Sony	204	183	-10	1.4
21	20	Integrated Device Technology	132	128	-3	1.0
22	19	National Semiconductor	137	112	-18	.9
23	26	Xicor	68	91	34	.7
24	28	Vitellic	64	85	33	.7
25	25	Sanyo	86	82	-5	.6
26	31	Atmel	54	78	44	.6
27	22	Philips	96	75	-22	.6
27	36	MOSel	31	75	142	.6
29	23	NMB Semiconductor	96	60	-38	.5
30	27	United Microelectronics	66	58	-12	.5
31	29	Microchip Technology	60	57	-5	.4
32	30	Seiko Epson	55	37	-33	.3
33	33	Matra MHS	37	35	-5	.3
34	35	SEEQ Technology	33	33	0	.3
35	34	Catalyst	35	32	-9	.2
36	50	Macronix	7	31	343	.2
37	45	Rohm	13	28	115	.2
38	32	Hualon Microelectronic Corp.	39	27	-31	.2

(Continued)

Table 2-7 (Continued)

Top 40 Companies' Factory Revenue from Shipments of MOS Memory ICs to the World  
(Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
39	42	Winbond	14	26	86	.2
40	37	Waferscale Integration	27	23	-15	.2
40	39	Harris	24	23	-4	.2
		All Others	151	131	-13	1.0
		North American Companies	2,977	3,298	11	25.7
		Japanese Companies	7,095	7,141	1	55.6
		European Companies	731	682	-7	5.3
		Asia/Pacific Companies	1,325	1,720	30	13.4
		Total Market	12,128	12,841	6	100.0

Source: Dataquest (June 1992)



**Table 2-8**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponent ICs to the World**  
 (Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	Intel	2,726	3,578	31	30.4
2	3	Motorola	970	1,171	21	9.9
3	2	NEC	981	1,149	17	9.8
4	4	Hitachi	546	583	7	5.0
5	5	Mitsubishi	441	543	23	4.6
6	6	Toshiba	386	454	18	3.9
7	7	Texas Instruments	320	419	31	3.6
8	13	Advanced Micro Devices	178	395	122	3.4
9	8	Matsushita	250	321	28	2.7
10	9	National Semiconductor	242	286	18	2.4
11	11	Fujitsu	213	244	15	2.1
12	12	Philips	192	212	10	1.8
13	15	Western Digital	148	209	41	1.8
14	14	SGS-Thomson	175	167	-5	1.4
15	10	Chips & Technologies	240	165	-31	1.4
15	21	VLSI Technology	105	165	57	1.4
17	17	Cirrus Logic	129	151	17	1.3
18	16	Oki	131	137	5	1.2
19	18	Sharp	124	134	8	1.1
19	19	Siemens	116	134	16	1.1
21	23	LSI Logic	93	115	24	1.0
22	22	Zilog	100	110	10	.9
23	26	Sony	43	88	105	.7
24	24	Sanyo	71	69	-3	.6
25	20	Harris	110	65	-41	.6
26	29	United Microelectronics	39	62	59	.5
26	36	Ricoh	22	62	182	.5
28	42	Cypress Semiconductor	15	48	220	.4
29	NM	Dallas Semiconductor	0	41	NM	.3
30	27	Standard Microsystems	40	40	0	.3
31	25	Weitek	57	39	-32	.3
31	32	NCR	31	39	26	.3
33	31	Matra MHS	33	37	12	.3
34	33	ITT	28	35	25	.3
35	37	AT&T	21	33	57	.3
36	34	Performance Semiconductor	24	28	17	.2
37	35	Samsung	22	27	23	.2
38	40	Rohm	17	23	35	.2

(Continued)

**Table 2-8 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponent ICs to the World**  
**(Millions of U.S. Dollars)**

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
39	28	Rockwell	40	20	-50	.2
39	39	Analog Devices	20	20	0	.2
39	38	Integrated Device Technology	20	20	0	.2
		All Others	125	136	9	1.2
		North American Companies	5,743	7,256	26	61.6
		Japanese Companies	3,236	3,824	18	32.5
		European Companies	538	567	5	4.8
		Asia/Pacific Companies	67	127	90	1.1
		Total Market	9,584	11,774	23	100.0

NM - Not meaningful

Source: Dataquest (June 1992)

**Table 2-9**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	NEC	904	1,052	16	10.8
2	2	Toshiba	736	813	10	8.4
3	4	Fujitsu	476	585	23	6.0
4	5	Motorola	461	561	22	5.8
5	3	LSI Logic	503	555	10	5.7
6	8	Texas Instruments	306	473	55	4.9
7	10	Matsushita	283	377	33	3.9
8	7	Hitachi	343	367	7	3.8
9	6	Oki	364	354	-3	3.6
9	9	AT&T	303	354	17	3.6
11	11	Sharp	248	280	13	2.9
12	12	Philips	226	259	15	2.7
13	13	VLSI Technology	211	249	18	2.6
14	16	Hewlett Packard	200	206	3	2.1
15	14	National Semiconductor	206	191	-7	2.0
16	19	Samsung	153	176	15	1.8
17	18	Siemens	164	175	7	1.8
18	17	Sanyo	167	169	1	1.7
19	20	Advanced Micro Devices	139	167	20	1.7
20	24	Sony	101	160	58	1.6
21	15	Harris	201	158	-21	1.6
22	22	Seiko Epson	120	155	29	1.6
23	28	ITT	79	150	90	1.5
24	21	Yamaha	127	146	15	1.5
25	26	Xilinx	84	130	55	1.3
26	25	GEC Plessey	99	126	27	1.3
27	23	SGS-Thomson	110	118	7	1.2
28	29	Altera	78	107	37	1.1
29	30	Mitsubishi	77	90	17	.9
30	33	United Microelectronics	45	80	78	.8
31	27	NCR	80	75	-6	.8
32	31	Lattice	62	68	10	.7
33	34	Integrated Device Technology	44	50	14	.5
34	36	Cypress Semiconductor	42	47	12	.5
35	38	Rohm	39	46	18	.5
36	39	Austria Mikro Systeme	37	39	5	.4
37	35	Amel	44	38	-14	.4
38	48	Actel	21	37	76	.4

(Continued)

Table 2-9 (Continued)

Top 40 Companies' Factory Revenue from Shipments of MOS Logic ICs to the World  
(Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
39	57	Hualon Microelectronic Corp.	10	34	240	.4
40	32	Intel	60	33	-45	.3
		All Others	487	450	-8	4.6
		North American Companies	3,310	3,823	15	39.4
		Japanese Companies	4,058	4,650	15	47.9
		European Companies	813	881	8	9.1
		Asia/Pacific Companies	259	346	34	3.6
		Total Market	8,440	9,700	15	100.0

Source: Dataquest (June 1992)

**Table 2-10**  
**Top 40 Companies' Factory Revenue from Shipments of Analog ICs to the World**  
**(Millions of U.S. Dollars)**

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	Philips	653	664	2	6.1
2	2	National Semiconductor	593	629	6	5.8
3	4	Toshiba	535	612	14	5.6
4	6	Sanyo	467	599	28	5.5
5	3	SGS-Thomson	554	578	4	5.3
6	8	Mitsubishi	413	477	15	4.4
7	5	Motorola	482	456	-5	4.2
8	11	Analog Devices	360	444	23	4.1
9	7	Texas Instruments	458	439	-4	4.0
10	10	NEC	377	422	12	3.9
11	9	Matsushita	396	412	4	3.8
12	12	Sony	351	394	12	3.6
13	13	Hitachi	313	358	14	3.3
14	14	Rohm	273	341	25	3.1
15	16	AT&T	197	242	23	2.2
16	15	Harris	260	226	-13	2.1
17	18	GEC Plessey	173	185	7	1.7
18	19	Silicon Systems	165	184	12	1.7
19	17	Siemens	182	181	-1	1.7
20	22	Fujitsu	148	179	21	1.6
21	21	Sanken	159	171	8	1.6
22	20	Rockwell	160	165	3	1.5
23	23	Burr-Brown	145	152	5	1.4
24	24	New JRC	114	122	7	1.1
25	25	Telefunken Electronic	111	118	6	1.1
26	28	Samsung	92	112	22	1.0
27	30	Linear Technology	83	107	29	1.0
27	32	Exar	75	107	43	1.0
29	31	Advanced Micro Devices	76	94	24	.9
30	27	Allegro MicroSystems	96	91	-5	.8
31	34	Brooktree	70	84	20	.8
32	33	Mietec	72	83	15	.8
33	36	Maxim	65	80	23	.7
34	37	Sierra Semiconductor	55	79	44	.7
35	35	Sharp	65	66	2	.6
36	47	Tektronix	35	65	86	.6
37	39	Siliconix	54	64	19	.6
38	41	Ericsson	48	58	21	.5

(Continued)

Table 2-10 (Continued)

Top 40 Companies' Factory Revenue from Shipments of Analog ICs to the World  
(Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
39	42	Mitel	47	50	6	.5
39	53	Shindengen Electric	26	50	92	.5
		All Others	1,136	972	-14	8.9
		North American Companies	4,286	4,389	2	40.2
		Japanese Companies	3,785	4,327	14	39.7
		European Companies	1,834	1,938	6	17.8
		Asia/Pacific Companies	229	258	13	2.4
		Total Market	10,134	10,912	8	100.0

Source: Dataquest (June 1992)

Table 2-11

Top 40 Companies' Factory Revenue from Shipments of Discrete Semiconductors to the World  
(Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	2	Toshiba	764	884	16	11.0
2	1	Motorola	799	794	-1	9.9
3	3	Hitachi	575	598	4	7.4
4	5	NEC	479	544	14	6.8
5	4	Philips	507	531	5	6.6
6	6	Matsushita	339	379	12	4.7
7	8	Rohm	314	374	19	4.7
8	9	Mitsubishi	311	325	5	4.0
9	7	SGS-Thomson	315	299	-5	3.7
10	11	Fuji Electric	248	263	6	3.3
11	13	Sanken	221	259	17	3.2
12	15	Sanyo	197	250	27	3.1
13	10	Siemens	256	245	-4	3.0
14	12	International Rectifier	224	237	6	2.9
15	14	General Instrument	214	200	-7	2.5
16	20	Fujitsu	107	152	42	1.9
17	17	Shindengen Electric	133	134	1	1.7
18	16	ITT	161	110	-32	1.4
19	21	Semikron	106	108	2	1.3
20	18	Harris	130	107	-18	1.3
21	24	Korean Electronic Co.	79	95	20	1.2
22	22	Eupec	96	93	-3	1.2
23	25	Samsung	77	92	19	1.1
24	27	Sony	76	91	20	1.1
25	26	Telefunken Electronic	76	89	17	1.1
26	23	Powerex	92	78	-15	1.0
27	29	Siliconix	62	76	23	.9
28	34	Microsemi	50	71	42	.9
29	28	National Semiconductor	70	60	-14	.7
30	30	ABB-LXYS	58	54	-7	.7
31	31	Hewlett Packard	56	45	-20	.6
32	32	Unitrode	54	39	-28	.5
33	35	GEC Plessey	36	35	-3	.4
34	46	Toko	6	31	417	.4
35	37	TAG	25	30	20	.4
35	NM	Dongsung Semiconductor	NA	30	NM	.4
37	36	Fagor	30	29	-3	.4
38	33	Texas Instruments	53	28	-47	.3

(Continued)

Table 2-11 (Continued)  
 Top 40 Companies' Factory Revenue from Shipments of Discrete Semiconductors to the World  
 (Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
39	39	Zetex	23	25	9	.3
40	38	Solitron	24	21	-13	.3
40	41	Semtech	16	21	31	.3
		All Others	215	109	-49	1.4
		North American Companies	2,174	1,919	-12	23.9
		Japanese Companies	3,783	4,296	14	53.5
		European Companies	1,539	1,588	3	19.8
		Asia/Pacific Companies	178	232	30	2.9
		Total Market	7,674	8,035	5	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (June 1992)



Table 2-12

Top 20 Companies' Factory Revenue from Shipments of Optoelectronic Semiconductors to the World  
(Millions of U.S. Dollars)

1991 Rank	1990 Rank		1990 Revenue	1991 Revenue	Percent Change	1991 Market Share (%)
1	1	Sharp	303	362	19	12.9
2	2	Matsushita	281	318	13	11.3
3	3	Toshiba	255	286	12	10.2
4	4	Sony	235	279	19	10.0
5	6	Sanyo	149	193	30	6.9
6	5	Hewlett Packard	189	191	1	6.8
7	7	Siemens	131	189	44	6.7
8	9	Fujitsu	108	127	18	4.5
9	10	Rohm	102	122	20	4.4
10	8	NEC	108	121	12	4.3
11	11	Telefunken Electronic	78	74	-5	2.6
12	13	Hitachi	63	68	8	2.4
13	15	Texas Instruments	33	58	76	2.1
14	12	Optek	66	52	-21	1.9
15	16	Philips	31	36	16	1.3
16	14	Quality Technologies	34	34	0	1.2
17	24	AT&T	14	32	129	1.1
18	18	Oki	28	30	7	1.1
19	19	Motorola	26	28	8	1.0
20	17	Mitsubishi	29	25	-14	.9
20	20	Honeywell	25	25	0	.9
		All Others	124	154	24	5.5
		North American Companies	423	449	6	16.0
		Japanese Companies	1,694	1,992	18	71.0
		European Companies	267	334	25	11.9
		Asia/Pacific Companies	28	29	4	1.0
		Total Market	2,412	2,804	16	100.0

Source: Dataquest (June 1992)

# Dataquest

## *Dataquest Research and Sales Offices:*

**Dataquest Incorporated**  
1290 Ridder Park Drive  
San Jose, California 95131-2398  
United States  
Phone: 01-408-437-8000  
Facsimile: 01-408-437-0292

**Dataquest Incorporated**  
**Dataquest/Ledgeway**  
550 Cochituate Road  
Framingham, Massachusetts 01701-9324  
United States  
Phone: 01-508-370-5555  
Facsimile: 01-508-370-6262

**Dataquest Incorporated Invitational**  
**Computer Conferences Division**  
3151 Airway Avenue, C-2  
Costa Mesa, California 92626  
United States  
Phone: 01-714-957-0171  
Facsimile: 01-714-957-0903

**Dataquest Australia**  
Suite 1, Century Plaza  
80 Berry Street  
North Sydney, NSW 2060  
Australia  
Phone: 61-2-959-4544  
Facsimile: 61-2-929-0635

**Dataquest Europe Limited**  
Roussel House, Broadwater Park  
Denham, Uxbridge  
Middlesex UB9 5HP  
England  
Phone: 44-895-835050  
Facsimile: 44-895-835260/1

**Dataquest Europe SA**  
Tour Galliéni 2  
36, avenue du Général-de-Gaulle  
93175 Bagnolet Cedex  
France  
Phone: 33-1-48-97-3100  
Facsimile: 33-1-48-97-3400

**Dataquest GmbH**  
Kronstadter Strasse 9  
8000 Munich 80  
Germany  
Phone: 49-89-930-9090  
Facsimile: 49-89-930-3277

**Dataquest Germany**  
In der Schneithohl 17  
6242 Kronberg 2  
Germany  
Phone: 49-6173/61685  
Facsimile: 49-6173/67901

**Dataquest Hong Kong**  
Rm. 4A01  
HKPC Building  
78 Tat Chee Avenue  
Kowloon, Hong Kong  
Phone: 852-788-5432  
Facsimile: 852-788-5433

**Dataquest Japan Limited**  
Shinkawa Sanko Building  
1-3-17 Shinkawa, Chuo-ku  
Tokyo, 104  
Japan  
Phone: 81-3-5566-0411  
Facsimile: 81-3-5566-0425

**Dataquest Korea**  
Daeheung Building 1105  
648-23 Yeoksam-dong  
Kangnam-gu  
Seoul 135-080, Korea  
Phone: 82-2-556-4166  
Facsimile: 82-2-552-2661

**Dataquest Singapore**  
4012 Ang Mo Kio Industrial Park 1  
Ave. 10, #03-10 to #03-12  
Singapore 2056  
Phone: 65-4597181  
Telex: 38257  
Facsimile: 65-4563129

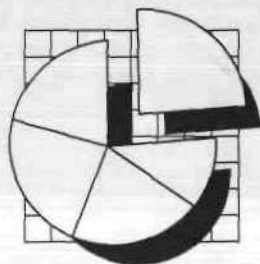
**Dataquest Taiwan**  
Room 801/8th Floor  
Ever Spring Building  
147, Sec. 2, Chien Kuo N. Rd.  
Taipei, Taiwan R.O.C. 104  
Phone: 886-2-501-7960  
886-2-501-5592  
Facsimile: 886-2-505-4265

**Dataquest Thailand**  
300/31 Rachdapisek Road  
Bangkok 10310  
Thailand  
Phone: 66-2-275-1904/5  
66-2-277-8850  
Facsimile: 66-2-275-7005

**Dataquest<sup>®</sup>**

**Semiconductors**

# **Final 1992 Worldwide Semiconductor Market Share**



**Market Statistics**

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**1993**

**Program:** Semiconductors Worldwide

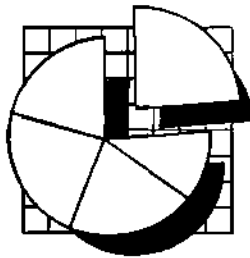
**Product Code:** SEMI-WW-MS-9301

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# Dataquest®

## Semiconductors

# Final 1992 Worldwide Semiconductor Market Share



## Market Statistics

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### 1993

**Program:** Semiconductors Worldwide  
**Product Code:** SEMI-WW-MS-9301  
**Publication Date:** May 17, 1993

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Note: All tables show estimated data.

# Final 1992 Worldwide Semiconductor Market Share

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## Introduction

This document contains detailed information on Dataquest's view of the semiconductor market. Included in this document are the following:

- 1990-1992 market share estimates
- 1990-1992 market share rankings

Analyses of market share by company provide insight into high-technology markets and reinforce estimates of consumption, production, and company revenue.

Worldwide market share estimates combine data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. market consumption or revenue are based on the average exchange rate for the given year. Refer to the section entitled "Exchange Rates" for more information regarding these average rates. As a rule, Dataquest's estimates are calculated in local currencies and then converted to U.S. dollars.

More detailed data on this market may be requested through Dataquest's client inquiry service. Qualitative analysis of this data is provided in the *Dataquest Perspectives* located in the binder of the same name.

## Segmentation

This section outlines the market segments that are specific to this document. Dataquest's objective is to provide data along lines of segmentation that is logical, appropriate to the industry in question, and immediately useful to clients.

Dataquest defines the semiconductor industry as the group of competing companies primarily engaged in manufacturing semiconductors and related solid-state devices. Important products of the semiconductor industry include integrated circuits, discrete devices, and optoelectronic devices.



For market share purposes, Dataquest defines the semiconductor market according to the following functional segmentation scheme:

- Total Semiconductor
  - Total Integrated Circuit
    - Bipolar Digital IC
      - Bipolar Digital Memory
      - Bipolar Digital Microcomponent
      - Bipolar Digital Logic
    - MOS Digital IC
      - MOS Digital Memory
      - MOS Digital Microcomponent
      - MOS Digital Logic
    - Analog IC
      - Monolithic Analog
      - Hybrid Analog
  - Discrete Semiconductor
  - Optoelectronic Semiconductor

## Definitions

This section lists the definitions that are used by Dataquest to present the data in this document. For a complete listing of all semiconductor market segments tracked by Dataquest, please refer to the *Dataquest Semiconductor Market Definitions Guide*.

### Product Definitions

**Total Semiconductor** (Total Integrated Circuit + Total Discrete + Total Optoelectronic). Defined as an active semiconductor product that contains semiconducting material (such as silicon, germanium, or gallium arsenide, but excluding ceramics) and reacts dynamically to an input signal, either by modifying its shape or adding energy to it. This definition excludes standalone passive components, such as capacitors, resistors, inductors, oscillators, crystals, transformers, and relays.

**Total Integrated Circuit** (Bipolar Digital IC + MOS Digital IC + Monolithic Analog IC + Hybrid Analog IC). An IC is defined as a large number of passive and/or active discrete semiconductor circuits integrated into a single package. A monolithic IC is one in which discrete circuits are integrated onto a single die, while a hybrid IC is one in which discrete circuits are integrated onto a small number of die.

**Bipolar Digital IC** (Bipolar Digital Memory + Bipolar Digital Microcomponent + Bipolar Digital Logic). A bipolar digital IC is defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, 100 percent of the die area is manufactured using bipolar semiconductor technology. A digital function is one in which data-carrying signals vary in discrete values.

**Bipolar Digital Memory.** Defined as a bipolar digital semiconductor product in which binary data is stored and electronically retrieved. Includes ECL random-access memory (RAM), read-only memory (ROM), programmable ROM (PROM), last-in/first-out (LIFO) memory, and first-in/first-out (FIFO) memory. Not included are products made with mixed bipolar CMOS (that is, BiCMOS) with TTL or ECL outputs, which are classified as MOS.

**Bipolar Digital Microcomponent.** Defined as a bipolar digital semiconductor product that contains a data processing unit or serves as an interface to such a unit. Includes both complex-instruction-set computing (CISC) and reduced-instruction-set computing (RISC) processor architectures. Includes bipolar digital microprocessor (MPU), bipolar digital microcontroller (MCU), and bipolar digital microperipheral (MPR), where applicable.

**Bipolar Digital Logic (Bipolar Application-Specific IC + Bipolar Digital Standard Logic + Other Bipolar Logic).** Defined as a bipolar digital semiconductor product in which more than 50 percent of the die area performs logic functions. Excludes bipolar digital microcomponent ICs.

**MOS Digital IC (MOS Digital Memory + MOS Digital Microcomponent + MOS Digital Logic).** Defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, where any portion of the die area is manufactured using metal oxide semiconductor (MOS) technology. A digital function is one in which data carrying signals vary in discrete values. Includes mixed technology manufacturing, such as BiMOS and BiCMOS, where there is some MOS technology employed.

**MOS Digital Memory (DRAM + SRAM + EPROM + EEPROM + Flash Memory + Mask ROM + Other MOS Digital Memory).** Defined as a MOS digital IC in which binary data is stored and electronically retrieved.

**MOS Digital Microcomponent (MOS Digital Microprocessor + MOS Digital Microcontroller + MOS Digital Microperipheral + MOS Programmable Digital Signal Processor).** Defined as a MOS digital IC that contains a data processing unit or serves as an interface to such a unit. Includes both CISC and RISC architectures.

**MOS Digital Logic (MOS Digital Application-Specific IC + MOS Digital Standard Logic + Other MOS Logic).** Defined as a MOS digital semiconductor product in which more than 50 percent of the die area performs logic functions. Excludes MOS digital microcomponent ICs.

### Analog IC (Monolithic Analog + Hybrid Analog).

**Monolithic Analog.** A monolithic analog IC is a semiconductor product that deals in the realm of electrical signal processing, power control, or electrical drive capability. It is one in which some of its inputs or outputs can be defined in terms of continuously or linearly variable voltages, currents, or frequencies. Includes all monolithic analog ICs manufactured using bipolar, MOS, or BiCMOS technologies. A monolithic IC is a single die contained in a single package.

**Hybrid Analog.** A hybrid analog IC is defined as a semiconductor product consisting of more than one die contained in a single package. A hybrid IC may perform 100 percent linear, 100 percent digital, or mixed-signal (both linear and digital) functions. Includes hybrid implementation of all monolithic IC functions. Includes all hybrid ICs manufactured using bipolar, MOS, or BiCMOS technologies.

**Total Discrete (Transistor + Diode + Thyristor + Other Discrete).** A discrete semiconductor is defined as a unit building block performing a fundamental semiconductor function.

**Total Optoelectronic (LED Lamp/Display + Optocoupler + CCD + Laser Diode + Photosensor + Other Optoelectronic).** Defined as a semiconductor product in which photons induce the flow of electrons, or vice versa. Other functions may also be integrated onto the product. This category does not include LCD, incandescent displays, fluorescent displays, cathode ray tubes (CRTs), or plasma displays.

**Merchant versus Captive Consumption.** Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. The data excludes completely captive suppliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

### **Regional Definitions**

**North America:** Includes Canada, Mexico, and the United States.

**Japan:** Japan is the only single-country region.

**Europe:** Western Europe includes Austria, Belgium, Denmark, Eire, Finland, France, Germany (including former East Germany), Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and Rest of Western Europe (Cyprus, Iceland, Malta, Turkey, and Others). Eastern Europe includes Albania, Bulgaria, Czech and Slovak republics, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Republics of the former USSR (including Belorussia, Russia, and Ukraine), and Others.

**Asia-Pacific:** Includes Asia/Pacific's newly industrialized economies (NIEs) and the Rest of Asia/Pacific region. NIEs include Hong Kong, Singapore, South Korea, and Taiwan. The Rest of Asia/Pacific region includes Australia, Cambodia, China, India, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Philippines, Thailand, and Vietnam.

**Rest of World:** Includes Africa, Caribbean, Central America, Middle East, Oceania, and South America.

### **Line Item Definitions**

Factory revenue is defined as the money value received by a semiconductor manufacturer for its products. Revenue from the sale of semiconductors sold either as finished goods, die, or wafers to another semiconductor vendor for resale is attributed to the semiconductor vendor that sells the product to a distributor or equipment manufacturer.

## **Market Share Methodology**

Dataquest utilizes both primary and secondary sources to produce market statistics data. In the fourth quarter of each year, Dataquest surveys all major participants within each industry. Selected companies are resurveyed during the first quarter of the following year to verify final annual results. This primary research is supplemented with additional primary research and secondary research to verify market size, shipment totals, and pricing information. Sources of data utilized by Dataquest include the following:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data (such as WSTS, MITI, and U.S. DOC)
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and CD-ROM data banks
- Articles in both the general and trade press
- Reports from financial analysts
- End-user surveys

Dataquest believes that the estimates presented in this document are the most accurate and meaningful statistics available.

Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Dataquest and those provided by other suppliers.

## Notes on Market Share

In the process of conducting data collection and preparing market statistics information, Dataquest will sometimes consolidate or revise a particular company, model, series, or industry's numbers. In this section, we explain any such changes contained within this document for your reference.

### Notes to Market Share Tables

1. AAB-HAFO was formerly known as ASEA Brown Boveri.
2. ABB-IXYS was formerly the Germany-based power semiconductor division of ASEA Brown Boveri.
3. Allegro MicroSystems was formerly known as Sprague Technologies.
4. Analog Devices revenue includes Precision Monolithics revenue from 1991 forward.
5. Appian Technology was formerly known as ZYMOS.
6. Cirrus Logic revenue includes Acumos and Crystal Semiconductor revenue from 1992 forward.
7. GEC Plessey revenue includes MEDL and Plessey revenue from 1990 forward.
8. Inmos revenue is included in SGS-Thomson revenue.
9. Macronix revenue, beginning in 1991, was moved from the North American Companies area and is now included under the Asia/Pacific Companies section.
10. MOSel and Vitelic merged in 1992 to form MOSel/Vitellic Corporation.
11. Other North American Companies revenue has been restated to reflect the different number of companies published in 1992.
12. Philips revenue includes Signetics revenue.
13. Quality Technologies acquired Philips' Optocoupler Division in 1992.

14. Raytheon revenue includes that of TRW's LSI Division from 1992 forward.

15. Thomson Semiconductors Specific (TCS) was formed through the merger of Thomson Composants Microndes (TCM) and Thomson Composants Militaires et Spatiaux (TMS).

16. Unitrode revenue includes that of Microsemi's Semiconductor Products Division from 1992 forward.

17. Vertex (formerly known as Integrated CMOS Systems) revenue is included in Toshiba revenue from 1991 forward.

18. Xilinx acquired Plus Logic in 1992.

19. The following companies were added to Worldwide market share tables starting in 1992, and may result in higher 1992 market growth rates in certain product areas:

- ACC Microelectronics
- Adaptec
- Cyrix
- Dialog Semiconductor
- EM Microelectronics Marin
- ETEQ Microsystems
- Integrated Circuit Systems
- Integrated Information Technology
- Logic Devices
- Micronas
- Natel Engineering
- Oak Technology
- OPTi
- S3
- Symphony Laboratories
- Teccor Electronics
- Trident Microsystems
- Tseng Labs
- Westcode

## Exchange Rates

Dataquest uses an average annual exchange rate in converting revenue to U.S. dollar amounts. Table 1 outlines these rates for 1990 through 1992.

**Table 1**  
**Exchange Rates**

	1990	1991	1992
Japan (Yen/U.S.\$)	144.00	136.00	126.45
France (Franc/U.S.\$)	5.44	5.64	5.27
Germany (Deutsche Mark/U.S.\$)	1.62	1.66	1.56
United Kingdom (U.S.\$/Pound Sterling)	1.79	1.77	1.77

Source: Dataquest (May 1993)

## Section 1: Final 1992 Worldwide Semiconductor Market Share

**Table 1-1**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	54,545	59,694	65,261	100.0	100.0	100.0
North American Companies	21,047	22,940	27,105	38.6	38.4	41.5
ACC Microelectronics	NA	NA	26	NA	NA	0
Actel	21	37	44	0	0.1	0.1
Adaptec	NA	NA	89	NA	NA	0.1
Advanced Micro Devices	1,053	1,226	1,514	1.9	2.1	2.3
Allegro MicroSystems	116	104	115	0.2	0.2	0.2
Altera	78	107	102	0.1	0.2	0.2
Analog Devices	381	464	516	0.7	0.8	0.8
Appian Technology	50	15	10	0.1	0	0
Applied Micro Circuits Corporation	28	38	39	0.1	0.1	0.1
AT&T	737	713	911	1.4	1.2	1.4
Atmel	123	120	140	0.2	0.2	0.2
Bipolar Integrated Technology	1	10	15	0	0	0
Brooktree	70	84	96	0.1	0.1	0.1
Burr-Brown	145	152	127	0.3	0.3	0.2
California Micro Devices	27	8	12	0	0	0
Catalyst	36	32	41	0.1	0.1	0.1
Cherry Semiconductor	36	37	46	0.1	0.1	0.1
Chips & Technologies	265	181	119	0.5	0.3	0.2
Cirrus Logic	130	152	275	0.2	0.3	0.4
Comlinear	13	14	15	0	0	0
Cypress Semiconductor	223	281	267	0.4	0.5	0.4
Cyrix	NA	NA	63	NA	NA	0.1
Dallas Semiconductor	17	75	97	0	0.1	0.1
Elantec	13	16	16	0	0	0
Electronic Designs	NA	12	20	NA	0	0
ETEQ Microsystems	NA	NA	20	NA	NA	0
Exar	75	107	123	0.1	0.2	0.2
General Instrument	214	200	220	0.4	0.3	0.3
Gennum	18	23	27	0	0	0
Gould AMI	52	54	79	0.1	0.1	0.1
Harris	800	623	559	1.5	1.0	0.9

(Continued)



**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Hewlett-Packard	445	442	449	0.8	0.7	0.7
Honeywell	49	45	48	0.1	0.1	0.1
Hughes	44	40	37	0.1	0.1	0.1
IMI	15	17	18	0	0	0
Integrated Circuit Systems	NA	NA	36	NA	NA	0.1
Integrated Device Technology	199	204	220	0.4	0.3	0.3
Integrated Information Technology	NA	NA	42	NA	NA	0.1
Intel	3,171	4,019	5,091	5.8	6.7	7.8
International Microelectronic Products	40	32	32	0.1	0.1	0
International Rectifier	225	238	271	0.4	0.4	0.4
ITT	371	340	254	0.7	0.6	0.4
Kulite	28	26	24	0.1	0	0
Lattice	62	68	90	0.1	0.1	0.1
Linear Technology	83	107	132	0.2	0.2	0.2
Logic Devices	NA	NA	12	NA	NA	0
LSI Logic	598	670	615	1.1	1.1	0.9
Maxim	65	80	97	0.1	0.1	0.1
Micrel	5	6	15	0	0	0
Microchip Technology	85	81	83	0.2	0.1	0.1
Micro Linear	45	36	33	0.1	0.1	0.1
Micron Technology	286	455	557	0.5	0.8	0.9
Micro Power Systems	24	26	22	0	0	0
Microsemi	50	71	84	0.1	0.1	0.1
Mitel	47	50	52	0.1	0.1	0.1
MOSel	31	75	0	0.1	0.1	0
MOSel/Vitellic	NA	NA	161	NA	NA	0.2
Motorola	3,539	3,802	4,634	6.5	6.4	7.1
Natel Engineering	NA	NA	11	NA	NA	0
National Semiconductor	1,653	1,602	1,797	3.0	2.7	2.8
NCR	145	145	228	0.3	0.2	0.3
Novasensor	12	11	13	0	0	0
Oak Technology	NA	NA	50	NA	NA	0.1
Optek	66	52	57	0.1	0.1	0.1
OPTi	NA	NA	98	NA	NA	0.2
Performance Semiconductor	51	54	46	0.1	0.1	0.1
Powerex	92	78	80	0.2	0.1	0.1
Precision Monolithics	91	0	0	0.2	0	0

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Quality Semiconductor	NA	14	18	NA	0	0
Quality Technology	34	34	46	0.1	0.1	0.1
Raytheon	84	85	96	0.2	0.1	0.1
Rockwell	200	185	172	0.4	0.3	0.3
S3	NA	NA	31	NA	NA	0
SEEQ Technology	45	47	35	0.1	0.1	0.1
Semtech	18	27	20	0	0	0
Sierra Semiconductor	61	86	92	0.1	0.1	0.1
Silicon General	36	32	29	0.1	0.1	0
Siliconix	116	140	156	0.2	0.2	0.2
Silicon Systems	165	184	241	0.3	0.3	0.4
Sipex	21	21	20	0	0	0
Solitron	33	30	15	0.1	0.1	0
Standard Microsystems	49	45	40	0.1	0.1	0.1
Supertex	27	27	24	0	0	0
Symphony Laboratories	NA	NA	26	NA	NA	0
Teccor Electronics	NA	NA	46	NA	NA	0.1
Tektronix	40	70	47	0.1	0.1	0.1
Teledyne	25	24	26	0	0	0
Texas Instruments	2,574	2,738	3,085	4.7	4.6	4.7
Trident Microsystems	NA	NA	80	NA	NA	0.1
TRW	28	28	0	0.1	0	0
Tseng Labs	NA	NA	74	NA	NA	0.1
Unitrode	104	80	76	0.2	0.1	0.1
Universal	14	14	14	0	0	0
Vitellic	64	85	0	0.1	0.1	0
VLSI Technology	324	414	429	0.6	0.7	0.7
VTC	40	20	45	0.1	0	0.1
WaferScale Integration	33	33	29	0.1	0.1	0
Weitek	58	39	26	0.1	0.1	0
Western Digital	148	209	190	0.3	0.4	0.3
Xicor	71	94	93	0.1	0.2	0.1
Xilinx	84	130	163	0.2	0.2	0.2
Zilog	100	110	146	0.2	0.2	0.2
Other North American Companies	112	138	243	0.2	0.2	0.4

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Japanese Companies	25,278	27,684	27,576	46.3	46.4	42.3
Fuji Electric	319	319	297	0.6	0.5	0.5
Fujitsu	2,599	2,705	2,553	4.8	4.5	3.9
Hitachi	3,516	3,765	3,851	6.4	6.3	5.9
Matsushita	1,826	2,037	1,942	3.3	3.4	3.0
Mitsubishi	2,108	2,303	2,213	3.9	3.9	3.4
NEC	4,322	4,774	4,869	7.9	8.0	7.5
New JRC	140	151	138	0.3	0.3	0.2
NMB Semiconductor	96	60	120	0.2	0.1	0.2
Oki	954	981	956	1.7	1.6	1.5
Ricoh	89	97	93	0.2	0.2	0.1
Rohm	759	934	844	1.4	1.6	1.3
Sanken	399	451	426	0.7	0.8	0.7
Sanyo	1,196	1,362	1,385	2.2	2.3	2.1
Seiko Epson	196	220	230	0.4	0.4	0.4
Sharp	1,194	1,318	1,354	2.2	2.2	2.1
Shindengen Electric	159	184	170	0.3	0.3	0.3
Sony	1,010	1,196	1,103	1.9	2.0	1.7
Toko	60	64	59	0.1	0.1	0.1
Toshiba	4,202	4,579	4,675	7.7	7.7	7.2
Yamaha	134	158	201	0.2	0.3	0.3
Other Japanese Companies	0	26	97	0	0	0.1
European Companies	6,108	6,336	6,666	11.2	10.6	10.2
ABB-HAFO	42	38	40	0.1	0.1	0.1
ABB-IXYS	58	54	49	0.1	0.1	0.1
Austria Mikro Systeme	59	70	74	0.1	0.1	0.1
Dialog Semiconductor	NA	NA	17	NA	NA	0
EM Microelectronics Marin	NA	NA	45	NA	NA	0.1
Ericsson	56	74	72	0.1	0.1	0.1
Eupec	96	93	83	0.2	0.2	0.1
European Silicon Structures	27	28	30	0	0	0
Eurosil	39	29	30	0.1	0	0
Fagor	30	29	25	0.1	0	0
GEC Plessey	390	392	381	0.7	0.7	0.6
Matra MHS	100	104	122	0.2	0.2	0.2
Micronas	NA	NA	10	NA	NA	0

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Mietec	92	105	113	0.2	0.2	0.2
Philips	1,955	2,022	2,113	3.6	3.4	3.2
Semikron	106	108	103	0.2	0.2	0.2
SGS-Thomson	1,441	1,436	1,605	2.6	2.4	2.5
Siemens	1,204	1,263	1,245	2.2	2.1	1.9
STC	24	18	0	0	0	0
TAG	25	30	31	0	0.1	0
Telefunken Electronic	295	300	289	0.5	0.5	0.4
TCS	NA	NA	53	NA	NA	0.1
TMS	45	51	0	0.1	0.1	0
Westcode	NA	NA	35	NA	NA	0.1
Zetex	24	26	27	0	0	0
Other European Companies	0	66	74	0	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>2,112</b>	<b>2,734</b>	<b>3,914</b>	<b>3.9</b>	<b>4.6</b>	<b>6.0</b>
Daewoo	12	20	24	0	0	0
Dongsung Semiconductor	NA	30	11	NA	0.1	0
Goldstar	163	307	642	0.3	0.5	1.0
Hualon Microelectronics Corporation	50	71	75	0.1	0.1	0.1
Hyundai	115	248	556	0.2	0.4	0.9
Korean Electronic Company	114	136	148	0.2	0.2	0.2
Macronix	7	31	69	0	0.1	0.1
Samsung	1,315	1,473	1,900	2.4	2.5	2.9
Silicon Integrated Systems	33	28	40	0.1	0	0.1
United Microelectronics	150	200	198	0.3	0.3	0.3
Winbond Electronics	50	84	117	0.1	0.1	0.2
Other Asia/Pacific Companies	103	106	134	0.2	0.2	0.2

NA = Not available

Source: Dataquest (May 1993)

**Table 1-2**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	44,459	48,855	54,418	100.0	100.0	100.0
North American Companies	18,450	20,572	24,471	41.5	42.1	45.0
ACC Microelectronics	NA	NA	26	NA	NA	0
Actel	21	37	44	0	0.1	0.1
Adaptec	NA	NA	89	NA	NA	0.2
Advanced Micro Devices	1,053	1,226	1,514	2.4	2.5	2.8
Allegro MicroSystems	98	93	104	0.2	0.2	0.2
Altera	78	107	102	0.2	0.2	0.2
Analog Devices	380	464	516	0.9	0.9	0.9
Appian Technology	50	15	10	0.1	0	0
Applied Micro Circuits Corporation	28	38	39	0.1	0.1	0.1
AT&T	593	681	868	1.3	1.4	1.6
Atmel	123	120	140	0.3	0.2	0.3
Bipolar Integrated Technology	1	10	15	0	0	0
Brooktree	70	84	96	0.2	0.2	0.2
Burr-Brown	145	152	127	0.3	0.3	0.2
California Micro Devices	27	8	12	0.1	0	0
Catalyst	36	32	41	0.1	0.1	0.1
Cherry Semiconductor	36	37	46	0.1	0.1	0.1
Chips & Technologies	265	181	119	0.6	0.4	0.2
Cirrus Logic	130	152	275	0.3	0.3	0.5
Comlinear	13	14	15	0	0	0
Cypress Semiconductor	223	281	267	0.5	0.6	0.5
Cyrix	NA	NA	63	NA	NA	0.1
Dallas Semiconductor	17	75	97	0	0.2	0.2
Elantec	13	16	16	0	0	0
Electronic Designs	NA	12	20	NA	0	0
ETEQ Microsystems	NA	NA	20	NA	NA	0
Exar	75	107	123	0.2	0.2	0.2
Gennum	18	23	27	0	0	0
Gould AMI	52	54	79	0.1	0.1	0.1
Harris	655	507	444	1.5	1.0	0.8
Hewlett-Packard	200	206	214	0.4	0.4	0.4
Honeywell	24	20	21	0.1	0	0
Hughes	42	40	37	0.1	0.1	0.1
IMI	15	17	18	0	0	0

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Integrated Circuit Systems	NA	NA	36	NA	NA	0.1
Integrated Device Technology	199	204	220	0.4	0.4	0.4
Integrated Information Technology	NA	NA	42	NA	NA	0.1
Intel	3,171	4,019	5,091	7.1	8.2	9.4
International Microelectronic Products	40	32	32	0.1	0.1	0.1
International Rectifier	1	1	1	0	0	0
ITT	210	230	148	0.5	0.5	0.3
Kulite	28	26	24	0.1	0.1	0
Lattice	62	68	90	0.1	0.1	0.2
Linear Technology	83	107	132	0.2	0.2	0.2
Logic Devices	NA	NA	12	NA	NA	0
LSI Logic	598	670	615	1.3	1.4	1.1
Maxim	65	80	97	0.1	0.2	0.2
Micrel	5	6	15	0	0	0
Microchip Technology	85	81	83	0.2	0.2	0.2
Micro Linear	45	36	33	0.1	0.1	0.1
Micron Technology	286	455	557	0.6	0.9	1.0
Micro Power Systems	24	26	22	0.1	0.1	0
Mitel	47	50	52	0.1	0.1	0.1
MOSel	31	75	0	0.1	0.2	0
MOSel/Vitellic	NA	NA	161	NA	NA	0.3
Motorola	2,714	2,980	3,741	6.1	6.1	6.9
Natel Engineering	NA	NA	11	NA	NA	0
National Semiconductor	1,583	1,542	1,727	3.6	3.2	3.2
NCR	145	145	228	0.3	0.3	0.4
Novasensor	12	11	13	0	0	0
Oak Technology	NA	NA	50	NA	NA	0.1
OPTI	NA	NA	98	NA	NA	0.2
Performance Semiconductor	51	54	46	0.1	0.1	0.1
Precision Monolithics	91	0	0	0.2	0	0
Quality Semiconductor	NA	14	18	NA	0	0
Raytheon	74	77	89	0.2	0.2	0.2
Rockwell	200	185	172	0.4	0.4	0.3
S3	NA	NA	31	NA	NA	0.1
SEEQ Technology	45	47	35	0.1	0.1	0.1
Semtech	2	6	4	0	0	0
Sierra Semiconductor	61	86	92	0.1	0.2	0.2

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Silicon General	36	32	29	0.1	0.1	0.1
Siliconix	54	64	55	0.1	0.1	0.1
Silicon Systems	165	184	241	0.4	0.4	0.4
Sipex	21	21	20	0	0	0
Solitron	9	9	7	0	0	0
Standard Microsystems	49	45	40	0.1	0.1	0.1
Supertex	19	17	15	0	0	0
Symphony Laboratories	NA	NA	26	NA	NA	0
Tektronix	35	65	42	0.1	0.1	0.1
Teledyne	22	21	26	0	0	0
Texas Instruments	2,488	2,652	3,014	5.6	5.4	5.5
Trident Microsystems	NA	NA	80	NA	NA	0.1
TRW	28	28	0	0.1	0.1	0
Tseng Labs	NA	NA	74	NA	NA	0.1
Unitrode	50	41	66	0.1	0.1	0.1
Universal	14	14	14	0	0	0
Vitellic	64	85	0	0.1	0.2	0
VLSI Technology	324	414	429	0.7	0.8	0.8
VTC	40	20	45	0.1	0	0.1
WaferScale Integration	33	33	29	0.1	0.1	0.1
Weitek	57	39	26	0.1	0.1	0
Western Digital	148	209	190	0.3	0.4	0.3
Xicor	71	94	93	0.2	0.2	0.2
Xilinx	84	130	163	0.2	0.3	0.3
Zilog	100	110	146	0.2	0.2	0.3
Other North American Companies	100	123	139	0.2	0.3	0.3
<b>Japanese Companies</b>	<b>19,801</b>	<b>21,396</b>	<b>21,610</b>	<b>44.5</b>	<b>43.8</b>	<b>39.7</b>
Fuji Electric	70	55	51	0.2	0.1	0.1
Fujitsu	2,384	2,426	2,294	5.4	5.0	4.2
Hitachi	2,878	3,099	3,225	6.5	6.3	5.9
Matsushita	1,206	1,340	1,248	2.7	2.7	2.3
Mitsubishi	1,768	1,953	1,906	4.0	4.0	3.5
NEC	3,735	4,109	4,227	8.4	8.4	7.8
New JRC	123	134	123	0.3	0.3	0.2
NMB Semiconductor	96	60	120	0.2	0.1	0.2
Oki	917	942	922	2.1	1.9	1.7

(Continued)

Table 1-2 (Continued)

Each Company's Factory Revenue from Shipments of Integrated Circuits to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Ricoh	89	97	93	0.2	0.2	0.2
Rohm	343	438	391	0.8	0.9	0.7
Sanken	159	171	153	0.4	0.4	0.3
Sanyo	850	919	1,005	1.9	1.9	1.8
Seiko Epson	196	220	230	0.4	0.5	0.4
Sharp	891	956	1,002	2.0	2.0	1.8
Shindengen Electric	26	50	44	0.1	0.1	0.1
Sony	699	826	808	1.6	1.7	1.5
Toko	54	33	30	0.1	0.1	0.1
Toshiba	3,183	3,409	3,537	7.2	7.0	6.5
Yamaha	134	158	201	0.3	0.3	0.4
Other Japanese Companies	0	1	0	0	0	0
<b>European Companies</b>	<b>4,302</b>	<b>4,414</b>	<b>4,747</b>	<b>9.7</b>	<b>9.0</b>	<b>8.7</b>
ABB-HAFO	24	24	25	0.1	0	0
Austria Mikro Systeme	59	70	74	0.1	0.1	0.1
Dialog Semiconductor	NA	NA	17	NA	NA	0
EM Microelectronics Marin	NA	NA	45	NA	NA	0.1
Ericsson	56	74	72	0.1	0.2	0.1
European Silicon Structures	27	28	30	0.1	0.1	0.1
Eurosil	39	29	30	0.1	0.1	0.1
GEC Plessey	354	357	350	0.8	0.7	0.6
Matra MHS	100	104	122	0.2	0.2	0.2
Micronas	NA	NA	10	NA	NA	0
Mietec	92	105	113	0.2	0.2	0.2
Philips	1,417	1,455	1,562	3.2	3.0	2.9
SGS-Thomson	1,126	1,137	1,270	2.5	2.3	2.3
Siemens	817	829	847	1.8	1.7	1.6
STC	22	16	0	0	0	0
Telefunken Electronic	141	137	130	0.3	0.3	0.2
TCS	NA	NA	32	NA	NA	0.1
TMS	28	33	0	0.1	0.1	0
Other European Companies	0	16	18	0	0	0
<b>Asia/Pacific Companies</b>	<b>1,906</b>	<b>2,473</b>	<b>3,590</b>	<b>4.3</b>	<b>5.1</b>	<b>6.6</b>
Daewoo	12	20	24	0	0	0
Goldstar	163	307	631	0.4	0.6	1.2

(Continued)



**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Hualon Microelectronics Corporation	50	71	75	0.1	0.1	0.1
Hyundai	115	248	556	0.3	0.5	1.0
Korean Electronic Company	28	33	30	0.1	0.1	0.1
Macronix	7	31	69	0	0.1	0.1
Samsung	1,238	1,381	1,781	2.8	2.8	3.3
Silicon Integrated Systems	33	28	40	0.1	0.1	0.1
United Microelectronics	150	200	198	0.3	0.4	0.4
Winbond Electronics	50	84	117	0.1	0.2	0.2
Other Asia/Pacific Companies	60	70	69	0.1	0.1	0.1

NA = Not available

Source: Dataquest (May 1993)

**Table 1-3**  
**Each Company's Factory Revenue from Shipments of Bipolar Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	4,173	3,628	3,193	100.0	100.0	100.0
North American Companies	2,134	1,806	1,601	51.1	49.8	50.1
Advanced Micro Devices	407	300	247	9.8	8.3	7.7
Applied Micro Circuits Corporation	24	32	29	0.6	0.9	0.9
AT&T	59	48	60	1.4	1.3	1.9
Atmel	14	1	1	0.3	0	0
Bipolar Integrated Technology	1	10	15	0	0.3	0.5
Chips & Technologies	25	16	3	0.6	0.4	0.1
Harris	60	35	22	1.4	1.0	0.7
Integrated Device Technology	0	3	0	0	0.1	0
Intel	5	4	1	0.1	0.1	0
Motorola	406	380	384	9.7	10.5	12.0
National Semiconductor	405	324	274	9.7	8.9	8.6
Raytheon	54	53	51	1.3	1.5	1.6
Teledyne	3	3	0	0.1	0.1	0
Texas Instruments	663	583	505	15.9	16.1	15.8
TRW	8	7	0	0.2	0.2	0
Other North American Companies	0	7	9	0	0.2	0.3
Japanese Companies	1,627	1,454	1,240	39.0	40.1	38.8
Fujitsu	634	509	413	15.2	14.0	12.9
Hitachi	452	461	425	10.8	12.7	13.3
Matsushita	12	13	11	0.3	0.4	0.3
Mitsubishi	92	81	66	2.2	2.2	2.1
NEC	240	244	214	5.8	6.7	6.7
New JRC	1	1	0	0	0	0
Oki	41	39	33	1.0	1.1	1.0
Rohm	1	0	0	0	0	0
Sanyo	59	0	0	1.4	0	0
Sony	0	1	1	0	0	0
Toshiba	95	105	77	2.3	2.9	2.4
European Companies	386	346	328	9.2	9.5	10.3
GEC Plessey	66	41	40	1.6	1.1	1.3
Philips	250	245	241	6.0	6.8	7.5
SGS-Thomson	9	1	3	0.2	0	0.1

(Continued)

**Table 1-3 (Continued)**

**Each Company's Factory Revenue from Shipments of Bipolar Digital ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Siemens	43	41	40	1.0	1.1	1.3
STC	11	7	0	0.3	0.2	0
Telefunken Electronic	7	7	0	0.2	0.2	0
Other European Companies	0	4	4	0	0.1	0.1
Asia/Pacific Companies	26	22	24	0.6	0.6	0.8
Goldstar	26	22	24	0.6	0.6	0.8

Source: Dataquest (May 1993)

**Table 1-4**  
**Each Company's Factory Revenue from Shipments of TTL/Other Bipolar Digital ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	2,968	2,543	2,204	100.0	100.0	100.0
North American Companies	1,653	1,449	1,251	55.7	57.0	56.8
Advanced Micro Devices	306	294	237	10.3	11.6	10.8
AT&T	46	29	45	1.5	1.1	2.0
Bipolar Integrated Technology	0	7	9	0	0.3	0.4
Chips & Technologies	25	16	3	0.8	0.6	0.1
Harris	60	35	22	2.0	1.4	1.0
Intel	5	4	1	0.2	0.2	0
Motorola	174	156	154	5.9	6.1	7.0
National Semiconductor	319	271	227	10.7	10.7	10.3
Raytheon	52	50	47	1.8	2.0	2.1
Teledyne	3	3	0	0.1	0.1	0
Texas Instruments	663	583	505	22.3	22.9	22.9
Other North American Companies	0	1	1	0	0	0
Japanese Companies	1,005	812	683	33.9	31.9	31.0
Fujitsu	272	201	143	9.2	7.9	6.5
Hitachi	308	250	244	10.4	9.8	11.1
Matsushita	8	8	7	0.3	0.3	0.3
Mitsubishi	92	81	66	3.1	3.2	3.0
NEC	160	161	141	5.4	6.3	6.4
New JRC	1	1	0	0	0	0
Oki	37	35	31	1.2	1.4	1.4
Rohm	1	0	0	0	0	0
Sanyo	59	0	0	2.0	0	0
Toshiba	67	75	51	2.3	2.9	2.3
European Companies	284	260	246	9.6	10.2	11.2
GEC Plessey	20	5	3	0.7	0.2	0.1
Philips	236	229	225	8.0	9.0	10.2
SGS-Thomson	9	1	1	0.3	0	0
Siemens	12	14	13	0.4	0.6	0.6
Telefunken Electronic	7	7	0	0.2	0.3	0
Other European Companies	0	4	4	0	0.2	0.2
Asia/Pacific Companies	26	22	24	0.9	0.9	1.1
Goldstar	26	22	24	0.9	0.9	1.1

Source: Dataquest (May 1993)

**Table 1-5**  
**Each Company's Factory Revenue from Shipments of ECL Bipolar Digital ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	1,205	1,085	989	100.0	100.0	100.0
North American Companies	481	357	350	39.9	32.9	35.4
Advanced Micro Devices	101	6	10	8.4	0.6	1.0
Applied Micro Circuits Corporation	24	32	29	2.0	2.9	2.9
AT&T	13	19	15	1.1	1.8	1.5
Atmel	14	1	1	1.2	0.1	0.1
Bipolar Integrated Technology	1	3	6	0.1	0.3	0.6
Integrated Device Technology	0	3	0	0	0.3	0
Motorola	232	224	230	19.3	20.6	23.3
National Semiconductor	86	53	47	7.1	4.9	4.8
Raytheon	2	3	4	0.2	0.3	0.4
TRW	8	7	0	0.7	0.6	0
Other North American Companies	0	6	8	0	0.6	0.8
Japanese Companies	622	642	557	51.6	59.2	56.3
Fujitsu	362	308	270	30	28.4	27.3
Hitachi	144	211	181	12.0	19.4	18.3
Matsushita	4	5	4	0.3	0.5	0.4
NEC	80	83	73	6.6	7.6	7.4
Oki	4	4	2	0.3	0.4	0.2
Sony	0	1	1	0	0.1	0.1
Toshiba	28	30	26	2.3	2.8	2.6
European Companies	102	86	82	8.5	7.9	8.3
GEC Plessey	46	36	37	3.8	3.3	3.7
Philips	14	16	16	1.2	1.5	1.6
SGS-Thomson	0	0	2	0	0	0.2
Siemens	31	27	27	2.6	2.5	2.7
STC	11	7	0	0.9	0.6	0

Source: Dataquest (May 1993)

**Table 1-6**  
**Each Company's Factory Revenue from Shipments of Bipolar Memory ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	431	356	318	100.0	100.0	100.0
North American Companies	126	89	88	29.2	25.0	27.7
Advanced Micro Devices	65	52	46	15.1	14.6	14.5
Harris	5	2	13	1.2	0.6	4.1
Integrated Device Technology	0	3	0	0	0.8	0
Motorola	3	3	3	0.7	0.8	0.9
National Semiconductor	25	13	8	5.8	3.7	2.5
Raytheon	18	8	10	4.2	2.2	3.1
Texas Instruments	10	3	3	2.3	0.8	0.9
Other North American Companies	0	5	5	0	1.4	1.6
Japanese Companies	259	231	203	60.1	64.9	63.8
Fujitsu	144	113	90	33.4	31.7	28.3
Hitachi	95	99	94	22.0	27.8	29.6
NEC	20	19	19	4.6	5.3	6.0
European Companies	46	36	27	10.7	10.1	8.5
Philips	45	36	27	10.4	10.1	8.5
SGS-Thomson	1	0	0	0.2	0	0

Source: Dataquest (May 1993)

**Table 1-7**

**Each Company's Factory Revenue from Shipments of Bipolar Microcomponent ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	109	93	74	100.0	100.0	100.0
North American Companies	108	93	74	99.1	100.0	100.0
Advanced Micro Devices	40	21	16	36.7	22.6	21.6
Bipolar Integrated Technology	1	7	10	0.9	7.5	13.5
National Semiconductor	67	55	41	61.5	59.1	55.4
Texas Instruments	0	10	7	0	10.8	9.5
European Companies	1	0	0	0.9	0	0
Philips	1	0	0	0.9	0	0

Source: Dataquest (May 1993)

**Table 1-8**  
**Each Company's Factory Revenue from Shipments of Bipolar Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	3,633	3,179	2,801	100.0	100.0	100.0
North American Companies	1,900	1,624	1,439	52.3	51.1	51.4
Advanced Micro Devices	302	227	185	8.3	7.1	6.6
Applied Micro Circuits Corporation	24	32	29	0.7	1.0	1.0
AT&T	59	48	60	1.6	1.5	2.1
Atmel	14	1	1	0.4	0	0
Bipolar Integrated Technology	0	3	5	0	0.1	0.2
Chips & Technologies	25	16	3	0.7	0.5	0.1
Harris	55	33	9	1.5	1.0	0.3
Intel	5	4	1	0.1	0.1	0
Motorola	403	377	381	11.1	11.9	13.6
National Semiconductor	313	256	225	8.6	8.1	8.0
Raytheon	36	45	41	1.0	1.4	1.5
Teledyne	3	3	0	0.1	0.1	0
Texas Instruments	653	570	495	18.0	17.9	17.7
TRW	8	7	0	0.2	0.2	0
Other North American Companies	0	2	4	0	0.1	0.1
Japanese Companies	1,368	1,223	1,037	37.7	38.5	37.0
Fujitsu	490	396	323	13.5	12.5	11.5
Hitachi	357	362	331	9.8	11.4	11.8
Matsushita	12	13	11	0.3	0.4	0.4
Mitsubishi	92	81	66	2.5	2.5	2.4
NEC	220	225	195	6.1	7.1	7.0
New JRC	1	1	0	0	0	0
Oki	41	39	33	1.1	1.2	1.2
Rohm	1	0	0	0	0	0
Sanyo	59	0	0	1.6	0	0
Sony	0	1	1	0	0	0
Toshiba	95	105	77	2.6	3.3	2.7
European Companies	339	310	301	9.3	9.8	10.7
GEC Plessey	66	41	40	1.8	1.3	1.4
Philips	204	209	214	5.6	6.6	7.6
SGS-Thomson	8	1	3	0.2	0	0.1
Siemens	43	41	40	1.2	1.3	1.4

(Continued)



**Table 1-8 (Continued)**

**Each Company's Factory Revenue from Shipments of Bipolar Logic ICs to the World  
(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
STC	11	7	0	0.3	0.2	0
Telefunken Electronic	7	7	0	0.2	0.2	0
Other European Companies	0	4	4	0	0.1	0.1
Asia/Pacific Companies	26	22	24	0.7	0.7	0.9
Goldstar	26	22	24	0.7	0.7	0.9

Source: Dataquest (May 1993)

**Table 1-9**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	30,152	34,315	39,710	100.0	100.0	100.0
North American Companies	12,030	14,377	17,879	39.9	41.9	45.0
ACC Microelectronics	NA	NA	26	NA	NA	0.1
Actel	21	37	44	0.1	0.1	0.1
Adaptec	NA	NA	89	NA	NA	0.2
Advanced Micro Devices	570	832	1,157	1.9	2.4	2.9
Allegro MicroSystems	2	2	4	0	0	0
Altera	78	107	102	0.3	0.3	0.3
Analog Devices	20	20	39	0.1	0.1	0.1
Appian Technology	50	15	10	0.2	0	0
Applied Micro Circuits Corporation	4	6	10	0	0	0
AT&T	337	391	533	1.1	1.1	1.3
Atmel	98	118	138	0.3	0.3	0.3
California Micro Devices	8	3	5	0	0	0
Catalyst	35	32	40	0.1	0.1	0.1
Chips & Technologies	240	165	116	0.8	0.5	0.3
Cirrus Logic	129	151	246	0.4	0.4	0.6
Cypress Semiconductor	223	281	267	0.7	0.8	0.7
Cyrrix	NA	NA	63	NA	NA	0.2
Dallas Semiconductor	14	62	89	0	0.2	0.2
Electronic Designs	NA	12	20	NA	0	0.1
ETEQ Microsystems	NA	NA	20	NA	NA	0.1
Gould AMI	39	40	49	0.1	0.1	0.1
Harris	335	246	205	1.1	0.7	0.5
Hewlett-Packard	200	206	214	0.7	0.6	0.5
Honeywell	4	0	0	0	0	0
Hughes	34	32	25	0.1	0.1	0.1
IMI	14	14	15	0	0	0
Integrated Circuit Systems	NA	NA	36	NA	NA	0.1
Integrated Device Technology	196	198	220	0.7	0.6	0.6
Integrated Information Technology	NA	NA	42	NA	NA	0.1
Intel	3,157	4,006	5,080	10.5	11.7	12.8
International Microelectronic Products	28	26	21	0.1	0.1	0.1
ITT	107	195	130	0.4	0.6	0.3
Lattice	62	68	90	0.2	0.2	0.2
Logic Devices	NA	NA	12	NA	NA	0

(Continued)

**Table 1-9 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
LSI Logic	596	670	615	2.0	2.0	1.5
Micrel	0	0	5	0	0	0
Microchip Technology	85	81	83	0.3	0.2	0.2
Micron Technology	286	455	557	0.9	1.3	1.4
MOSel	31	75	0	0.1	0.2	0
MOSel/Vitellic	NA	NA	161	NA	NA	0.4
Motorola	1,826	2,144	2,706	6.1	6.2	6.8
National Semiconductor	585	589	714	1.9	1.7	1.8
NCR	115	117	178	0.4	0.3	0.4
Oak Technology	NA	NA	50	NA	NA	0.1
OPTi	NA	NA	98	NA	NA	0.2
Performance Semiconductor	51	54	46	0.2	0.2	0.1
Quality Semiconductor	NA	14	18	NA	0	0
Rockwell	40	20	17	0.1	0.1	0
S3	NA	NA	31	NA	NA	0.1
SEEQ Technology	45	39	26	0.1	0.1	0.1
Sierra Semiconductor	6	7	7	0	0	0
Standard Microsystems	49	45	40	0.2	0.1	0.1
Supertex	6	5	5	0	0	0
Symphony Laboratories	NA	NA	26	NA	NA	0.1
Texas Instruments	1,367	1,630	2,019	4.5	4.8	5.1
Trident Microsystems	NA	NA	80	NA	NA	0.2
TRW	6	7	0	0	0	0
Tseng Labs	NA	NA	74	NA	NA	0.2
Universal	10	10	10	0	0	0
Vitellic	64	85	0	0.2	0.2	0
VLSI Technology	324	414	427	1.1	1.2	1.1
VTC	7	0	0	0	0	0
WaferScale Integration	33	33	29	0.1	0.1	0.1
Weitek	57	39	26	0.2	0.1	0.1
Western Digital	148	209	190	0.5	0.6	0.5
Xicor	68	91	93	0.2	0.3	0.2
Xilinx	84	130	163	0.3	0.4	0.4
Zilog	100	110	146	0.3	0.3	0.4
Other North American Companies	36	39	82	0.1	0.1	0.2

(Continued)

**Table 1-9 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Japanese Companies	14,389	15,615	16,267	47.7	45.5	41.0
Fuji Electric	25	24	26	0.1	0.1	0.1
Fujitsu	1,602	1,738	1,709	5.3	5.1	4.3
Hitachi	2,113	2,280	2,461	7.0	6.6	6.2
Matsushita	798	915	834	2.6	2.7	2.1
Mitsubishi	1,263	1,395	1,423	4.2	4.1	3.6
NEC	3,118	3,443	3,599	10.3	10.0	9.1
New JRC	8	11	10	0	0	0
NMB Semiconductor	96	60	120	0.3	0.2	0.3
Oki	845	871	862	2.8	2.5	2.2
Ricoh	89	91	86	0.3	0.3	0.2
Rohm	69	97	90	0.2	0.3	0.2
Sanyo	324	320	386	1.1	0.9	1.0
Seiko Epson	185	208	219	0.6	0.6	0.6
Sharp	826	890	938	2.7	2.6	2.4
Sony	348	431	435	1.2	1.3	1.1
Toshiba	2,553	2,692	2,879	8.5	7.8	7.3
Yamaha	127	148	190	0.4	0.4	0.5
Other Japanese Companies	0	1	0	0	0	0
European Companies	2,082	2,130	2,267	6.9	6.2	5.7
ABB-HAFO	24	24	0	0.1	0.1	0
Austria Mikro Systeme	37	39	29	0.1	0.1	0.1
Ericsson	8	16	15	0	0	0
European Silicon Structures	27	28	30	0.1	0.1	0.1
Eurosil	39	22	23	0.1	0.1	0.1
GEC Plessey	115	131	118	0.4	0.4	0.3
Matra MHS	96	99	114	0.3	0.3	0.3
Mietec	20	22	22	0.1	0.1	0.1
Philips	514	546	646	1.7	1.6	1.6
SGS-Thomson	563	558	609	1.9	1.6	1.5
Siemens	592	607	632	2.0	1.8	1.6
STC	5	4	0	0	0	0
Telefunken Electronic	23	12	7	0.1	0	0
TCS	NA	NA	22	NA	NA	0.1
TMS	19	22	0	0.1	0.1	0

(Continued)

**Table 1-9 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Asia/Pacific Companies	1,651	2,193	3,297	5.5	6.4	8.3
Daewoo	1	6	7	0	0	0
Goldstar	117	273	587	0.4	0.8	1.5
Hualon Microelectronics Corporation	49	70	74	0.2	0.2	0.2
Hyundai	115	248	556	0.4	0.7	1.4
Macronix	7	31	69	0	0.1	0.2
Samsung	1,146	1,269	1,664	3.8	3.7	4.2
Silicon Integrated Systems	33	28	40	0.1	0.1	0.1
United Microelectronics	150	200	198	0.5	0.6	0.5
Winbond Electronics	32	68	102	0.1	0.2	0.3
Other Asia/Pacific Companies	1	0	0	0	0	0

NA = Not available

Source: Dataquest (May 1993)

**Table 1-10**  
**Each Company's Factory Revenue from Shipments of N/PMOS Digital ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	6,547	6,005	5,391	100.0	100.0	100.0
North American Companies	2,233	1,860	1,482	34.1	31.0	27.5
Advanced Micro Devices	252	158	120	3.8	2.6	2.2
AT&T	48	40	26	0.7	0.7	0.5
Gould AMI	7	0	0	0.1	0	0
Harris	2	0	16	0	0	0.3
Hughes	1	1	1	0	0	0
Intel	1,104	1,180	1,016	16.9	19.7	18.8
International Microelectronic Products	4	4	2	0.1	0.1	0
ITT	43	70	30	0.7	1.2	0.6
Micrel	0	0	2	0	0	0
Microchip Technology	24	18	2	0.4	0.3	0
Micron Technology	71	0	0	1.1	0	0
Motorola	66	152	115	1.0	2.5	2.1
National Semiconductor	68	37	30	1.0	0.6	0.6
NCR	9	1	0	0.1	0	0
Rockwell	40	20	7	0.6	0.3	0.1
SEEQ Technology	5	4	2	0.1	0.1	0
Standard Microsystems	9	5	4	0.1	0.1	0.1
Texas Instruments	371	99	69	5.7	1.6	1.3
Xicor	53	36	13	0.8	0.6	0.2
Zilog	56	35	27	0.9	0.6	0.5
Japanese Companies	3,616	3,492	3,292	55.2	58.2	61.1
Fujitsu	330	320	236	5.0	5.3	4.4
Hitachi	426	437	424	6.5	7.3	7.9
Matsushita	290	304	258	4.4	5.1	4.8
Mitsubishi	623	603	670	9.5	10.0	12.4
NEC	841	729	703	12.8	12.1	13.0
Oki	208	189	183	3.2	3.1	3.4
Ricoh	32	29	22	0.5	0.5	0.4
Rohm	2	2	2	0	0	0
Sanyo	28	16	17	0.4	0.3	0.3
Sharp	209	230	215	3.2	3.8	4.0
Sony	37	41	32	0.6	0.7	0.6
Toshiba	590	592	530	9.0	9.9	9.8

(Continued)

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of N/PMOS Digital ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
<b>European Companies</b>	593	569	585	9.1	9.5	10.9
Austria Mikro Systeme	11	17	9	0.2	0.3	0.2
GEC Plessey	15	11	9	0.2	0.2	0.2
Mietec	7	3	1	0.1	0	0
Philips	94	106	115	1.4	1.8	2.1
SGS-Thomson	204	183	194	3.1	3.0	3.6
Siemens	235	233	246	3.6	3.9	4.6
Telefunken Electronic	23	12	7	0.4	0.2	0.1
TCS	NA	NA	4	NA	NA	0.1
TMS	4	4	0	0.1	0.1	0
<b>Asia/Pacific Companies</b>	105	84	32	1.6	1.4	0.6
Goldstar	6	2	2	0.1	0	0
Hualon Microelectronics Corporation	0	10	6	0	0.2	0.1
Macronix	7	0	0	0.1	0	0
Samsung	42	41	24	0.6	0.7	0.4
United Microelectronics	50	31	0	0.8	0.5	0

NA = Not available

Source: Dataquest (May 1993)

**Table 1-11**  
**Each Company's Factory Revenue from Shipments of CMOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	23,179	27,749	33,679	100.0	100.0	100.0
North American Companies	9,694	12,353	16,156	41.8	44.5	48.0
ACC Microelectronics	NA	NA	26	NA	NA	0.1
Actel	21	37	44	0.1	0.1	0.1
Adaptec	NA	NA	89	NA	NA	0.3
Advanced Micro Devices	318	674	1,037	1.4	2.4	3.1
Allegro MicroSystems	2	2	4	0	0	0
Altera	78	107	102	0.3	0.4	0.3
Analog Devices	20	20	39	0.1	0.1	0.1
Appian Technology	50	15	10	0.2	0.1	0
AT&T	289	343	500	1.2	1.2	1.5
Atmel	98	118	138	0.4	0.4	0.4
California Micro Devices	8	3	5	0	0	0
Catalyst	35	32	40	0.2	0.1	0.1
Chips & Technologies	240	165	116	1.0	0.6	0.3
Cirrus Logic	129	151	246	0.6	0.5	0.7
Cypress Semiconductor	222	271	252	1.0	1.0	0.7
Cyrrix	NA	NA	63	NA	NA	0.2
Dallas Semiconductor	14	62	89	0.1	0.2	0.3
Electronic Designs	NA	12	20	NA	0	0.1
ETEQ Microsystems	NA	NA	20	NA	NA	0.1
Gould AMI	32	40	49	0.1	0.1	0.1
Harris	318	231	189	1.4	0.8	0.6
Hewlett-Packard	200	206	214	0.9	0.7	0.6
Honeywell	4	0	0	0	0	0
Hughes	33	31	24	0.1	0.1	0.1
IMI	14	14	15	0.1	0.1	0
Integrated Circuit Systems	NA	NA	36	NA	NA	0.1
Integrated Device Technology	191	191	201	0.8	0.7	0.6
Integrated Information Technology	NA	NA	42	NA	NA	0.1
Intel	2,053	2,826	4,064	8.9	10.2	12.1
International Microelectronic Products	24	22	19	0.1	0.1	0.1
ITT	64	125	100	0.3	0.5	0.3
Lattice	62	68	90	0.3	0.2	0.3
Logic Devices	NA	NA	12	NA	NA	0
LSI Logic	591	665	613	2.5	2.4	1.8

(Continued)



**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of CMOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Micrel	0	0	3	0	0	0
Microchip Technology	61	63	81	0.3	0.2	0.2
Micron Technology	215	455	557	0.9	1.6	1.7
MOSel	31	75	0	0.1	0.3	0
MOSel/Vitellic	NA	NA	161	NA	NA	0.5
Motorola	1,737	1,954	2,539	7.5	7.0	7.5
National Semiconductor	483	501	632	2.1	1.8	1.9
NCR	106	116	178	0.5	0.4	0.5
Oak Technology	NA	NA	50	NA	NA	0.1
OPTi	NA	NA	98	NA	NA	0.3
Performance Semiconductor	51	54	46	0.2	0.2	0.1
Quality Semiconductor	NA	14	18	NA	0.1	0.1
Rockwell	0	0	10	0	0	0
S3	NA	NA	31	NA	NA	0.1
SEEQ Technology	40	35	24	0.2	0.1	0.1
Sierra Semiconductor	6	7	7	0	0	0
Standard Microsystems	40	40	36	0.2	0.1	0.1
Supertex	6	5	5	0	0	0
Symphony Laboratories	NA	NA	26	NA	NA	0.1
Texas Instruments	980	1,507	1,866	4.2	5.4	5.5
Trident Microsystems	NA	NA	80	NA	NA	0.2
TRW	6	7	0	0	0	0
Tseng Labs	NA	NA	74	NA	NA	0.2
Universal	10	10	10	0	0	0
Vitellic	64	85	0	0.3	0.3	0
VLSI Technology	324	414	427	1.4	1.5	1.3
VTC	7	0	0	0	0	0
WaferScale Integration	33	33	29	0.1	0.1	0.1
Weitek	57	39	26	0.2	0.1	0.1
Western Digital	148	209	190	0.6	0.8	0.6
Xicor	15	55	80	0.1	0.2	0.2
Xilinx	84	130	163	0.4	0.5	0.5
Zilog	44	75	119	0.2	0.3	0.4
Other North American Companies	36	39	82	0.2	0.1	0.2

(Continued)

**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of CMOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Japanese Companies	10,467	11,741	12,596	45.2	42.3	37.4
Fuji Electric	22	22	26	0.1	0.1	0.1
Fujitsu	1,182	1,311	1,366	5.1	4.7	4.1
Hitachi	1,591	1,728	1,924	6.9	6.2	5.7
Matsushita	508	611	576	2.2	2.2	1.7
Mitsubishi	640	792	753	2.8	2.9	2.2
NEC	2,188	2,600	2,782	9.4	9.4	8.3
New JRC	8	11	10	0	0	0
NMB Semiconductor	96	60	120	0.4	0.2	0.4
Oki	613	656	652	2.6	2.4	1.9
Ricoh	56	61	62	0.2	0.2	0.2
Rohm	67	95	88	0.3	0.3	0.3
Sanyo	296	301	366	1.3	1.1	1.1
Seiko Epson	185	208	219	0.8	0.7	0.7
Sharp	617	660	723	2.7	2.4	2.1
Sony	308	386	399	1.3	1.4	1.2
Toshiba	1,963	2,090	2,340	8.5	7.5	6.9
Yamaha	127	148	190	0.5	0.5	0.6
Other Japanese Companies	0	1	0	0	0	0
European Companies	1,472	1,547	1,665	6.4	5.6	4.9
ABB-HAFO	24	24	0	0.1	0.1	0
Austria Mikro Systeme	26	22	19	0.1	0.1	0.1
Ericsson	8	16	15	0	0.1	0
European Silicon Structures	27	28	30	0.1	0.1	0.1
Eurosil	39	22	23	0.2	0.1	0.1
GEC Plessey	100	120	109	0.4	0.4	0.3
Matra MHS	96	99	114	0.4	0.4	0.3
Mietec	13	19	21	0.1	0.1	0.1
Philips	420	440	531	1.8	1.6	1.6
SGS-Thomson	347	361	399	1.5	1.3	1.2
Siemens	357	374	386	1.5	1.3	1.1
STC	0	4	0	0	0	0
TCS	NA	NA	18	NA	NA	0.1
TMS	15	18	0	0.1	0.1	0

(Continued)

**Table 1-11 (Continued)**

**Each Company's Factory Revenue from Shipments of CMOS Digital ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Asia/Pacific Companies	1,546	2,108	3,262	6.7	7.6	9.7
Daewoo	1	6	7	0	0	0
Goldstar	111	271	585	0.5	1.0	1.7
Hualon Microelectronics Corporation	49	60	68	0.2	0.2	0.2
Hyundai	115	248	556	0.5	0.9	1.7
Macronix	0	31	69	0	0.1	0.2
Samsung	1,104	1,228	1,640	4.8	4.4	4.9
Silicon Integrated Systems	33	28	40	0.1	0.1	0.1
United Microelectronics	100	169	198	0.4	0.6	0.6
Winbond Electronics	32	67	99	0.1	0.2	0.3
Other Asia/Pacific Companies	1	0	0	0	0	0

NA = Not available

Source: Dataquest (May 1993)

**Table 1-12**  
**Each Company's Factory Revenue from Shipments of BiCMOS Digital ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	426	561	640	100.0	100.0	100.0
North American Companies	103	164	241	24.2	29.2	37.7
Applied Micro Circuits Corporation	4	6	10	0.9	1.1	1.6
AT&T	0	8	7	0	1.4	1.1
Cypress Semiconductor	1	10	15	0.2	1.8	2.3
Harris	15	15	0	3.5	2.7	0
Integrated Device Technology	5	7	19	1.2	1.2	3.0
LSI Logic	5	5	2	1.2	0.9	0.3
Motorola	23	38	52	5.4	6.8	8.1
National Semiconductor	34	51	52	8.0	9.1	8.1
Texas Instruments	16	24	84	3.8	4.3	13.1
Japanese Companies	306	382	379	71.8	68.1	59.2
Fuji Electric	3	2	0	0.7	0.4	0
Fujitsu	90	107	107	21.1	19.1	16.7
Hitachi	96	115	113	22.5	20.5	17.7
NEC	89	114	114	20.9	20.3	17.8
Oki	24	26	27	5.6	4.6	4.2
Ricoh	1	1	2	0.2	0.2	0.3
Sanyo	0	3	3	0	0.5	0.5
Sony	3	4	4	0.7	0.7	0.6
Toshiba	0	10	9	0	1.8	1.4
European Companies	17	14	17	4.0	2.5	2.7
Austria Mikro Systeme	0	0	1	0	0	0.2
SGS-Thomson	12	14	16	2.8	2.5	2.5
STC	5	0	0	1.2	0	0
Asia/Pacific Companies	0	1	3	0	0.2	0.5
Winbond Electronics	0	1	3	0	0.2	0.5

Source: Dataquest (May 1993)

**Table 1-13**  
**Each Company's Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	12,128	12,841	15,308	100.0	100.0	100.0
North American Companies	2,977	3,298	3,729	24.5	25.7	24.4
Advanced Micro Devices	253	270	282	2.1	2.1	1.8
AT&T	13	4	33	0.1	0	0.2
Atmel	54	78	99	0.4	0.6	0.6
Catalyst	35	32	40	0.3	0.2	0.3
Cypress Semiconductor	166	186	187	1.4	1.4	1.2
Dallas Semiconductor	14	21	24	0.1	0.2	0.2
Electronic Designs	NA	12	20	NA	0.1	0.1
Gould AMI	14	11	15	0.1	0.1	0.1
Harris	24	23	20	0.2	0.2	0.1
Honeywell	2	0	0	0	0	0
Integrated Device Technology	132	128	138	1.1	1.0	0.9
Intel	371	395	324	3.1	3.1	2.1
International Microelectronic Products	8	6	5	0.1	0	0
ITT	0	10	8	0	0.1	0.1
Logic Devices	NA	NA	4	NA	NA	0
Microchip Technology	60	57	47	0.5	0.4	0.3
Micron Technology	286	455	557	2.4	3.5	3.6
MOSEL	31	75	0	0.3	0.6	0
MOSEL/Vitellic	NA	NA	136	NA	NA	0.9
Motorola	395	412	610	3.3	3.2	4.0
National Semiconductor	137	112	128	1.1	0.9	0.8
NCR	4	3	2	0	0	0
Performance Semiconductor	19	18	16	0.2	0.1	0.1
Quality Semiconductor	NA	6	9	NA	0	0.1
SEEQ Technology	33	33	21	0.3	0.3	0.1
Texas Instruments	741	738	874	6.1	5.7	5.7
Vitellic	64	85	0	0.5	0.7	0
VLSI Technology	8	0	0	0.1	0	0
WaferScale Integration	27	23	22	0.2	0.2	0.1
Xicor	68	91	93	0.6	0.7	0.6
Other North American Companies	18	14	15	0.1	0.1	0.1

(Continued)

**Table 1-13 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
<b>Japanese Companies</b>	7,095	7,141	8,008	58.5	55.6	52.3
Fujitsu	913	909	927	7.5	7.1	6.1
Hitachi	1,224	1,330	1,519	10.1	10.4	9.9
Matsushita	265	217	217	2.2	1.7	1.4
Mitsubishi	745	762	878	6.1	5.9	5.7
NEC	1,233	1,242	1,422	10.2	9.7	9.3
NMB Semiconductor	96	60	120	0.8	0.5	0.8
Oki	350	380	424	2.9	3.0	2.8
Ricoh	26	8	8	0.2	0.1	0.1
Rohm	13	28	27	0.1	0.2	0.2
Sanyo	86	82	95	0.7	0.6	0.6
Seiko Epson	55	37	36	0.5	0.3	0.2
Sharp	454	476	519	3.7	3.7	3.4
Sony	204	183	197	1.7	1.4	1.3
Toshiba	1,431	1,425	1,618	11.8	11.1	10.6
Yamaha	0	2	1	0	0	0
<b>European Companies</b>	731	682	724	6.0	5.3	4.7
Eurosil	0	1	2	0	0	0
GEC Plessey	8	0	5	0.1	0	0
Matra MHS	37	35	37	0.3	0.3	0.2
Philips	96	75	40	0.8	0.6	0.3
SGS-Thomson	278	273	304	2.3	2.1	2.0
Siemens	312	298	336	2.6	2.3	2.2
<b>Asia/Pacific Companies</b>	1,325	1,720	2,847	10.9	13.4	18.6
Daewoo	0	0	1	0	0	0
Goldstar	96	249	557	0.8	1.9	3.6
Hualon Microelectronics Corporation	39	27	29	0.3	0.2	0.2
Hyundai	115	248	556	0.9	1.9	3.6
Macronix	7	31	57	0.1	0.2	0.4
Samsung	971	1,066	1,516	8.0	8.3	9.9
Silicon Integrated Systems	17	15	21	0.1	0.1	0.1
United Microelectronics	66	58	64	0.5	0.5	0.4
Winbond Electronics	14	26	46	0.1	0.2	0.3

NA = Not available

Source: Dataquest (May 1993)

**Table 1-14**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	9,584	11,774	14,359	100.0	100.0	100.0
North American Companies	5,743	7,256	9,879	59.9	61.6	68.8
ACC Microelectronics	NA	NA	26	NA	NA	0.2
Adaptec	NA	NA	89	NA	NA	0.6
Advanced Micro Devices	178	395	642	1.9	3.4	4.5
Analog Devices	20	20	39	0.2	0.2	0.3
Appian Technology	38	8	6	0.4	0.1	0
AT&T	21	33	115	0.2	0.3	0.8
Atmel	0	2	5	0	0	0
California Micro Devices	8	3	5	0.1	0	0
Chips & Technologies	240	165	116	2.5	1.4	0.8
Cirrus Logic	129	151	246	1.3	1.3	1.7
Cypress Semiconductor	15	48	40	0.2	0.4	0.3
Cyrix	NA	NA	63	NA	NA	0.4
Dallas Semiconductor	0	41	55	0	0.3	0.4
ETEQ Microsystems	NA	NA	20	NA	NA	0.1
Harris	110	65	57	1.1	0.6	0.4
Hughes	2	2	2	0	0	0
Integrated Device Technology	20	20	31	0.2	0.2	0.2
Integrated Information Technology	NA	NA	42	NA	NA	0.3
Intel	2,726	3,578	4,721	28.4	30.4	32.9
ITT	28	35	29	0.3	0.3	0.2
LSI Logic	93	115	51	1.0	1.0	0.4
Microchip Technology	16	15	32	0.2	0.1	0.2
Motorola	970	1,171	1,464	10.1	9.9	10.2
National Semiconductor	242	286	383	2.5	2.4	2.7
NCR	31	39	71	0.3	0.3	0.5
Oak Technology	NA	NA	50	NA	NA	0.3
OPTi	NA	NA	98	NA	NA	0.7
Performance Semiconductor	24	28	21	0.3	0.2	0.1
Rockwell	40	20	13	0.4	0.2	0.1
S3	NA	NA	31	NA	NA	0.2
SEEQ Technology	12	6	5	0.1	0.1	0
Sierra Semiconductor	1	1	1	0	0	0
Standard Microsystems	40	40	35	0.4	0.3	0.2
Supertex	0	2	2	0	0	0

(Continued)

Table 1-14 (Continued)

Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Symphony Laboratories	NA	NA	26	NA	NA	0.2
Texas Instruments	320	419	530	3.3	3.6	3.7
Trident Microsystems	NA	NA	80	NA	NA	0.6
TRW	6	7	0	0.1	0.1	0
Tseng Labs	NA	NA	74	NA	NA	0.5
VLSI Technology	105	165	141	1.1	1.4	1.0
WaferScale Integration	2	7	6	0	0.1	0
Weitek	57	39	26	0.6	0.3	0.2
Western Digital	148	209	190	1.5	1.8	1.3
Zilog	100	110	146	1.0	0.9	1.0
Other North American Companies	1	11	54	0	0.1	0.4
<b>Japanese Companies</b>	<b>3,236</b>	<b>3,824</b>	<b>3,649</b>	<b>33.8</b>	<b>32.5</b>	<b>25.4</b>
Fuji Electric	1	1	1	0	0	0
Fujitsu	213	244	233	2.2	2.1	1.6
Hitachi	546	583	596	5.7	5.0	4.2
Matsushita	250	321	275	2.6	2.7	1.9
Mitsubishi	441	543	456	4.6	4.6	3.2
NEC	981	1,149	1,130	10.2	9.8	7.9
Oki	131	137	124	1.4	1.2	0.9
Ricoh	22	62	56	0.2	0.5	0.4
Rohm	17	23	20	0.2	0.2	0.1
Sanyo	71	69	100	0.7	0.6	0.7
Seiko Epson	10	16	16	0.1	0.1	0.1
Sharp	124	134	129	1.3	1.1	0.9
Sony	43	88	73	0.4	0.7	0.5
Toshiba	386	454	440	4.0	3.9	3.1
<b>European Companies</b>	<b>538</b>	<b>567</b>	<b>637</b>	<b>5.6</b>	<b>4.8</b>	<b>4.4</b>
Eurosil	4	0	0	0	0	0
GEC Plessey	8	5	8	0.1	0	0.1
Matra MHS	33	37	47	0.3	0.3	0.3
Philips	192	212	287	2.0	1.8	2.0
SGS-Thomson	175	167	167	1.8	1.4	1.2
Siemens	116	134	116	1.2	1.1	0.8
TCS	NA	NA	12	NA	NA	0.1
TMS	10	12	0	0.1	0.1	0

(Continued)



**Table 1-14 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Asia/Pacific Companies	67	127	194	0.7	1.1	1.4
Daewoo	0	0	4	0	0	0
Goldstar	3	11	14	0	0.1	0.1
Hualon Microelectronics Corporation	0	9	10	0	0.1	0.1
Macronix	0	0	12	0	0	0.1
Samsung	22	27	24	0.2	0.2	0.2
Silicon Integrated Systems	3	4	19	0	0	0.1
United Microelectronics	39	62	69	0.4	0.5	0.5
Winbond Electronics	0	14	42	0	0.1	0.3

NA = Not available

Source: Dataquest (May 1993)

**Table 1-15**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	8,440	9,700	10,043	100.0	100.0	100.0
North American Companies	3,310	3,823	4,271	39.2	39.4	42.5
Actel	21	37	44	0.2	0.4	0.4
Advanced Micro Devices	139	167	233	1.6	1.7	2.3
Allegro MicroSystems	2	2	4	0	0	0
Altera	78	107	102	0.9	1.1	1.0
Appian Technology	12	7	4	0.1	0.1	0
Applied Micro Circuits Corporation	4	6	10	0	0.1	0.1
AT&T	303	354	385	3.6	3.6	3.8
Atmel	44	38	34	0.5	0.4	0.3
Cypress Semiconductor	42	47	40	0.5	0.5	0.4
Dallas Semiconductor	0	0	10	0	0	0.1
Gould AMI	25	29	34	0.3	0.3	0.3
Harris	201	158	128	2.4	1.6	1.3
Hewlett-Packard	200	206	214	2.4	2.1	2.1
Honeywell	2	0	0	0	0	0
Hughes	32	30	23	0.4	0.3	0.2
IMI	14	14	15	0.2	0.1	0.1
Integrated Circuit Systems	NA	NA	36	NA	NA	0.4
Integrated Device Technology	44	50	51	0.5	0.5	0.5
Intel	60	33	35	0.7	0.3	0.3
International Microelectronic Products	20	20	16	0.2	0.2	0.2
ITT	79	150	93	0.9	1.5	0.9
Lattice	62	68	90	0.7	0.7	0.9
Logic Devices	NA	NA	8	NA	NA	0.1
LSI Logic	503	555	564	6.0	5.7	5.6
Micrel	0	0	5	0	0	0
Microchip Technology	9	9	4	0.1	0.1	0
MOSel/Vitellic	NA	NA	25	NA	NA	0.2
Motorola	461	561	632	5.5	5.8	6.3
National Semiconductor	206	191	203	2.4	2.0	2.0
NCR	80	75	105	0.9	0.8	1.0
Performance Semiconductor	8	8	9	0.1	0.1	0.1
Quality Semiconductor	NA	8	9	NA	0.1	0.1
Rockwell	0	0	4	0	0	0
Sierra Semiconductor	5	6	6	0.1	0.1	0.1

(Continued)

**Table 1-15 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Standard Microsystems	9	5	5	0.1	0.1	0
Supertex	6	3	3	0.1	0	0
Texas Instruments	306	473	615	3.6	4.9	6.1
Universal	10	10	10	0.1	0.1	0.1
VLSI Technology	211	249	286	2.5	2.6	2.8
VTC	7	0	0	0.1	0	0
WaferScale Integration	4	3	1	0	0	0
Xilinx	84	130	163	1.0	1.3	1.6
Other North American Companies	17	14	13	0.2	0.1	0.1
<b>Japanese Companies</b>	<b>4,058</b>	<b>4,650</b>	<b>4,610</b>	<b>48.1</b>	<b>47.9</b>	<b>45.9</b>
Fuji Electric	24	23	25	0.3	0.2	0.2
Fujitsu	476	585	549	5.6	6.0	5.5
Hitachi	343	367	346	4.1	3.8	3.4
Matsushita	283	377	342	3.4	3.9	3.4
Mitsubishi	77	90	89	0.9	0.9	0.9
NEC	904	1,052	1,047	10.7	10.8	10.4
New JRC	8	11	10	0.1	0.1	0.1
Oki	364	354	314	4.3	3.6	3.1
Ricoh	41	21	22	0.5	0.2	0.2
Rohm	39	46	43	0.5	0.5	0.4
Sanyo	167	169	191	2.0	1.7	1.9
Seiko Epson	120	155	167	1.4	1.6	1.7
Sharp	248	280	290	2.9	2.9	2.9
Sony	101	160	165	1.2	1.6	1.6
Toshiba	736	813	821	8.7	8.4	8.2
Yamaha	127	146	189	1.5	1.5	1.9
Other Japanese Companies	0	1	0	0	0	0
<b>European Companies</b>	<b>813</b>	<b>881</b>	<b>906</b>	<b>9.6</b>	<b>9.1</b>	<b>9.0</b>
ABB-HAFO	24	24	0	0.3	0.2	0
Austria Mikro Systeme	37	39	29	0.4	0.4	0.3
Ericsson	8	16	15	0.1	0.2	0.1
European Silicon Structures	27	28	30	0.3	0.3	0.3
Eurosil	35	21	21	0.4	0.2	0.2
GEC Plessey	99	126	105	1.2	1.3	1.0
Matra MHS	26	27	30	0.3	0.3	0.3

(Continued)

**Table 1-15 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Mietec	20	22	22	0.2	0.2	0.2
Philips	226	259	319	2.7	2.7	3.2
SGS-Thomson	110	118	138	1.3	1.2	1.4
Siemens	164	175	180	1.9	1.8	1.8
STC	5	4	0	0.1	0	0
Telefunken Electronic	23	12	7	0.3	0.1	0.1
TCS	NA	NA	10	NA	NA	0.1
TMS	9	10	0	0.1	0.1	0
<b>Asia/Pacific Companies</b>	<b>259</b>	<b>346</b>	<b>256</b>	<b>3.1</b>	<b>3.6</b>	<b>2.5</b>
Daewoo	1	6	2	0	0.1	0
Goldstar	18	13	16	0.2	0.1	0.2
Hualon Microelectronics Corporation	10	34	35	0.1	0.4	0.3
Samsung	153	176	124	1.8	1.8	1.2
Silicon Integrated Systems	13	9	0	0.2	0.1	0
United Microelectronics	45	80	65	0.5	0.8	0.6
Winbond Electronics	18	28	14	0.2	0.3	0.1
Other Asia/Pacific Companies	1	0	0	0	0	0

NA = Not available

Source: Dataquest (May 1993)

**Table 1-16**  
**Each Company's Factory Revenue from Shipments of Analog ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	10,134	10,912	11,515	100.0	100.0	100.0
North American Companies	4,286	4,389	4,991	42.3	40.2	43.3
Advanced Micro Devices	76	94	110	0.7	0.9	1.0
Allegro MicroSystems	96	91	100	0.9	0.8	0.9
Analog Devices	360	444	477	3.6	4.1	4.1
AT&T	197	242	275	1.9	2.2	2.4
Atmel	11	1	1	0.1	0	0
Brooktree	70	84	96	0.7	0.8	0.8
Burr-Brown	145	152	127	1.4	1.4	1.1
California Micro Devices	19	5	7	0.2	0	0.1
Catalyst	1	0	1	0	0	0
Cherry Semiconductor	36	37	46	0.4	0.3	0.4
Cirrus Logic	1	1	29	0	0	0.3
Comlinear	13	14	15	0.1	0.1	0.1
Dallas Semiconductor	3	13	8	0	0.1	0.1
Elantec	13	16	16	0.1	0.1	0.1
Exar	75	107	123	0.7	1.0	1.1
Gennum	18	23	27	0.2	0.2	0.2
Gould AMI	13	14	30	0.1	0.1	0.3
Harris	260	226	217	2.6	2.1	1.9
Honeywell	20	20	21	0.2	0.2	0.2
Hughes	8	8	12	0.1	0.1	0.1
IMI	1	3	3	0	0	0
Integrated Device Technology	3	3	0	0	0	0
Intel	9	9	10	0.1	0.1	0.1
International Microelectronic Products	12	6	11	0.1	0.1	0.1
International Rectifier	1	1	1	0	0	0
ITT	103	35	18	1.0	0.3	0.2
Kulite	28	26	24	0.3	0.2	0.2
Linear Technology	83	107	132	0.8	1.0	1.1
LSI Logic	2	0	0	0	0	0
Maxim	65	80	97	0.6	0.7	0.8
Micrel	5	6	10	0	0.1	0.1
Micro Linear	45	36	33	0.4	0.3	0.3
Micro Power Systems	24	26	22	0.2	0.2	0.2
Mitel	47	50	52	0.5	0.5	0.5
Motorola	482	456	651	4.8	4.2	5.7

(Continued)

**Table 1-16 (Continued)**  
**Each Company's Factory Revenue from Shipments of Analog ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Natel Engineering	NA	NA	11	NA	NA	0.1
National Semiconductor	593	629	739	5.9	5.8	6.4
NCR	30	28	50	0.3	0.3	0.4
Novasensor	12	11	13	0.1	0.1	0.1
Precision Monolithics	91	0	0	0.9	0	0
Raytheon	20	24	38	0.2	0.2	0.3
Rockwell	160	165	155	1.6	1.5	1.3
SEEQ Technology	0	8	9	0	0.1	0.1
Semtech	2	6	4	0	0.1	0
Sierra Semiconductor	55	79	85	0.5	0.7	0.7
Silicon General	36	32	29	0.4	0.3	0.3
Siliconix	54	64	55	0.5	0.6	0.5
Silicon Systems	165	184	241	1.6	1.7	2.1
Sipex	21	21	20	0.2	0.2	0.2
Solitron	9	9	7	0.1	0.1	0.1
Supertex	13	12	10	0.1	0.1	0.1
Tektronix	35	65	42	0.3	0.6	0.4
Teledyne	19	18	26	0.2	0.2	0.2
Texas Instruments	458	439	490	4.5	4.0	4.3
TRW	14	14	0	0.1	0.1	0
Unitrode	50	41	66	0.5	0.4	0.6
Universal	4	4	4	0	0	0
VLSI Technology	0	0	2	0	0	0
VTC	33	20	45	0.3	0.2	0.4
Xicor	3	3	0	0	0	0
Other North American Companies	64	77	48	0.6	0.7	0.4
<b>Japanese Companies</b>	<b>3,785</b>	<b>4,327</b>	<b>4,103</b>	<b>37.3</b>	<b>39.7</b>	<b>35.6</b>
Fuji Electric	45	31	25	0.4	0.3	0.2
Fujitsu	148	179	172	1.5	1.6	1.5
Hitachi	313	358	339	3.1	3.3	2.9
Matsushita	396	412	403	3.9	3.8	3.5
Mitsubishi	413	477	417	4.1	4.4	3.6
NEC	377	422	414	3.7	3.9	3.6
New JRC	114	122	113	1.1	1.1	1.0
Oki	31	32	27	0.3	0.3	0.2
Ricoh	0	6	7	0	0.1	0.1
Rohm	273	341	301	2.7	3.1	2.6

(Continued)

**Table 1-16 (Continued)**  
**Each Company's Factory Revenue from Shipments of Analog ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Sanken	159	171	153	1.6	1.6	1.3
Sanyo	467	599	619	4.6	5.5	5.4
Seiko Epson	11	12	11	0.1	0.1	0.1
Sharp	65	66	64	0.6	0.6	0.6
Shindengen Electric	26	50	44	0.3	0.5	0.4
Sony	351	394	372	3.5	3.6	3.2
Toko	54	33	30	0.5	0.3	0.3
Toshiba	535	612	581	5.3	5.6	5.0
Yamaha	7	10	11	0.1	0.1	0.1
<b>European Companies</b>	<b>1,834</b>	<b>1,938</b>	<b>2,152</b>	<b>18.1</b>	<b>17.8</b>	<b>18.7</b>
ABB-HAFO	0	0	25	0	0	0.2
Austria Mikro Systeme	22	31	45	0.2	0.3	0.4
Dialog Semiconductor	NA	NA	17	NA	NA	0.1
EM Microelectronics Marin	NA	NA	45	NA	NA	0.4
Ericsson	48	58	57	0.5	0.5	0.5
Eurosil	0	7	7	0	0.1	0.1
GEC Plessey	173	185	192	1.7	1.7	1.7
Matra MHS	4	5	8	0	0	0.1
Micronas	NA	NA	10	NA	NA	0.1
Mietec	72	83	91	0.7	0.8	0.8
Philips	653	664	675	6.4	6.1	5.9
SGS-Thomson	554	578	658	5.5	5.3	5.7
Siemens	182	181	175	1.8	1.7	1.5
STC	6	5	0	0.1	0	0
Telefunken Electronic	111	118	123	1.1	1.1	1.1
TCS	NA	NA	10	NA	NA	0.1
TMS	9	11	0	0.1	0.1	0
Other European Companies	0	12	14	0	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>229</b>	<b>258</b>	<b>269</b>	<b>2.3</b>	<b>2.4</b>	<b>2.3</b>
Daewoo	11	14	17	0.1	0.1	0.1
Goldstar	20	12	20	0.2	0.1	0.2
Hualon Microelectronics Corporation	1	1	1	0	0	0
Korean Electronic Company	28	33	30	0.3	0.3	0.3
Samsung	92	112	117	0.9	1.0	1.0
Winbond Electronics	18	16	15	0.2	0.1	0.1
Other Asia/Pacific Companies	59	70	69	0.6	0.6	0.6

NA = Not available

Source: Dataquest (May 1993)

**Table 1-17****Each Company's Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	7,674	8,035	8,155	100.0	100.0	100.0
North American Companies	2,174	1,919	2,139	28.3	23.9	26.2
Allegro MicroSystems	17	11	11	0.2	0.1	0.1
Analog Devices	1	0	0	0	0	0
AT&T	130	0	4	1.7	0	0
General Instrument	214	200	220	2.8	2.5	2.7
Harris	130	107	115	1.7	1.3	1.4
Hewlett-Packard	56	45	48	0.7	0.6	0.6
International Rectifier	224	237	270	2.9	2.9	3.3
ITT	161	110	106	2.1	1.4	1.3
Microsemi	50	71	84	0.7	0.9	1.0
Motorola	799	794	857	10.4	9.9	10.5
National Semiconductor	70	60	70	0.9	0.7	0.9
Optek	0	0	2	0	0	0
Powerex	92	78	80	1.2	1.0	1.0
Raytheon	10	8	7	0.1	0.1	0.1
Semtech	16	21	16	0.2	0.3	0.2
Siliconix	62	76	101	0.8	0.9	1.2
Solitron	24	21	8	0.3	0.3	0.1
Supertex	8	10	9	0.1	0.1	0.1
Teccor Electronics	NA	NA	46	NA	NA	0.6
Teledyne	3	3	0	0	0	0
Texas Instruments	53	28	29	0.7	0.3	0.4
Unitrode	54	39	10	0.7	0.5	0.1
Other North American Companies	0	0	46	0	0	0.6
Japanese Companies	3,783	4,296	4,117	49.3	53.5	50.5
Fuji Electric	248	263	246	3.2	3.3	3.0
Fujitsu	107	152	142	1.4	1.9	1.7
Hitachi	575	598	566	7.5	7.4	6.9
Matsushita	339	379	379	4.4	4.7	4.6
Mitsubishi	311	325	284	4.1	4.0	3.5
NEC	479	544	532	6.2	6.8	6.5
New JRC	4	3	3	0.1	0	0
Oki	9	9	8	0.1	0.1	0.1
Rohm	314	374	343	4.1	4.7	4.2

(Continued)



Table 1-17 (Continued)

Each Company's Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Sanken	221	259	253	2.9	3.2	3.1
Sanyo	197	250	244	2.6	3.1	3.0
Shindengen Electric	133	134	126	1.7	1.7	1.5
Sony	76	91	79	1.0	1.1	1.0
Toko	6	31	29	0.1	0.4	0.4
Toshiba	764	884	883	10.0	11.0	10.8
<b>European Companies</b>	<b>1,539</b>	<b>1,588</b>	<b>1,623</b>	<b>20.1</b>	<b>19.8</b>	<b>19.9</b>
ABB-HAFO	8	6	7	0.1	0.1	0.1
ABB-IXYS	58	54	49	0.8	0.7	0.6
Eupec	96	93	83	1.3	1.2	1.0
Fagor	30	29	25	0.4	0.4	0.3
GEC Plessey	36	35	31	0.5	0.4	0.4
Philips	507	531	551	6.6	6.6	6.8
Semikron	106	108	103	1.4	1.3	1.3
SGS-Thomson	315	299	335	4.1	3.7	4.1
Siemens	256	245	219	3.3	3.0	2.7
STC	2	2	0	0	0	0
TAG	25	30	31	0.3	0.4	0.4
Telefunken Electronic	76	89	81	1.0	1.1	1.0
TCS	NA	NA	1	NA	NA	0
TMS	1	1	0	0	0	0
Westcode	NA	NA	35	NA	NA	0.4
Zetex	23	25	26	0.3	0.3	0.3
Other European Companies	0	41	46	0	0.5	0.6
<b>Asia/Pacific Companies</b>	<b>178</b>	<b>232</b>	<b>276</b>	<b>2.3</b>	<b>2.9</b>	<b>3.4</b>
Dongsung Semiconductor	NA	30	11	NA	0.4	0.1
Goldstar	0	0	11	0	0	0.1
Korean Electronic Company	79	95	110	1.0	1.2	1.3
Samsung	77	92	119	1.0	1.1	1.5
Other Asia/Pacific Companies	22	15	25	0.3	0.2	0.3

NA = Not available

Source: Dataquest (May 1993)

**Table 1-18**  
**Each Company's Factory Revenue from Shipments of Optoelectronic Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
Total Market	2,412	2,804	2,688	100.0	100.0	100.0
North American Companies	423	449	495	17.5	16.0	18.4
Allegro MicroSystems	1	0	0	0	0	0
AT&T	14	32	39	0.6	1.1	1.5
Harris	15	9	0	0.6	0.3	0
Hewlett-Packard	189	191	187	7.8	6.8	7.0
Honeywell	25	25	27	1.0	0.9	1.0
Hughes	2	0	0	0.1	0	0
Motorola	26	28	36	1.1	1.0	1.3
Optek	66	52	55	2.7	1.9	2.0
Quality Technology	34	34	46	1.4	1.2	1.7
Tektronix	5	5	5	0.2	0.2	0.2
Texas Instruments	33	58	42	1.4	2.1	1.6
Weitek	1	0	0	0	0	0
Other North American Companies	12	15	58	0.5	0.5	2.2
Japanese Companies	1,694	1,992	1,849	70.2	71.0	68.8
Fuji Electric	1	1	0	0	0	0
Fujitsu	108	127	117	4.5	4.5	4.4
Hitachi	63	68	60	2.6	2.4	2.2
Matsushita	281	318	315	11.7	11.3	11.7
Mitsubishi	29	25	23	1.2	0.9	0.9
NEC	108	121	110	4.5	4.3	4.1
New JRC	13	14	12	0.5	0.5	0.4
Oki	28	30	26	1.2	1.1	1.0
Rohm	102	122	110	4.2	4.4	4.1
Sanken	19	21	20	0.8	0.7	0.7
Sanyo	149	193	136	6.2	6.9	5.1
Sharp	303	362	352	12.6	12.9	13.1
Sony	235	279	216	9.7	10.0	8.0
Toshiba	255	286	255	10.6	10.2	9.5
Other Japanese Companies	0	25	97	0	0.9	3.6

(Continued)

**Table 1-18 (Continued)**  
**Each Company's Factory Revenue from Shipments of Optoelectronic Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1990	1991	1992	1990	1991	1992
European Companies	267	334	296	11.1	11.9	11.0
ABB-HAFO	10	8	8	0.4	0.3	0.3
Philips	31	36	0	1.3	1.3	0
Siemens	131	189	179	5.4	6.7	6.7
Telefunken Electronic	78	74	78	3.2	2.6	2.9
TCS	NA	NA	20	NA	NA	0.7
TMS	16	17	0	0.7	0.6	0
Zetex	1	1	1	0	0	0
Other European Companies	0	9	10	0	0.3	0.4
Asia/Pacific Companies	28	29	48	1.2	1.0	1.8
Korean Electronic Company	7	8	8	0.3	0.3	0.3
Other Asia/Pacific Companies	21	21	40	0.9	0.7	1.5

NA = Not available

Source: Dataquest (May 1993)

## Section 2: Final 1992 Worldwide Semiconductor Market Share Rankings

Table 2-1

Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World  
(Millions of U.S. Dollars)

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	3	Intel	4,019	5,091	27	7.8
2	1	NEC	4,774	4,869	2	7.5
3	2	Toshiba	4,579	4,675	2	7.2
4	4	Motorola	3,802	4,634	22	7.1
5	5	Hitachi	3,765	3,851	2	5.9
6	6	Texas Instruments	2,738	3,085	13	4.7
7	7	Fujitsu	2,705	2,553	-6	3.9
8	8	Mitsubishi	2,303	2,213	-4	3.4
9	10	Philips	2,022	2,113	5	3.2
10	9	Matsushita	2,037	1,942	-5	3.0
11	12	Samsung	1,473	1,900	29	2.9
12	11	National Semiconductor	1,602	1,797	12	2.8
13	13	SGS-Thomson	1,436	1,605	12	2.5
14	17	Advanced Micro Devices	1,226	1,514	23	2.3
15	14	Sanyo	1,362	1,385	2	2.1
16	15	Sharp	1,318	1,354	3	2.1
17	16	Siemens	1,263	1,245	-1	1.9
18	18	Sony	1,196	1,103	-8	1.7
19	19	Oki	981	956	-3	1.5
20	21	AT&T	713	911	28	1.4
21	20	Rohm	934	844	-10	1.3
22	32	Goldstar	307	642	109	1.0
23	22	LSI Logic	670	615	-8	0.9
24	23	Harris	623	559	-10	0.9
25	25	Micron Technology	455	557	22	0.9
26	35	Hyundai	248	556	124	0.9
27	24	Analog Devices	464	516	11	0.8
28	27	Hewlett-Packard	442	449	2	0.7
29	28	VLSI Technology	414	429	4	0.7
30	26	Sanken	451	426	-6	0.7
31	29	GEC Plessey	392	381	-3	0.6
32	31	Fuji Electric	319	297	-7	0.5

(Continued)

**Table 2-1 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World**  
**(Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
33	33	Telefunken Electronic	300	289	-4	0.4
34	47	Cirrus Logic	152	275	81	0.4
35	36	International Rectifier	238	271	14	0.4
36	34	Cypress Semiconductor	281	267	-5	0.4
37	30	ITT	340	254	-25	0.4
38	43	Silicon Systems	184	241	31	0.4
39	37	Seiko Epson	220	230	5	0.4
40	50	NCR	145	228	57	0.3
		All Others	6,801	8,139	20	12.5
		North American Companies	22,940	27,105	18	41.5
		Japanese Companies	27,684	27,576	0	42.3
		European Companies	6,336	6,666	5	10.2
		Asia/Pacific Companies	2,734	3,914	43	6.0
		Total Market	59,694	65,261	9	100.0

Source: Dataquest (May 1993)

**Table 2-2**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	2	Intel	4,019	5,091	27	9.4
2	1	NEC	4,109	4,227	3	7.8
3	5	Motorola	2,980	3,741	26	6.9
4	3	Toshiba	3,409	3,537	4	6.5
5	4	Hitachi	3,099	3,225	4	5.9
6	6	Texas Instruments	2,652	3,014	14	5.5
7	7	Fujitsu	2,426	2,294	-5	4.2
8	8	Mitsubishi	1,953	1,906	-2	3.5
9	11	Samsung	1,381	1,781	29	3.3
10	9	National Semiconductor	1,542	1,727	12	3.2
11	10	Philips	1,455	1,562	7	2.9
12	13	Advanced Micro Devices	1,226	1,514	23	2.8
13	14	SGS-Thomson	1,137	1,270	12	2.3
14	12	Matsushita	1,340	1,248	-7	2.3
15	17	Sanyo	919	1,005	9	1.8
16	15	Sharp	956	1,002	5	1.8
17	16	Oki	942	922	-2	1.7
18	20	AT&T	681	868	27	1.6
19	18	Siemens	829	847	2	1.6
20	19	Sony	826	808	-2	1.5
21	28	Goldstar	307	631	106	1.2
22	21	LSI Logic	670	615	-8	1.1
23	24	Micron Technology	455	557	22	1.0
24	30	Hyundai	248	556	124	1.0
25	23	Analog Devices	464	516	11	0.9
26	22	Harris	507	444	-12	0.8
27	26	VLSI Technology	414	429	4	0.8
28	25	Rohm	438	391	-11	0.7
29	27	GEC Plessey	357	350	-2	0.6
30	42	Cirrus Logic	152	275	81	0.5
31	29	Cypress Semiconductor	281	267	-5	0.5
32	38	Silicon Systems	184	241	31	0.4
33	32	Seiko Epson	220	230	5	0.4
34	44	NCR	145	228	57	0.4
35	35	Integrated Device Technology	204	220	8	0.4
36	34	Hewlett-Packard	206	214	4	0.4

(Continued)

**Table 2-2 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
37	41	Yamaha	158	201	27	0.4
38	36	United Microelectronics	200	198	-1	0.4
39	33	Western Digital	209	190	-9	0.3
40	37	Rockwell	185	172	-7	0.3
		All Others	4,970	5,904	19	10.8
		North American Companies	20,572	24,471	19	45.0
		Japanese Companies	21,396	21,610	1	39.7
		European Companies	4,414	4,747	8	8.7
		Asia/Pacific Companies	2,473	3,590	45	6.6
		Total Market	48,855	54,418	11	100.0

Source: Dataquest (May 1993)

**Table 2-3**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Digital ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	Texas Instruments	583	505	-13	15.8
2	3	Hitachi	461	425	-8	13.3
3	2	Fujitsu	509	413	-19	12.9
4	4	Motorola	380	384	1	12.0
5	5	National Semiconductor	324	274	-15	8.6
6	6	Advanced Micro Devices	300	247	-18	7.7
7	7	Philips	245	241	-2	7.5
8	8	NEC	244	214	-12	6.7
9	9	Toshiba	105	77	-27	2.4
10	10	Mitsubishi	81	66	-19	2.1
11	12	AT&T	48	60	25	1.9
12	11	Raytheon	53	51	-4	1.6
13	13	GEC Plessey	41	40	-2	1.3
13	13	Siemens	41	40	-2	1.3
15	15	Oki	39	33	-15	1.0
16	17	Applied Micro Circuits Corporation	32	29	-9	0.9
17	18	Goldstar	22	24	9	0.8
18	16	Harris	35	22	-37	0.7
19	21	Bipolar Integrated Technology	10	15	50	0.5
20	20	Matsushita	13	11	-15	0.3
		All Others	62	22	-65	0.7
		North American Companies	1,806	1,601	-11	50.1
		Japanese Companies	1,454	1,240	-15	38.8
		European Companies	346	328	-5	10.3
		Asia/Pacific Companies	22	24	9	0.8
		Total Market	3,628	3,193	-12	100.0

Source: Dataquest (May 1993)



**Table 2-4**  
**Top 10 Companies' Factory Revenue from Shipments of Bipolar Memory ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	2	Hitachi	99	94	-5	29.6
2	1	Fujitsu	113	90	-20	28.3
3	3	Advanced Micro Devices	52	46	-12	14.5
4	4	Philips	36	27	-25	8.5
5	5	NEC	19	19	0	6.0
6	11	Harris	2	13	550	4.1
7	7	Raytheon	8	10	25	3.1
8	6	National Semiconductor	13	8	-38	2.5
9	8	Motorola	3	3	0	0.9
9	8	Texas Instruments	3	3	0	0.9
		All Others	8	5	-38	1.6
		North American Companies	89	88	-1	27.7
		Japanese Companies	231	203	-12	63.8
		European Companies	36	27	-25	8.5
		Asia/Pacific Companies	0	0	0	0
		Total Market	356	318	-11	100.0

Source: Dataquest (May 1993)

**Table 2-5**  
**Top 4 Companies' Factory Revenue from Shipments of Bipolar Microcomponent ICs**  
**to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	National Semiconductor	55	41	-25	55.4
2	2	Advanced Micro Devices	21	16	-24	21.6
3	4	Bipolar Integrated Technology	7	10	43	13.5
4	3	Texas Instruments	10	7	-30	9.5
		All Others	0	0	0	0
		North American Companies	93	74	-20	100.0
		Japanese Companies	0	0	0	0
		European Companies	0	0	0	0
		Asia/Pacific Companies	0	0	0	0
		Total Market	93	74	-20	100.0

Source: Dataquest (May 1993)

**Table 2-6**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Logic ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	Texas Instruments	570	495	-13	17.7
2	3	Motorola	377	381	1	13.6
3	4	Hitachi	362	331	-9	11.8
4	2	Fujitsu	396	323	-18	11.5
5	5	National Semiconductor	256	225	-12	8.0
6	8	Philips	209	214	2	7.6
7	7	NEC	225	195	-13	7.0
8	6	Advanced Micro Devices	227	185	-19	6.6
9	9	Toshiba	105	77	-27	2.7
10	10	Mitsubishi	81	66	-19	2.4
11	11	AT&T	48	60	25	2.1
12	12	Raytheon	45	41	-9	1.5
13	13	Siemens	41	40	-2	1.4
13	13	GEC Plessey	41	40	-2	1.4
15	15	Oki	39	33	-15	1.2
16	17	Applied Micro Circuits Corporation	32	29	-9	1.0
17	18	Goldstar	22	24	9	0.9
18	20	Matsushita	13	11	-15	0.4
19	16	Harris	33	9	-73	0.3
20	25	Bipolar Integrated Technology	3	5	67	0.2
		All Others	54	17	-69	0.6
		North American Companies	1,624	1,439	-11	51.4
		Japanese Companies	1,223	1,037	-15	37.0
		European Companies	310	301	-3	10.7
		Asia/Pacific Companies	22	24	9	0.9
		Total Market	3,179	2,801	-12	100.0

Source: Dataquest (May 1993)

**Table 2-7**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	Intel	4,006	5,080	27	12.8
2	2	NEC	3,443	3,599	5	9.1
3	3	Toshiba	2,692	2,879	7	7.3
4	5	Motorola	2,144	2,706	26	6.8
5	4	Hitachi	2,280	2,461	8	6.2
6	7	Texas Instruments	1,630	2,019	24	5.1
7	6	Fujitsu	1,738	1,709	-2	4.3
8	9	Samsung	1,269	1,664	31	4.2
9	8	Mitsubishi	1,395	1,423	2	3.6
10	13	Advanced Micro Devices	832	1,157	39	2.9
11	11	Sharp	890	938	5	2.4
12	12	Oki	871	862	-1	2.2
13	10	Matsushita	915	834	-9	2.1
14	16	National Semiconductor	589	714	21	1.8
15	18	Philips	546	646	18	1.6
16	15	Siemens	607	632	4	1.6
17	14	LSI Logic	670	615	-8	1.5
18	17	SGS-Thomson	558	609	9	1.5
19	25	Goldstar	273	587	115	1.5
20	19	Micron Technology	455	557	22	1.4
21	26	Hyundai	248	556	124	1.4
22	22	AT&T	391	533	36	1.3
23	20	Sony	431	435	1	1.1
24	21	VLSI Technology	414	427	3	1.1
25	23	Sanyo	320	386	21	1.0
26	24	Cypress Semiconductor	281	267	-5	0.7
27	35	Cirrus Logic	151	246	63	0.6
28	32	Integrated Device Technology	198	220	11	0.6
29	29	Seiko Epson	208	219	5	0.6
30	30	Hewlett-Packard	206	214	4	0.5
31	27	Harris	246	205	-17	0.5
32	31	United Microelectronics	200	198	-1	0.5
33	28	Western Digital	209	190	-9	0.5
33	36	Yamaha	148	190	28	0.5
35	40	NCR	117	178	52	0.4
36	38	Xilinx	130	163	25	0.4

(Continued)

**Table 2-7 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
37	NM	MOSel/Vitellic	NA	161	NA	0.4
38	41	Zilog	110	146	33	0.4
39	39	Atmel	118	138	17	0.3
40	33	ITT	195	130	-33	0.3
		All Others	2,191	2,817	29	7.1
		North American Companies	14,377	17,879	24	45.0
		Japanese Companies	15,615	16,267	4	41.0
		European Companies	2,130	2,267	6	5.7
		Asia/Pacific Companies	2,193	3,297	50	8.3
		Total Market	34,315	39,710	16	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1993)

**Table 2-8**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	Toshiba	1,425	1,618	14	10.6
2	2	Hitachi	1,330	1,519	14	9.9
3	4	Samsung	1,066	1,516	42	9.9
4	3	NEC	1,242	1,422	14	9.3
5	5	Fujitsu	909	927	2	6.1
6	6	Mitsubishi	762	878	15	5.7
7	7	Texas Instruments	738	874	18	5.7
8	10	Motorola	412	610	48	4.0
9	9	Micron Technology	455	557	22	3.6
9	16	Goldstar	249	557	124	3.6
11	17	Hyundai	248	556	124	3.6
12	8	Sharp	476	519	9	3.4
13	12	Oki	380	424	12	2.8
14	13	Siemens	298	336	13	2.2
15	11	Intel	395	324	-18	2.1
16	14	SGS-Thomson	273	304	11	2.0
17	15	Advanced Micro Devices	270	282	4	1.8
18	18	Matsushita	217	217	0	1.4
19	20	Sony	183	197	8	1.3
20	19	Cypress Semiconductor	186	187	1	1.2
21	21	Integrated Device Technology	128	138	8	0.9
22	NM	MOSel/Vitellic	NA	136	NA	0.9
23	22	National Semiconductor	112	128	14	0.8
24	29	NMB Semiconductor	60	120	100	0.8
25	26	Atmel	78	99	27	0.6
26	25	Sanyo	82	95	16	0.6
27	23	Xicor	91	93	2	0.6
28	30	United Microelectronics	58	64	10	0.4
29	36	Macronix	31	57	84	0.4
30	31	Microchip Technology	57	47	-18	0.3
31	39	Winbond Electronics	26	46	77	0.3
32	27	Philips	75	40	-47	0.3
32	35	Catalyst	32	40	25	0.3
34	33	Matra MHS	35	37	6	0.2
35	32	Seiko Epson	37	36	-3	0.2
36	51	AT&T	4	33	725	0.2

(Continued)

**Table 2-8 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
37	38	Hualon Microelectronics Corporation	27	29	7	0.2
38	37	Rohm	28	27	-4	0.2
39	42	Dallas Semiconductor	21	24	14	0.2
40	40	WaferScale Integration	23	22	-4	0.1
		All Others	322	173	-46	1.1
		North American Companies	3,298	3,729	13	24.4
		Japanese Companies	7,141	8,008	12	52.3
		European Companies	682	724	6	4.7
		Asia/Pacific Companies	1,720	2,847	66	18.6
		<b>Total Market</b>	<b>12,841</b>	<b>15,308</b>	<b>19</b>	<b>100.0</b>

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1993)

Table 2-9

**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	Intel	3,578	4,721	32	32.9
2	2	Motorola	1,171	1,464	25	10.2
3	3	NEC	1,149	1,130	-2	7.9
4	8	Advanced Micro Devices	395	642	63	4.5
5	4	Hitachi	583	596	2	4.2
6	7	Texas Instruments	419	530	26	3.7
7	5	Mitsubishi	543	456	-16	3.2
8	6	Toshiba	454	440	-3	3.1
9	10	National Semiconductor	286	383	34	2.7
10	12	Philips	212	287	35	2.0
11	9	Matsushita	321	275	-14	1.9
12	17	Cirrus Logic	151	246	63	1.7
13	11	Fujitsu	244	233	-5	1.6
14	13	Western Digital	209	190	-9	1.3
15	14	SGS-Thomson	167	167	0	1.2
16	22	Zilog	110	146	33	1.0
17	15	VLSI Technology	165	141	-15	1.0
18	19	Sharp	134	129	-4	0.9
19	18	Oki	137	124	-9	0.9
20	15	Chips & Technologies	165	116	-30	0.8
20	19	Siemens	134	116	-13	0.8
22	35	AT&T	33	115	248	0.8
23	24	Sanyo	69	100	45	0.7
24	NM	OPTi	NA	98	NA	0.7
25	NM	Adaptec	NA	89	NA	0.6
26	NM	Trident Microsystems	NA	80	NA	0.6
27	NM	Tseng Labs	NA	74	NA	0.5
28	23	Sony	88	73	-17	0.5
29	31	NCR	39	71	82	0.5
30	26	United Microelectronics	62	69	11	0.5
31	NM	Cyrix	NA	63	NA	0.4
32	25	Harris	65	57	-12	0.4
33	26	Ricoh	62	56	-10	0.4
34	29	Dallas Semiconductor	41	55	34	0.4
35	21	LSI Logic	115	51	-56	0.4
36	NM	Oak Technology	NA	50	NA	0.3

(Continued)



**Table 2-9 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
37	33	Matra MHS	37	47	27	0.3
38	44	Winbond Electronics	14	42	200	0.3
38	NM	Integrated Information Technology	NA	42	NA	0.3
40	28	Cypress Semiconductor	48	40	-17	0.3
		All Others	374	555	48	3.9
		North American Companies	7,256	9,879	36	68.8
		Japanese Companies	3,824	3,649	-5	25.4
		European Companies	567	637	12	4.4
		Asia/Pacific Companies	127	194	53	1.4
		Total Market	11,774	14,359	22	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1993)

**Table 2-10**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	NEC	1,052	1,047	0	10.4
2	2	Toshiba	813	821	1	8.2
3	4	Motorola	561	632	13	6.3
4	6	Texas Instruments	473	615	30	6.1
5	5	LSI Logic	555	564	2	5.6
6	3	Fujitsu	585	549	-6	5.5
7	9	AT&T	354	385	9	3.8
8	8	Hitachi	367	346	-6	3.4
9	7	Matsushita	377	342	-9	3.4
10	12	Philips	259	319	23	3.2
11	9	Oki	354	314	-11	3.1
12	11	Sharp	280	290	4	2.9
13	13	VLSI Technology	249	286	15	2.8
14	19	Advanced Micro Devices	167	233	40	2.3
15	14	Hewlett-Packard	206	214	4	2.1
16	15	National Semiconductor	191	203	6	2.0
17	18	Sanyo	169	191	13	1.9
18	24	Yamaha	146	189	29	1.9
19	17	Siemens	175	180	3	1.8
20	22	Seiko Epson	155	167	8	1.7
21	20	Sony	160	165	3	1.6
22	25	Xilinx	130	163	25	1.6
23	27	SGS-Thomson	118	138	17	1.4
24	21	Harris	158	128	-19	1.3
25	16	Samsung	176	124	-30	1.2
26	26	GEC Plessey	126	105	-17	1.0
26	31	NCR	75	105	40	1.0
28	28	Altera	107	102	-5	1.0
29	23	ITT	150	93	-38	0.9
30	32	Lattice	68	90	32	0.9
31	29	Mitsubishi	90	89	-1	0.9
32	30	United Microelectronics	80	65	-19	0.6
33	33	Integrated Device Technology	50	51	2	0.5
34	38	Actel	37	44	19	0.4
35	35	Rohm	46	43	-7	0.4
36	34	Cypress Semiconductor	47	40	-15	0.4

(Continued)

**Table 2-10 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
37	NM	Integrated Circuit Systems	NA	36	NA	0.4
38	39	Hualon Microelectronics Corporation	34	35	3	0.3
38	40	Intel	33	35	6	0.3
40	37	Atmel	38	34	-11	0.3
40	42	Gould AMI	29	34	17	0.3
		All Others	460	437	-5	4.4
		North American Companies	3,823	4,271	12	42.5
		Japanese Companies	4,650	4,610	-1	45.9
		European Companies	881	906	3	9.0
		Asia/Pacific Companies	346	256	-26	2.5
		Total Market	9,700	10,043	4	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1993)

**Table 2-11**  
**Top 40 Companies' Factory Revenue from Shipments of Analog ICs to the World**  
**(Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	2	National Semiconductor	629	739	17	6.4
2	1	Philips	664	675	2	5.9
3	5	SGS-Thomson	578	658	14	5.7
4	7	Motorola	456	651	43	5.7
5	4	Sanyo	599	619	3	5.4
6	3	Toshiba	612	581	-5	5.0
7	9	Texas Instruments	439	490	12	4.3
8	8	Analog Devices	444	477	7	4.1
9	6	Mitsubishi	477	417	-13	3.6
10	10	NEC	422	414	-2	3.6
11	11	Matsushita	412	403	-2	3.5
12	12	Sony	394	372	-6	3.2
13	13	Hitachi	358	339	-5	2.9
14	14	Rohm	341	301	-12	2.6
15	15	AT&T	242	275	14	2.4
16	18	Silicon Systems	184	241	31	2.1
17	16	Harris	226	217	-4	1.9
18	17	GEC Plessey	185	192	4	1.7
19	19	Siemens	181	175	-3	1.5
20	20	Fujitsu	179	172	-4	1.5
21	22	Rockwell	165	155	-6	1.3
22	21	Sanken	171	153	-11	1.3
23	27	Linear Technology	107	132	23	1.1
24	23	Burr-Brown	152	127	-16	1.1
25	25	Telefunken Electronic	118	123	4	1.1
25	27	Exar	107	123	15	1.1
27	26	Samsung	112	117	4	1.0
28	24	New JRC	122	113	-7	1.0
29	29	Advanced Micro Devices	94	110	17	1.0
30	30	Allegro MicroSystems	91	100	10	0.9
31	33	Maxim	80	97	21	0.8
32	31	Brooktree	84	96	14	0.8
33	32	Mietec	83	91	10	0.8
34	34	Sierra Semiconductor	79	85	8	0.7
35	41	Unitrode	41	66	61	0.6
36	35	Sharp	66	64	-3	0.6

(Continued)

**Table 2-11 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Analog ICs to the World**  
**(Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
37	38	Ericsson	58	57	-2	0.5
38	37	Siliconix	64	55	-14	0.5
39	39	Mitel	50	52	4	0.5
40	51	NCR	28	50	79	0.4
		All Others	1,018	1,141	12	9.9
		North American Companies	4,389	4,991	14	43.3
		Japanese Companies	4,327	4,103	-5	35.6
		European Companies	1,938	2,152	11	18.7
		Asia/Pacific Companies	258	269	4	2.3
		Total Market	10,912	11,515	6	100.0

Source: Dataquest (May 1993)

**Table 2-12**  
**Top 40 Companies' Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	Toshiba	884	883	0	10.8
2	2	Motorola	794	857	8	10.5
3	3	Hitachi	598	566	-5	6.9
4	5	Philips	531	551	4	6.8
5	4	NEC	544	532	-2	6.5
6	6	Matsushita	379	379	0	4.6
7	7	Rohm	374	343	-8	4.2
8	9	SGS-Thomson	299	335	12	4.1
9	8	Mitsubishi	325	284	-13	3.5
10	14	International Rectifier	237	270	14	3.3
11	11	Sanken	259	253	-2	3.1
12	10	Fuji Electric	263	246	-6	3.0
13	12	Sanyo	250	244	-2	3.0
14	15	General Instrument	200	220	10	2.7
15	13	Siemens	245	219	-11	2.7
16	16	Fujitsu	152	142	-7	1.7
17	17	Shindengen Electric	134	126	-6	1.5
18	23	Samsung	92	119	29	1.5
19	20	Harris	107	115	7	1.4
20	21	Korean Electronic Company	95	110	16	1.3
21	18	ITT	110	106	-4	1.3
22	19	Semikron	108	103	-5	1.3
23	27	Siliconix	76	101	33	1.2
24	28	Microsemi	71	84	18	1.0
25	22	Eupec	93	83	-11	1.0
26	25	Telefunken Electronic	89	81	-9	1.0
27	26	Powerex	78	80	3	1.0
28	24	Sony	91	79	-13	1.0
29	29	National Semiconductor	60	70	17	0.9
30	30	ABB-IXYS	54	49	-9	0.6
31	31	Hewlett-Packard	45	48	7	0.6
32	NM	Teccor Electronics	NA	46	NA	0.6
33	NM	Westcode	NA	35	NA	0.4
34	33	GEC Plessey	35	31	-11	0.4
34	35	TAG	30	31	3	0.4
36	34	Toko	31	29	-6	0.4

(Continued)

**Table 2-12 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
36	38	Texas Instruments	28	29	4	0.4
38	39	Zetex	25	26	4	0.3
39	37	Fagor	29	25	-14	0.3
40	40	Semtech	21	16	-24	0.2
		All Others	199	209	5	2.6
		North American Companies	1,919	2,139	11	26.2
		Japanese Companies	4,296	4,117	-4	50.5
		European Companies	1,588	1,623	2	19.9
		Asia/Pacific Companies	232	276	19	3.4
		Total Market	8,035	8,155	1	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (May 1993)

**Table 2-13**  
**Top 20 Companies' Factory Revenue from Shipments of Optoelectronic Semiconductors to the World (Millions of U.S. Dollars)**

1992 Rank	1991 Rank		1991 Revenue	1992 Revenue	Percent Change	1992 Market Share (%)
1	1	Sharp	362	352	-3	13.1
2	2	Matsushita	318	315	-1	11.7
3	3	Toshiba	286	255	-11	9.5
4	4	Sony	279	216	-23	8.0
5	6	Hewlett-Packard	191	187	-2	7.0
6	7	Siemens	189	179	-5	6.7
7	5	Sanyo	193	136	-30	5.1
8	8	Fujitsu	127	117	-8	4.4
9	9	Rohm	122	110	-10	4.1
9	10	NEC	121	110	-9	4.1
11	11	Telefunken Electronic	74	78	5	2.9
12	12	Hitachi	68	60	-12	2.2
13	14	Optek	52	55	6	2.0
14	16	Quality Technology	34	46	35	1.7
15	13	Texas Instruments	58	42	-28	1.6
16	17	AT&T	32	39	22	1.5
17	19	Motorola	28	36	29	1.3
18	20	Honeywell	25	27	8	1.0
19	18	Oki	30	26	-13	1.0
20	20	Mitsubishi	25	23	-8	0.9
		All Others	190	279	47	10.4
		North American Companies	449	495	10	18.4
		Japanese Companies	1,992	1,849	-7	68.8
		European Companies	334	296	-11	11.0
		Asia/Pacific Companies	29	48	66	1.8
		Total Market	2,804	2,688	-4	100.0

Source: Dataquest (May 1993)



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**For More Information...**

Gary Grandbois, Senior Industry Analyst.....(408) 437-8251  
Via fax.....(408) 437-0292

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# Dataquest®

**CB** a company of  
The Dun & Bradstreet Corporation

Dataquest Incorporated  
1290 Ridder Park Drive  
San Jose, California 95131-2398  
United States  
Phone: 01-408-437-8000  
Facsimile: 01-408-437-0292

Dataquest Incorporated  
550 Cochituate Road  
Framingham, Massachusetts 01701-9324  
United States  
Phone: 01-508-370-5555  
Facsimile: 01-508-370-6262

Invitational Computer Conferences (ICC)  
3990 Westerly Place, Suite 100  
Newport Beach, California 92660  
United States  
Phone: (714) 476-9117  
Facsimile: (714) 476-9969

Dataquest Japan Limited  
Shinkawa Sanko Building  
1-3-17, Shinkawa, Chuo-ku  
Tokyo 104  
Japan  
Phone: 81-3-5566-0411  
Facsimile: 81-3-5566-0425

Dataquest Korea  
Dacheung Building, Room 1105  
648-23 Yorksam-dong  
Kangnam-gu, Seoul 135-080  
Korea  
Phone: 011-82-2-556-4166  
Facsimile: 011-82-2-552-2661

European Headquarters  
Dataquest Europe Limited  
Roussel House, Broadwater Park  
Denham, Uxbridge  
Middlesex UB9 5HP  
England  
Phone: 44-895-835050  
Facsimile: 44-895-835260/1

Dataquest GmbH  
Kronstadter Strasse 9  
8000 Munich 80  
Germany  
Phone: 011-49-89-930-9090  
Facsimile: 011-49-89-930-3277

Dataquest Europe SA  
Tour Gallieni 2  
36, Avenue du General de Gaulle  
93175 Bagnolet Cedex  
France  
Phone: 011-33-1-48-97-3100  
Facsimile: 011-33-1-48-97-3400

Representative Agencies in  
Bangkok, Hong Kong,  
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**Dataquest**

**Semiconductors**

# **Final 1993 Worldwide Semiconductor Market Share**



**Market Statistics**

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**1994**

**Program:** Semiconductors Worldwide

**Product Code:** SEMI-WW-MS-9401

**Publication Date:** March 7, 1994

**Dataquest®**

**Semiconductors**

**Final 1993 Worldwide  
Semiconductor Market Share**



**Market Statistics**

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**1994**

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Note: All tables show estimated data.

# Final 1993 Worldwide Semiconductor Market Share ---

## Introduction

This document contains detailed information on Dataquest's view of the semiconductor market. Included in this document are the following:

- 1991-1993 market share estimates
- 1991-1993 market share rankings

Analyses of market share by company provide insight into high-technology markets and reinforce estimates of consumption, production, and company revenue.

Worldwide market share estimates combine data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. market consumption or revenue are based on the average exchange rate for the given year. Refer to the section entitled "Exchange Rates" for more information regarding these average rates. As a rule, Dataquest's estimates are calculated in local currencies and then converted to U.S. dollars.

More detailed data on this market may be requested through Dataquest's client inquiry service. Qualitative analysis of this data is provided in the *Dataquest Perspectives* located in the binder of the same name.

## Segmentation

This section outlines the market segments that are specific to this document. Dataquest's objective is to provide data along lines of segmentation that is logical, appropriate to the industry in question, and immediately useful to clients.

Dataquest defines the semiconductor industry as the group of competing companies primarily engaged in manufacturing semiconductors and related solid-state devices. Important products of the semiconductor industry include integrated circuits, discrete devices, and optoelectronic devices.



For market share purposes, Dataquest defines the semiconductor market according to the following functional segmentation scheme:

- Total Semiconductor (Including Hybrids)
- Total Semiconductor (Excluding Hybrids)
  - Total Integrated Circuit (Including Hybrids)
  - Total Integrated Circuit (Excluding Hybrids)
    - Bipolar Digital IC
      - Bipolar Memory
      - Bipolar Logic
    - MOS Digital IC
      - MOS Memory
      - MOS Microcomponent
      - MOS Logic
    - Monolithic Analog IC
    - Hybrid IC
  - Discrete Semiconductor
  - Optoelectronic Semiconductor

## Definitions

This section lists the definitions that are used by Dataquest to present the data in this document. For a complete listing of all semiconductor market segments tracked by Dataquest, please refer to the *Dataquest Semiconductor Market Definitions Guide*.

### Product Definitions

**Total Semiconductor** (Total Integrated Circuit + Total Discrete + Total Optoelectronic). Defined as an active semiconductor product that contains semiconducting material (such as silicon, germanium, or gallium arsenide, but excluding ceramics) and reacts dynamically to an input signal, either by modifying its shape or adding energy to it. This definition excludes standalone passive components, such as capacitors, resistors, inductors, oscillators, crystals, transformers, and relays.

**Total Integrated Circuit** (Digital Monolithic Bipolar IC + Digital Monolithic MOS IC + Analog IC). An IC is defined as a large number of passive and/or active discrete semiconductor circuits integrated into a single package. A monolithic IC is one in which discrete circuits are integrated onto a single die.

**Bipolar Digital IC** (Bipolar Digital Memory + Bipolar Digital Microcomponent + Bipolar Digital Logic). A bipolar digital IC is defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, 100 percent of the die area is manufactured using bipolar semiconductor technology. A digital function is one in which data-carrying signals vary in discrete values.

**Bipolar Digital Memory**. Defined as a bipolar digital semiconductor product in which binary data is stored and electronically retrieved. Includes ECL random-access memory (RAM), read-only memory (ROM),

programmable ROM (PROM), last-in/first-out (LIFO) memory, and first-in/first-out (FIFO) memory. Not included are products made with mixed bipolar CMOS (that is, BiCMOS) with TTL or ECL outputs, which are classified as MOS.

**Bipolar Digital Logic (Bipolar Application-Specific IC + Bipolar Digital Standard Logic + Other Bipolar Logic).** Defined as a bipolar digital semiconductor product in which more than 50 percent of the die area performs logic functions. Excludes bipolar digital microcomponent ICs.

**MOS Digital IC (MOS Digital Memory + MOS Digital Microcomponent + MOS Digital Logic).** Defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, where any portion of the die area is manufactured using metal oxide semiconductor (MOS) technology. A digital function is one in which data carrying signals vary in discrete values. Includes mixed technology manufacturing, such as BiMOS and BiCMOS, where there is some MOS technology employed.

**MOS Digital Memory (DRAM + SRAM + EPROM + EEPROM + Flash Memory + Mask ROM + Other MOS Digital Memory).** Defined as a MOS digital IC in which binary data is stored and electronically retrieved.

**MOS Digital Microcomponent IC. (MOS Digital Microprocessor + MOS Digital Microcontroller + MOS Digital Microperipheral + Programmable Digital Signal Processor).** Defined as a MOS digital IC that contains a data processing unit or serves as an interface to such a unit.

**MOS Digital Logic IC. (MOS Digital Logic Application-Specific IC + MOS Digital Standard Logic IC + Other MOS Digital Logic IC).** Defined as an MOS digital IC in which more than 50 percent of the die area performs logic functions. Excludes MOS digital microcomponent ICs.

**Total Analog IC. (Amplifier/Comparator IC + Voltage Regulator/Reference IC + Data Converter/Switch/Multiplexer IC + Interface IC + Telecom IC + Disk Drive IC + Other Special function IC + Linear Array/ASIC + Mixed-Signal ASIC + Total Special Consumer IC + Special Automotive IC + Smart Power IC)**

An analog IC is a semiconductor product that deals in the realm of electrical signal processing, power control, or electrical drive capability. It is one in which some of the inputs or outputs can be defined in terms of continuously or linearly variable voltages, currents, or frequencies. Includes only monolithic analog ICs manufactured using bipolar, MOS, or BiCMOS technologies. A monolithic IC is a single die contained in a single package.

**Hybrid Integrated Circuit.** Defined as a semiconductor product consisting of more than one die contained in a single package. A hybrid IC may perform 100 percent linear, 100 percent digital, or mixed-signal (both linear and digital) functions. Includes hybrid implementation of all

monolithic IC functions described in the following categories. Includes all hybrid ICs manufactured using bipolar, MOS, or BiCMOS technologies.

**Total Discrete (Transistor + Diode + Thyristor + Other Discrete).** A discrete semiconductor is defined as a unit building block performing a fundamental semiconductor function.

**Total Optoelectronic (LED Lamp/Display + Optocoupler + CCD + Laser Diode + Photosensor + Other Optoelectronic).** Defined as a semiconductor product in which photons induce the flow of electrons, or vice versa. Other functions may also be integrated onto the product. This category does not include LCD, incandescent displays, fluorescent displays, cathode ray tubes (CRTs), or plasma displays.

**Merchant versus Captive Consumption.** Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. The data excludes completely captive suppliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

### **Regional Definitions**

**North America:** Includes Canada, Mexico, and the United States.

**Japan:** Japan is the only single-country region.

**Western Europe:** Includes Austria, Belgium, Denmark, Eire (Ireland), Finland, France, Germany (including former East Germany), Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and Rest of Western Europe (Andorra, Cyprus, Gibraltar, Liechtenstein, Monaco, San Marino, Vatican City, Iceland, Malta, and Turkey).

**Eastern Europe:** Includes Albania, Bulgaria, the Czech Republic and Slovakia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the republics of the former Yugoslavia, and the republics of the former USSR (Belorussia, Russian Federation, Ukraine, Georgia, Moldavia, Armenia, Azerbaijan, Kazakhstan, Uzbekistan, Tadjikistan, Kirghizia, and Turkenistan).

**Asia/Pacific:** Includes Asia/Pacific's newly industrialized economies (NIEs) and the Rest of Asia/Pacific regions. NIEs include Hong Kong, Singapore, South Korea, and Taiwan. The Rest of Asia/Pacific region includes Australia, Cambodia, China, India, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam.

**Rest of World:** Includes Africa, Caribbean, Central America, Middle East, Oceania, and South America.

### **Line Item Definitions**

Factory revenue is defined as the money value received by a semiconductor manufacturer for its products. Revenue from the sale of semiconductors sold either as finished goods, die, or wafers to another semiconductor vendor for resale is attributed to the semiconductor vendor that sells the product to a distributor or equipment manufacturer.

### **Market Share Methodology**

Dataquest utilizes both primary and secondary sources to produce market statistics data. In the fourth quarter of each year, Dataquest surveys all major participants within each industry. Selected companies are resurveyed during the first quarter of the following year to verify final annual results. This primary research is supplemented with additional primary research and secondary research to verify market size, shipment totals, and pricing information. Sources of data utilized by Dataquest include the following:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data (such as WSTS, MITI, and U.S. DOC)
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and CD-ROM data banks
- Articles in both the general and trade press
- Reports from financial analysts
- End-user surveys

Dataquest believes that the estimates presented in this document are the most accurate and meaningful statistics available.

Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Dataquest and those provided by other suppliers.

## Notes on Market Share

In the process of conducting data collection and preparing market statistics information, Dataquest will sometimes consolidate or revise a particular company, model, series, or industry's numbers. In this section, we explain any such changes contained within this document for your reference.

### Notes to Market Share Tables

1. Analog Devices revenue includes Precision Monolithics revenue from 1991 forward.
2. Cirrus Logic revenue includes Acumos and Crystal Semiconductor revenue from 1992 forward.
3. Cypress Semiconductor acquired the logic division of Performance Semiconductor in 1993.
4. Dialog, Eurosil, Matra, Telefunken, and Siliconix are now known as TEMIC.
5. Fujitsu acquired Ross Semiconductor from Cypress Semiconductor in 1993.
6. IBM's merchant revenue will be included in our Market Statistics beginning in 1993, which was the first complete year that IBM sold product on the merchant market.
7. IMP was formerly known as International Microelectronic Products.
8. Immos revenue is included in SGS-Thomson revenue.
9. Linfinity was formerly known as Silicon General.
10. Macronix revenue, beginning in 1991, was moved from the North American Companies area and is now included under the Asia/Pacific Companies section.
11. Mitsubishi's revenue includes Powerex's European revenue beginning in 1993.
12. MOSel and Vitelic merged in 1992 to form MOSel/Vitelic Corporation. In 1993, MOSel/Vitelic was moved to the Asia/Pacific-Rest of World region.
13. Nittetsu Semiconductor was formerly known as NMB Semiconductor.
14. Philips revenue includes Signetics revenue.
15. SGS-Thomson's revenue includes TAG in 1993.
16. Quality Technologies acquired Philips' Optocoupler Division in 1992.

17. Raytheon revenue includes that of TRW's LSI Division from 1992 forward.

18. Thomson Semiconductors Specific (TCS) was formed through the merger of Thomson Composants Microndes (TCM) and Thomson Composants Militaires et Spatiaux (TMS).

19. Unistore revenue includes that of Microsemi's Semiconductor Products Division from 1992 forward.

20. Vertex (formerly known as Integrated CMOS Systems) revenue is included in Toshiba revenue from 1991 forward.

21. Xilinx acquired Plus Logic in 1992.

22. The following companies were added to Worldwide market share tables starting in 1993, and may result in higher 1993 market growth rates in certain product areas:

- Acer Labs
- Alliance Semiconductor
- DSP Semiconductor
- Holtek
- IBM
- Paradigm
- Q Logic

## Exchange Rates

Dataquest uses an average annual exchange rate in converting revenue to U.S. dollar amounts. Table 1 outlines these rates for 1991 through 1993.

**Table 1**  
**Exchange Rates**

	1991	1992	1993
Japan (Yen/U.S.\$)	136.00	126.45	111.20
France (Franc/U.S.\$)	5.64	5.27	5.67
Germany (Deutsche Mark/U.S.\$)	1.66	1.56	1.66
United Kingdom (U.S.\$/Pound Sterling)	1.77	1.77	1.50

Source: Dataquest (February 1994)

## Section 1: Final 1993 Worldwide Semiconductor Market Share

**Table 1-1**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	59,695	65,260	85,641	100.0	100.0	100.0
North American Companies	22,940	26,943	37,159	38.4	41.3	43.4
ACC Microelectronics	NA	26	36	0	0	0
Actel	37	44	60	0.1	0.1	0.1
Adaptec	NA	89	122	0	0.1	0.1
Advanced Micro Devices	1,226	1,514	1,660	2.1	2.3	1.9
Allegro MicroSystems	104	115	118	0.2	0.2	0.1
Alliance Semiconductor	NA	13	41	0	0	0
Altera	107	102	140	0.2	0.2	0.2
Analog Devices	464	514	635	0.8	0.8	0.7
Appian Technology	15	10	10	0	0	0
Applied Micro Circuits Corp.	38	39	48	0.1	0.1	0.1
AT&T	713	911	1,110	1.2	1.4	1.3
Atmel	120	140	225	0.2	0.2	0.3
Brooktree	84	96	117	0.1	0.1	0.1
Burr-Brown	152	127	158	0.3	0.2	0.2
California Micro Devices	8	12	14	0	0	0
Catalyst	32	41	55	0.1	0.1	0.1
Cherry Semiconductor	37	46	55	0.1	0.1	0.1
Chips & Technologies	181	119	89	0.3	0.2	0.1
Cirrus Logic	152	275	451	0.3	0.4	0.5
Comlinear	14	15	16	0	0	0
Cypress Semiconductor	281	267	300	0.5	0.4	0.4
Cyrrix	NA	63	125	0	0.1	0.1
Dallas Semiconductor	75	97	112	0.1	0.1	0.1
DSP Semiconductor	10	10	8	0	0	0
Elantec	16	16	23	0	0	0
ETEQ Microsystems	NA	20	19	0	0	0
Exar	107	123	158	0.2	0.2	0.2
General Instrument	200	220	239	0.3	0.3	0.3
Gennum	23	27	30	0	0	0
Gould AMI	54	79	101	0.1	0.1	0.1

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Harris	623	559	605	1.0	0.9	0.7
Hewlett-Packard	442	449	469	0.7	0.7	0.5
Honeywell	45	48	53	0.1	0.1	0.1
Hughes	40	37	40	0.1	0.1	0
IBM	NA	NA	2,510	0	0	2.9
IMI	17	18	21	0	0	0
Integrated Circuit Systems	NA	35	41	0	0.1	0
Integrated Device Technology	204	220	303	0.3	0.3	0.4
Integrated Information Tech.	NA	42	40	0	0.1	0
Intel	4,019	5,091	7,970	6.7	7.8	9.3
IMP	32	32	37	0.1	0	0
International Rectifier	238	271	288	0.4	0.4	0.3
ITT	340	254	262	0.6	0.4	0.3
Kulite	26	24	24	0	0	0
Lattice	68	90	127	0.1	0.1	0.1
Linear Technology	107	132	173	0.2	0.2	0.2
Linfinity	32	29	37	0.1	0	0
Logic Devices	NA	12	12	0	0	0
LSI Logic	670	615	719	1.1	0.9	0.8
Maxim	80	97	115	0.1	0.1	0.1
Micrel	6	15	18	0	0	0
Micro Linear	36	33	45	0.1	0.1	0.1
Micro Power Systems	26	22	23	0	0	0
Microchip Technology	81	83	140	0.1	0.1	0.2
Micron Technology	455	557	925	0.8	0.9	1.1
Microsemi	71	84	97	0.1	0.1	0.1
Mitel	50	52	69	0.1	0.1	0.1
Motorola	3,802	4,634	5,957	6.4	7.1	7.0
NCR	145	228	275	0.2	0.3	0.3
National Semiconductor	1,602	1,797	2,132	2.7	2.8	2.5
Novasensor	11	13	16	0	0	0
Oak Technology	NA	50	50	0	0.1	0.1
Optek	52	57	56	0.1	0.1	0.1
OPTi	NA	98	86	0	0.2	0.1
Paradigm	8	7	34	0	0	0
Performance Semiconductor	54	46	41	0.1	0.1	0
Powerex	78	80	58	0.1	0.1	0.1

(Continued)



**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Q Logic	NA	NA	21	0	0	0
Quality Semiconductor	14	18	22	0	0	0
Quality Technologies	34	46	47	0.1	0.1	0.1
Raytheon	85	96	103	0.1	0.1	0.1
Rockwell	185	172	176	0.3	0.3	0.2
S3	NA	31	113	0	0	0.1
SEEQ Technology	47	35	29	0.1	0.1	0
Semtech	27	20	19	0	0	0
Sierra Semiconductor	86	92	96	0.1	0.1	0.1
Silicon Systems	184	241	265	0.3	0.4	0.3
Siliconix	140	156	0	0.2	0.2	0
Sipex	21	20	20	0	0	0
Solitron	30	15	11	0.1	0	0
Standard Microsystems	45	40	47	0.1	0.1	0.1
Supertex	27	24	25	0	0	0
Symphony Laboratories	NA	26	66	0	0	0.1
Teccor Electronics	NA	46	45	0	0.1	0.1
Tektronix	70	47	54	0.1	0.1	0.1
Teledyne	24	26	26	0	0	0
Texas Instruments	2,738	3,087	4,083	4.6	4.7	4.8
Trident Microsystems	NA	80	60	0	0.1	0.1
Tseng Labs	NA	74	71	0	0.1	0.1
Unitrode	80	76	78	0.1	0.1	0.1
Universal	14	14	14	0	0	0
VLSI Technology	414	429	517	0.7	0.7	0.6
VTC	20	45	70	0	0.1	0.1
WaferScale Integration	33	29	25	0.1	0	0
Weitek	39	26	33	0.1	0	0
Western Digital	209	190	218	0.4	0.3	0.3
Xicor	94	93	105	0.2	0.1	0.1
Xilinx	130	163	231	0.2	0.2	0.3
Zilog	110	146	203	0.2	0.2	0.2
Other North American Companies	330	259	123	0.6	0.4	0.1

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
<b>Japanese Companies</b>	27,685	27,576	34,573	46.4	42.3	40.4
Fuji Electric	319	297	366	0.5	0.5	0.4
Fujitsu	2,705	2,553	2,928	4.5	3.9	3.4
Hitachi	3,765	3,851	5,015	6.3	5.9	5.9
Matsushita	2,037	1,942	2,344	3.4	3.0	2.7
Mitsubishi	2,304	2,213	2,823	3.9	3.4	3.3
NEC	4,774	4,869	6,141	8.0	7.5	7.2
New JRC	151	138	186	0.3	0.2	0.2
Nittetsu Semiconductor	60	120	148	0.1	0.2	0.2
Oki	981	956	1,187	1.6	1.5	1.4
Ricoh	97	93	143	0.2	0.1	0.2
Rohm	934	844	930	1.6	1.3	1.1
Sanken	451	426	533	0.8	0.7	0.6
Sanyo	1,362	1,385	1,843	2.3	2.1	2.2
Seiko Epson	220	230	252	0.4	0.4	0.3
Shindengen Electric	184	170	211	0.3	0.3	0.2
Sharp	1,318	1,354	1,760	2.2	2.1	2.1
Sony	1,196	1,103	1,398	2.0	1.7	1.6
Toko	64	59	81	0.1	0.1	0.1
Toshiba	4,579	4,675	5,727	7.7	7.2	6.7
Yamaha	158	201	317	0.3	0.3	0.4
Other Japanese Companies	26	97	240	0	0.1	0.3
<b>European Companies</b>	6,336	6,666	7,696	10.6	10.2	9.0
ABB-HAFO	38	40	34	0.1	0.1	0
ABB-DXYS	54	49	38	0.1	0.1	0
Austria Mikro Systeme	70	74	85	0.1	0.1	0.1
Dialog Semiconductor	NA	17	0	0	0	0
EM Microelectronics Marin	NA	45	50	0	0.1	0.1
Ericsson	74	72	72	0.1	0.1	0.1
Eupec	93	83	82	0.2	0.1	0.1
European Silicon Structures	28	30	36	0	0	0
Eurosil	29	30	0	0	0	0
Fagor	29	25	19	0	0	0
GEC Plessey	392	381	290	0.7	0.6	0.3
Matra MHS	104	122	0	0.2	0.2	0
Micronas	NA	10	14	0	0	0

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Mietec	105	113	148	0.2	0.2	0.2
Philips	2,022	2,113	2,300	3.4	3.2	2.7
Semikron	108	103	94	0.2	0.2	0.1
SGS-Thomson	1,436	1,605	2,088	2.4	2.5	2.4
Siemens	1,263	1,245	1,510	2.1	1.9	1.8
TAG	30	31	0	0.1	0	0
Telefunken Electronic	300	289	0	0.5	0.4	0
TEMIC	NA	NA	625	0	0	0.7
TCS	NA	53	65	0	0.1	0.1
Westcode	NA	35	35	0	0.1	0
Zetex	26	27	32	0	0	0
Other European Companies	66	74	79	0.1	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>2,734</b>	<b>4,075</b>	<b>6,213</b>	<b>4.6</b>	<b>6.2</b>	<b>7.3</b>
Acer Labs	NA	NA	50	0	0	0.1
Daewoo	20	24	31	0	0	0
Dongsung Semiconductor	30	11	2	0.1	0	0
Goldstar	307	642	946	0.5	1.0	1.1
Holtek	NA	NA	53	0	0	0.1
Hualon Microelectronics Corp.	71	75	83	0.1	0.1	0.1
Hyundai	248	556	853	0.4	0.9	1.0
Korean Electronic Co.	136	148	177	0.2	0.2	0.2
Macronix	31	69	144	0.1	0.1	0.2
MOSel/Vitellic	NA	161	223	0	0.2	0.3
Samsung	1,473	1,900	3,044	2.5	2.9	3.6
Silicon Integrated Systems	28	40	71	0	0.1	0.1
United Microelectronics	200	198	309	0.3	0.3	0.4
Winbond Electronics	84	117	184	0.1	0.2	0.2
Other Asia/Pacific Companies	106	134	43	0.2	0.2	0.1

NA = Not available

Source: Dataquest (February 1994)

**Table 1-2**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the**  
**World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	58,300	63,925	84,159	100.0	100.0	100.0
North American Companies	22,658	26,603	36,770	38.9	41.6	43.7
ACC Microelectronics	NA	26	36	0	0	0
Actel	37	44	60	0.1	0.1	0.1
Adaptec	NA	89	122	0	0.1	0.1
Advanced Micro Devices	1,226	1,514	1,660	2.1	2.4	2.0
Allegro MicroSystems	104	115	118	0.2	0.2	0.1
Alliance Semiconductor	NA	13	41	0	0	0
Altera	107	102	140	0.2	0.2	0.2
Analog Devices	420	467	595	0.7	0.7	0.7
Appian Technology	15	10	10	0	0	0
Applied Micro Circuits Corp.	38	39	48	0.1	0.1	0.1
AT&T	712	911	1,110	1.2	1.4	1.3
Atmel	120	140	225	0.2	0.2	0.3
Brooktree	84	96	117	0.1	0.2	0.1
Burr-Brown	80	73	88	0.1	0.1	0.1
California Micro Devices	8	12	14	0	0	0
Catalyst	32	41	55	0.1	0.1	0.1
Cherry Semiconductor	37	46	55	0.1	0.1	0.1
Chips & Technologies	181	119	89	0.3	0.2	0.1
Cirrus Logic	152	275	451	0.3	0.4	0.5
Comlinear	6	7	8	0	0	0
Cypress Semiconductor	281	267	300	0.5	0.4	0.4
Cyrrix	NA	63	125	0	0.1	0.1
Dallas Semiconductor	75	97	112	0.1	0.2	0.1
DSP Semiconductor	10	10	8	0	0	0
Elantec	11	14	21	0	0	0
ETEQ Microsystems	NA	20	19	0	0	0
Exar	107	123	158	0.2	0.2	0.2
General Instrument	200	220	239	0.3	0.3	0.3
Gennum	23	27	30	0	0	0
Gould AMI	54	79	101	0.1	0.1	0.1
Harris	623	559	605	1.1	0.9	0.7
Hewlett-Packard	442	449	469	0.8	0.7	0.6
Honeywell	45	48	53	0.1	0.1	0.1
Hughes	40	37	40	0.1	0.1	0
IBM	NA	NA	2,510	0	0	3.0

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
IMI	17	18	21	0	0	0
Integrated Circuit Systems	NA	35	41	0	0.1	0
Integrated Device Technology	204	220	303	0.3	0.3	0.4
Integrated Information Tech.	NA	42	40	0	0.1	0
Intel	4,019	5,091	7,970	6.9	8.0	9.5
IMP	32	32	37	0.1	0.1	0
International Rectifier	238	271	288	0.4	0.4	0.3
ITT	340	254	262	0.6	0.4	0.3
Kulite	26	24	24	0	0	0
Lattice	68	90	127	0.1	0.1	0.2
Linear Technology	107	132	173	0.2	0.2	0.2
Linfinity	29	27	34	0	0	0
Logic Devices	NA	12	12	0	0	0
LSI Logic	670	615	719	1.1	1.0	0.9
Maxim	76	93	111	0.1	0.1	0.1
Micrel	6	15	18	0	0	0
Micro Linear	36	33	45	0.1	0.1	0.1
Micro Power Systems	26	22	23	0	0	0
Microchip Technology	81	83	140	0.1	0.1	0.2
Micron Technology	455	557	925	0.8	0.9	1.1
Microsemi	71	84	97	0.1	0.1	0.1
Mitel	35	39	55	0.1	0.1	0.1
Motorola	3,766	4,511	5,786	6.5	7.1	6.9
NCR	145	228	275	0.2	0.4	0.3
National Semiconductor	1,573	1,763	2,099	2.7	2.8	2.5
Novasensor	11	13	16	0	0	0
Oak Technology	NA	50	50	0	0.1	0.1
Optek	52	57	56	0.1	0.1	0.1
OPTi	NA	98	86	0	0.2	0.1
Paradigm	8	7	34	0	0	0
Performance Semiconductor	54	46	41	0.1	0.1	0
Powerex	78	80	58	0.1	0.1	0.1
Q Logic	NA	NA	21	0	0	0
Quality Semiconductor	14	18	22	0	0	0
Quality Technologies	34	46	47	0.1	0.1	0.1
Raytheon	85	96	103	0.1	0.2	0.1
Rockwell	185	172	176	0.3	0.3	0.2
S3	NA	31	113	0	0	0.1

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the**  
**World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
SEEQ Technology	47	35	29	0.1	0.1	0
Semtech	27	18	19	0	0	0
Sierra Semiconductor	86	92	96	0.1	0.1	0.1
Silicon Systems	184	241	265	0.3	0.4	0.3
Siliconix	140	156	0	0.2	0.2	0
Sipex	3	3	3	0	0	0
Solitron	21	8	11	0	0	0
Standard Microsystems	45	40	47	0.1	0.1	0.1
Supertex	27	24	25	0	0	0
Symphony Laboratories	NA	26	66	0	0	0.1
Teccor Electronics	NA	46	45	0	0.1	0.1
Tektronix	40	39	46	0.1	0.1	0.1
Teledyne	24	26	26	0	0	0
Texas Instruments	2,738	3,087	4,083	4.7	4.8	4.9
Trident Microsystems	NA	80	60	0	0.1	0.1
Tseng Labs	NA	74	71	0	0.1	0.1
Unitrode	73	62	64	0.1	0.1	0.1
Universal	14	14	14	0	0	0
VLSI Technology	414	429	517	0.7	0.7	0.6
VTC	20	45	70	0	0.1	0.1
WaferScale Integration	33	29	25	0.1	0	0
Weitek	39	26	33	0.1	0	0
Western Digital	209	190	218	0.4	0.3	0.3
Xicor	94	93	105	0.2	0.1	0.1
Xilinx	130	163	231	0.2	0.3	0.3
Zilog	110	146	203	0.2	0.2	0.2
Other North American Companies	329	254	118	0.6	0.4	0.1
Japanese Companies	26,716	26,707	33,585	45.8	41.8	39.9
Fuji Electric	297	281	345	0.5	0.4	0.4
Fujitsu	2,645	2,496	2,866	4.5	3.9	3.4
Hitachi	3,662	3,754	4,913	6.3	5.9	5.8
Matsushita	2,037	1,942	2,344	3.5	3.0	2.8
Mitsubishi	2,180	2,111	2,717	3.7	3.3	3.2
NEC	4,683	4,786	6,043	8.0	7.5	7.2
New JRC	151	138	186	0.3	0.2	0.2
Nittetsu Semiconductor	60	120	148	0.1	0.2	0.2
OKI	969	945	1,175	1.7	1.5	1.4

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Ricoh	97	93	143	0.2	0.1	0.2
Rohm	865	781	862	1.5	1.2	1.0
Sanken	280	273	331	0.5	0.4	0.4
Sanyo	1,202	1,236	1,677	2.1	1.9	2.0
Seiko Epson	220	230	252	0.4	0.4	0.3
Shindengen Electric	134	126	162	0.2	0.2	0.2
Sharp	1,318	1,354	1,760	2.3	2.1	2.1
Sony	1,160	1,070	1,362	2.0	1.7	1.6
Toko	54	51	73	0.1	0.1	0.1
Toshiba	4,518	4,622	5,669	7.7	7.2	6.7
Yamaha	158	201	317	0.3	0.3	0.4
Other Japanese Companies	26	97	240	0	0.2	0.3
European Companies	6,192	6,540	7,591	10.6	10.2	9.0
ABB-HAFO	38	40	34	0.1	0.1	0
ABB-DXYS	54	49	38	0.1	0.1	0
Austria Mikro Systeme	70	74	85	0.1	0.1	0.1
Dialog Semiconductor	NA	17	0	0	0	0
EM Microelectronics Marin	NA	45	50	0	0.1	0.1
Ericsson	74	72	60	0.1	0.1	0.1
Eupec	93	83	82	0.2	0.1	0.1
European Silicon Structures	28	30	36	0	0	0
Eurosil	29	30	0	0	0	0
Fagor	29	25	19	0	0	0
GEC Plessey	349	343	269	0.6	0.5	0.3
Matra MHS	104	122	0	0.2	0.2	0
Micronas	NA	10	14	0	0	0
Mietec	105	113	148	0.2	0.2	0.2
Philips	1,942	2,041	2,245	3.3	3.2	2.7
Semikron	108	103	94	0.2	0.2	0.1
SGS-Thomson	1,434	1,605	2,088	2.5	2.5	2.5
Siemens	1,263	1,245	1,510	2.2	1.9	1.8
TAG	30	31	0	0.1	0	0
Telefunken Electronic	294	287	0	0.5	0.4	0
TEMIC	NA	NA	623	0	0	0.7
TCS	NA	53	65	0	0.1	0.1

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the**  
**World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Westcode	NA	35	35	0	0.1	0
Zetex	26	27	32	0	0	0
Other European Companies	54	60	64	0.1	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>2,734</b>	<b>4,075</b>	<b>6,213</b>	<b>4.7</b>	<b>6.4</b>	<b>7.4</b>
Acer Labs	NA	NA	50	0	0	0.1
Daewoo	20	24	31	0	0	0
Dongsung Semiconductor	30	11	2	0.1	0	0
Goldstar	307	642	946	0.5	1.0	1.1
Holtek	NA	NA	53	0	0	0.1
Hualon Microelectronics Corp.	71	75	83	0.1	0.1	0.1
Hyundai	248	556	853	0.4	0.9	1.0
Korean Electronic Co.	136	148	177	0.2	0.2	0.2
Macronix	31	69	144	0.1	0.1	0.2
MOSel/Vitellic	NA	161	223	0	0.3	0.3
Samsung	1,473	1,900	3,044	2.5	3.0	3.6
Silicon Integrated Systems	28	40	71	0	0.1	0.1
United Microelectronics	200	198	309	0.3	0.3	0.4
Winbond Electronics	84	117	184	0.1	0.2	0.2
Other Asia/Pacific Companies	106	134	43	0.2	0.2	0.1

NA = Not available

Source: Dataquest (February 1994)



**Table 1-3**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	48,856	54,417	73,534	100.0	100.0	100.0
North American Companies	20,572	24,309	34,456	42.1	44.7	46.9
ACC Microelectronics	NA	26	36	0	0	0
Actel	37	44	60	0.1	0.1	0.1
Adaptec	NA	89	122	0	0.2	0.2
Advanced Micro Devices	1,226	1,514	1,660	2.5	2.8	2.3
Allegro MicroSystems	93	104	108	0.2	0.2	0.1
Alliance Semiconductor	NA	13	41	0	0	0.1
Altera	107	102	140	0.2	0.2	0.2
Analog Devices	464	514	635	0.9	0.9	0.9
Appian Technology	15	10	10	0	0	0
Applied Micro Circuits Corp.	38	39	48	0.1	0.1	0.1
AT&T	681	868	1,065	1.4	1.6	1.4
Atmel	120	140	225	0.2	0.3	0.3
Brooktree	84	96	117	0.2	0.2	0.2
Burr-Brown	152	127	158	0.3	0.2	0.2
California Micro Devices	8	12	14	0	0	0
Catalyst	32	41	55	0.1	0.1	0.1
Cherry Semiconductor	37	46	55	0.1	0.1	0.1
Chips & Technologies	181	119	89	0.4	0.2	0.1
Cirrus Logic	152	275	451	0.3	0.5	0.6
Comlinear	14	15	16	0	0	0
Cypress Semiconductor	281	267	300	0.6	0.5	0.4
Cyrix	NA	63	125	0	0.1	0.2
Dallas Semiconductor	75	97	112	0.2	0.2	0.2
DSP Semiconductor	10	10	8	0	0	0
Elantec	16	16	23	0	0	0
ETEQ Microsystems	NA	20	19	0	0	0
Exar	107	123	158	0.2	0.2	0.2
Gerrum	23	27	30	0	0	0
Gould AMI	54	79	101	0.1	0.1	0.1
Harris	507	444	467	1.0	0.8	0.6
Hewlett-Packard	206	214	230	0.4	0.4	0.3
Honeywell	20	21	26	0	0	0
Hughes	40	37	40	0.1	0.1	0.1
IBM	NA	NA	2,510	0	0	3.4

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
IMI	17	18	21	0	0	0
Integrated Circuit Systems	NA	35	41	0	0.1	0.1
Integrated Device Technology	204	220	303	0.4	0.4	0.4
Integrated Information Tech.	NA	42	40	0	0.1	0.1
Intel	4,019	5,091	7,970	8.2	9.4	10.8
IMP	32	32	37	0.1	0.1	0.1
International Rectifier	1	1	3	0	0	0
ITT	230	148	155	0.5	0.3	0.2
Kulite	26	24	24	0.1	0	0
Lattice	68	90	127	0.1	0.2	0.2
Linear Technology	107	132	173	0.2	0.2	0.2
Linfinity	29	27	37	0	0	0.1
Logic Devices	NA	12	12	0	0	0
LSI Logic	670	615	719	1.4	1.1	1.0
Maxim	80	97	115	0.2	0.2	0.2
Micrel	6	15	18	0	0	0
Micro Linear	36	33	45	0.1	0.1	0.1
Micro Power Systems	26	22	23	0.1	0	0
Microchip Technology	81	83	140	0.2	0.2	0.2
Micron Technology	455	557	925	0.9	1.0	1.3
Mitel	50	52	69	0.1	0.1	0.1
Motorola	2,980	3,741	4,922	6.1	6.9	6.7
NCR	145	228	275	0.3	0.4	0.4
National Semiconductor	1,542	1,727	2,055	3.2	3.2	2.8
Novasensor	11	13	16	0	0	0
Oak Technology	NA	50	50	0	0.1	0.1
OPTi	NA	98	86	0	0.2	0.1
Paradigm	8	7	34	0	0	0
Performance Semiconductor	54	46	41	0.1	0.1	0.1
Q Logic	NA	NA	21	0	0	0
Quality Semiconductor	14	18	22	0	0	0
Raytheon	77	89	95	0.2	0.2	0.1
Rockwell	185	172	176	0.4	0.3	0.2
S3	NA	31	113	0	0.1	0.2
SEEQ Technology	47	35	29	0.1	0.1	0
Semtech	6	4	2	0	0	0
Sierra Semiconductor	86	92	96	0.2	0.2	0.1

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Silicon Systems	184	241	265	0.4	0.4	0.4
Siliconix	64	55	0	0.1	0.1	0
Sipex	21	20	20	0	0	0
Solitron	9	7	0	0	0	0
Standard Microsystems	45	40	47	0.1	0.1	0.1
Supertex	17	15	15	0	0	0
Symphony Laboratories	NA	26	66	0	0	0.1
Tektronix	65	42	49	0.1	0.1	0.1
Teledyne	21	26	26	0	0	0
Texas Instruments	2,652	3,016	4,000	5.4	5.5	5.4
Trident Microsystems	NA	80	60	0	0.1	0.1
Tseng Labs	NA	74	71	0	0.1	0.1
Unitrode	41	66	78	0.1	0.1	0.1
Universal	14	14	14	0	0	0
VLSI Technology	414	429	517	0.8	0.8	0.7
VTC	20	45	70	0	0.1	0.1
WaferScale Integration	33	29	25	0.1	0.1	0
Weitek	39	26	33	0.1	0	0
Western Digital	209	190	218	0.4	0.3	0.3
Xicor	94	93	105	0.2	0.2	0.1
Xilinx	130	163	231	0.3	0.3	0.3
Zilog	110	146	203	0.2	0.3	0.3
Other North American Companies	315	155	59	0.6	0.3	0.1
<b>Japanese Companies</b>	<b>21,397</b>	<b>21,610</b>	<b>27,550</b>	<b>43.8</b>	<b>39.7</b>	<b>37.5</b>
Fuji Electric	55	51	73	0.1	0.1	0.1
Fujitsu	2,426	2,294	2,648	5.0	4.2	3.6
Hitachi	3,099	3,225	4,286	6.3	5.9	5.8
Matsushita	1,340	1,248	1,536	2.7	2.3	2.1
Mitsubishi	1,954	1,906	2,413	4.0	3.5	3.3
NEC	4,109	4,227	5,444	8.4	7.8	7.4
New JRC	134	123	170	0.3	0.2	0.2
Nittetsu Semiconductor	60	120	148	0.1	0.2	0.2
OKI	942	922	1,150	1.9	1.7	1.6
Ricoh	97	93	143	0.2	0.2	0.2
Rohm	438	391	438	0.9	0.7	0.6
Sanken	171	153	202	0.4	0.3	0.3

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Sanyo	919	1,005	1,370	1.9	1.8	1.9
Seiko Epson	220	230	252	0.5	0.4	0.3
Shindengen Electric	50	44	49	0.1	0.1	0.1
Sharp	956	1,002	1,342	2.0	1.8	1.8
Sony	826	808	1,073	1.7	1.5	1.5
Toko	33	30	36	0.1	0.1	0
Toshiba	3,409	3,537	4,384	7.0	6.5	6.0
Yamaha	158	201	317	0.3	0.4	0.4
Other Japanese Companies	1	0	76	0	0	0.1
<b>European Companies</b>	<b>4,414</b>	<b>4,747</b>	<b>5,647</b>	<b>9.0</b>	<b>8.7</b>	<b>7.7</b>
ABB-HAFO	24	25	20	0	0	0
Austria Mikro Systeme	70	74	85	0.1	0.1	0.1
Dialog Semiconductor	NA	17	0	0	0	0
EM Microelectronics Marin	NA	45	50	0	0.1	0.1
Ericsson	74	72	72	0.2	0.1	0.1
European Silicon Structures	28	30	36	0.1	0.1	0
Eurosil	29	30	0	0.1	0.1	0
GEC Plessey	357	350	269	0.7	0.6	0.4
Matra MHS	104	122	0	0.2	0.2	0
Micronas	NA	10	14	0	0	0
Mietec	105	113	148	0.2	0.2	0.2
Philips	1,455	1,562	1,696	3.0	2.9	2.3
SGS-Thomson	1,137	1,270	1,687	2.3	2.3	2.3
Siemens	829	847	1,110	1.7	1.6	1.5
Telefunken Electronic	137	130	0	0.3	0.2	0
TEMIC	NA	NA	396	0	0	0.5
TCS	NA	32	43	0	0.1	0.1
Zetex	0	0	2	0	0	0
Other European Companies	16	18	19	0	0	0
<b>Asia/Pacific Companies</b>	<b>2,473</b>	<b>3,751</b>	<b>5,881</b>	<b>5.1</b>	<b>6.9</b>	<b>8.0</b>
Acer Labs	NA	NA	50	0	0	0.1
Daewoo	20	24	31	0	0	0
Goldstar	307	631	946	0.6	1.2	1.3
Holtek	NA	NA	53	0	0	0.1
Hualon Microelectronics Corp.	71	75	83	0.1	0.1	0.1

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Hyundai	248	556	853	0.5	1.0	1.2
Korean Electronic Co.	33	30	37	0.1	0.1	0.1
Macronix	31	69	144	0.1	0.1	0.2
MOSel/Vitellic	NA	161	223	0	0.3	0.3
Samsung	1,381	1,781	2,897	2.8	3.3	3.9
Silicon Integrated Systems	28	40	71	0.1	0.1	0.1
United Microelectronics	200	198	309	0.4	0.4	0.4
Winbond Electronics	84	117	184	0.2	0.2	0.3
Other Asia/Pacific Companies	70	69	0	0.1	0.1	0

NA = Not available

Source: Dataquest (February 1994)

**Table 1-4**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	47,461	53,082	72,052	100.0	100.0	100.0
North American Companies	20,290	23,969	34,067	42.8	45.2	47.3
ACC Microelectronics	NA	26	36	0	0	0
Actel	37	44	60	0.1	0.1	0.1
Adaptec	NA	89	122	0	0.2	0.2
Advanced Micro Devices	1,226	1,514	1,660	2.6	2.9	2.3
Allegro MicroSystems	93	104	108	0.2	0.2	0.1
Alliance Semiconductor	NA	13	41	0	0	0.1
Altera	107	102	140	0.2	0.2	0.2
Analog Devices	420	467	595	0.9	0.9	0.8
Appian Technology	15	10	10	0	0	0
Applied Micro Circuits Corp.	38	39	48	0.1	0.1	0.1
AT&T	680	868	1,065	1.4	1.6	1.5
Atmel	120	140	225	0.3	0.3	0.3
Brooktree	84	96	117	0.2	0.2	0.2
Burr-Brown	80	73	88	0.2	0.1	0.1
California Micro Devices	8	12	14	0	0	0
Catalyst	32	41	55	0.1	0.1	0.1
Cherry Semiconductor	37	46	55	0.1	0.1	0.1
Chips & Technologies	181	119	89	0.4	0.2	0.1
Cirrus Logic	152	275	451	0.3	0.5	0.6
Comlinear	6	7	8	0	0	0
Cypress Semiconductor	281	267	300	0.6	0.5	0.4
Cyrix	NA	63	125	0	0.1	0.2
Dallas Semiconductor	75	97	112	0.2	0.2	0.2
DSP Semiconductor	10	10	8	0	0	0
Elantec	11	14	21	0	0	0
ETEQ Microsystems	NA	20	19	0	0	0
Exar	107	123	158	0.2	0.2	0.2
Gennum	23	27	30	0	0.1	0
Gould AMI	54	79	101	0.1	0.1	0.1
Harris	507	444	467	1.1	0.8	0.6
Hewlett-Packard	206	214	230	0.4	0.4	0.3
Honeywell	20	21	26	0	0	0
Hughes	40	37	40	0.1	0.1	0.1
IBM	NA	NA	2,510	0	0	3.5

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
IMI	17	18	21	0	0	0
Integrated Circuit Systems	NA	35	41	0	0.1	0.1
Integrated Device Technology	204	220	303	0.4	0.4	0.4
Integrated Information Tech.	NA	42	40	0	0.1	0.1
Intel	4,019	5,091	7,970	8.5	9.6	11.1
IMP	32	32	37	0.1	0.1	0.1
International Rectifier	1	1	3	0	0	0
ITT	230	148	155	0.5	0.3	0.2
Kulite	26	24	24	0.1	0	0
Lattice	68	90	127	0.1	0.2	0.2
Linear Technology	107	132	173	0.2	0.2	0.2
Linfinity	32	29	37	0	0	0
Logic Devices	NA	12	12	0	0	0
LSI Logic	670	615	719	1.4	1.2	1.0
Maxim	76	93	111	0.2	0.2	0.2
Micrel	6	15	18	0	0	0
Micro Linear	36	33	45	0.1	0.1	0.1
Micro Power Systems	26	22	23	0.1	0	0
Microchip Technology	81	83	140	0.2	0.2	0.2
Micron Technology	455	557	925	1.0	1.0	1.3
Mitel	35	39	55	0.1	0.1	0.1
Motorola	2,944	3,618	4,751	6.2	6.8	6.6
NCR	145	228	275	0.3	0.4	0.4
National Semiconductor	1,513	1,693	2,022	3.2	3.2	2.8
Novasensor	11	13	16	0	0	0
Oak Technology	NA	50	50	0	0.1	0.1
OPTi	NA	98	86	0	0.2	0.1
Paradigm	8	7	34	0	0	0
Performance Semiconductor	54	46	41	0.1	0.1	0.1
Q Logic	NA	NA	21	0	0	0
Quality Semiconductor	14	18	22	0	0	0
Raytheon	77	89	95	0.2	0.2	0.1
Rockwell	185	172	176	0.4	0.3	0.2
S3	NA	31	113	0	0.1	0.2
SEEQ Technology	47	35	29	0.1	0.1	0
Semtech	6	2	2	0	0	0
Sierra Semiconductor	86	92	96	0.2	0.2	0.1

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Silicon Systems	184	241	265	0.4	0.5	0.4
Siliconix	64	55	0	0.1	0.1	0
Sipex	3	3	3	0	0	0
Standard Microsystems	45	40	47	0.1	0.1	0.1
Supertex	17	15	15	0	0	0
Symphony Laboratories	NA	26	66	0	0	0.1
Tektronix	35	34	41	0.1	0.1	0.1
Teledyne	21	26	26	0	0	0
Texas Instruments	2,652	3,016	4,000	5.6	5.7	5.6
Trident Microsystems	NA	80	60	0	0.2	0.1
Tseng Labs	NA	74	71	0	0.1	0.1
Unitrode	34	52	64	0.1	0.1	0.1
Universal	14	14	14	0	0	0
VLSI Technology	414	429	517	0.9	0.8	0.7
VTC	20	45	70	0	0.1	0.1
WaferScale Integration	33	29	25	0.1	0.1	0
Weitek	39	26	33	0.1	0	0
Western Digital	209	190	218	0.4	0.4	0.3
Xicor	94	93	105	0.2	0.2	0.1
Xilinx	130	163	231	0.3	0.3	0.3
Zilog	110	146	203	0.2	0.3	0.3
Other North American Companies	314	150	54	0.7	0.3	0.1
<b>Japanese Companies</b>	<b>20,428</b>	<b>20,741</b>	<b>26,562</b>	<b>43.0</b>	<b>39.1</b>	<b>36.9</b>
Fuji Electric	33	35	52	0.1	0.1	0.1
Fujitsu	2,366	2,237	2,586	5.0	4.2	3.6
Hitachi	2,996	3,128	4,184	6.3	5.9	5.8
Matsushita	1,340	1,248	1,536	2.8	2.4	2.1
Mitsubishi	1,830	1,804	2,307	3.9	3.4	3.2
NEC	4,018	4,144	5,346	8.5	7.8	7.4
New JRC	134	123	170	0.3	0.2	0.2
Nittetsu Semiconductor	60	120	148	0.1	0.2	0.2
OKI	930	911	1,138	2.0	1.7	1.6
Ricoh	97	93	143	0.2	0.2	0.2
Rohm	369	328	370	0.8	0.6	0.5
Sanyo	759	856	1,204	1.6	1.6	1.7
Seiko Epson	220	230	252	0.5	0.4	0.3

(Continued)



**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Sharp	956	1,002	1,342	2.0	1.9	1.9
Sony	790	775	1,037	1.7	1.5	1.4
Toko	23	22	28	0	0	0
Toshiba	3,348	3,484	4,326	7.1	6.6	6.0
Yamaha	158	201	317	0.3	0.4	0.4
Other Japanese Companies	1	0	76	0	0	0.1
<b>European Companies</b>	<b>4,270</b>	<b>4,621</b>	<b>5,542</b>	<b>9.0</b>	<b>8.7</b>	<b>7.7</b>
ABB-HAFO	24	25	20	0.1	0	0
Austria Mikro Systeme	70	74	85	0.1	0.1	0.1
Dialog Semiconductor	NA	17	0	0	0	0
EM Microelectronics Marin	NA	45	50	0	0.1	0.1
Ericsson	74	72	60	0.2	0.1	0.1
European Silicon Structures	28	30	36	0.1	0.1	0
Eurosil	29	30	0	0.1	0.1	0
GEC Plessey	314	312	248	0.7	0.6	0.3
Matra MHS	104	122	0	0.2	0.2	0
Micronas	NA	10	14	0	0	0
Mietec	105	113	148	0.2	0.2	0.2
Philips	1,375	1,490	1,641	2.9	2.8	2.3
SGS-Thomson	1,135	1,270	1,687	2.4	2.4	2.3
Siemens	829	847	1,110	1.7	1.6	1.5
Telefunken Electronic	131	128	0	0.3	0.2	0
TEMIC	NA	NA	394	0	0	0.5
TCS	NA	32	43	0	0.1	0.1
Zetex	0	0	2	0	0	0
Other European Companies	4	4	4	0	0	0
<b>Asia/Pacific Companies</b>	<b>2,473</b>	<b>3,751</b>	<b>5,881</b>	<b>5.2</b>	<b>7.1</b>	<b>8.2</b>
Acer Labs	NA	NA	50	0	0	0.1
Daewoo	20	24	31	0	0	0
Goldstar	307	631	946	0.6	1.2	1.3
Holtek	NA	NA	53	0	0	0.1
Hualon Microelectronics Corp.	71	75	83	0.1	0.1	0.1
Hyundai	248	556	853	0.5	1.0	1.2
Korean Electronic Co.	33	30	37	0.1	0.1	0.1
Macronix	31	69	144	0.1	0.1	0.2

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
MOSel/Vitellic	NA	161	223	0	0.3	0.3
Samsung	1,381	1,781	2,897	2.9	3.4	4.0
Silicon Integrated Systems	28	40	71	0.1	0.1	0.1
United Microelectronics	200	198	309	0.4	0.4	0.4
Winbond Electronics	84	117	184	0.2	0.2	0.3
Other Asia/Pacific Companies	70	69	0	0.1	0.1	0

NA = Not available

Source: Dataquest (February 1994)

**Table 1-5**  
**Each Company's Factory Revenue from Shipments of Bipolar Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
<b>Total Market</b>	3,628	3,193	3,093	100.0	100.0	100.0
<b>North American Companies</b>	1,806	1,601	1,657	49.8	50.1	53.6
Advanced Micro Devices	300	247	199	8.3	7.7	6.4
Applied Micro Circuits Corp.	32	29	26	0.9	0.9	0.8
AT&T	48	60	60	1.3	1.9	1.9
Atmel	1	1	1	0	0	0
Chips & Technologies	16	3	3	0.4	0.1	0.1
Harris	35	22	13	1.0	0.7	0.4
Intel	4	1	1	0.1	0	0
Motorola	380	384	432	10.5	12.0	14.0
National Semiconductor	324	274	286	8.9	8.6	9.2
Raytheon	53	51	27	1.5	1.6	0.9
Texas Instruments	583	505	594	16.1	15.8	19.2
Other North American Companies	24	24	15	0.7	0.8	0.5
<b>Japanese Companies</b>	1,454	1,240	1,158	40.1	38.8	37.4
Fujitsu	509	413	371	14.0	12.9	12.0
Hitachi	461	425	391	12.7	13.3	12.6
Matsushita	13	11	26	0.4	0.3	0.8
Mitsubishi	81	66	63	2.2	2.1	2.0
NEC	244	214	201	6.7	6.7	6.5
OKI	39	33	31	1.1	1.0	1.0
Sony	1	1	0	0	0	0
Toshiba	105	77	75	2.9	2.4	2.4
<b>European Companies</b>	346	328	234	9.5	10.3	7.6
GEC Plessey	41	40	23	1.1	1.3	0.7
Philips	245	241	152	6.8	7.5	4.9
SGS-Thomson	1	3	14	0	0.1	0.5
Siemens	41	40	41	1.1	1.3	1.3
Other European Companies	4	4	4	0.1	0.1	0.1
<b>Asia/Pacific Companies</b>	22	24	44	0.6	0.8	1.4
Goldstar	22	24	44	0.6	0.8	1.4

NA = Not available

Source: Dataquest (February 1994)

**Table 1-6**  
**Each Company's Factory Revenue from Shipments of Bipolar Memory ICs**  
**to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
<b>Total Market</b>	356	318	245	100.0	100.0	100.0
<b>North American Companies</b>	89	88	60	25.0	27.7	24.5
Advanced Micro Devices	52	46	39	14.6	14.5	15.9
Harris	2	13	4	0.6	4.1	1.6
Motorola	3	3	2	0.8	0.9	0.8
National Semiconductor	13	8	6	3.7	2.5	2.4
Raytheon	8	10	6	2.2	3.1	2.4
Texas Instruments	3	3	3	0.8	0.9	1.2
Other North American Companies	5	5	0	1.4	1.6	0
<b>Japanese Companies</b>	231	203	182	64.9	63.8	74.3
Fujitsu	113	90	81	31.7	28.3	33.1
Hitachi	99	94	85	27.8	29.6	34.7
NEC	19	19	16	5.3	6.0	6.5
<b>European Companies</b>	36	27	3	10.1	8.5	1.2
Philips	36	27	3	10.1	8.5	1.2

Source: Dataquest (February 1994)

**Table 1-7**  
**Each Company's Factory Revenue from Shipments of Bipolar Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
<b>Total Market</b>	<b>3,272</b>	<b>2,875</b>	<b>2,848</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>North American Companies</b>	<b>1,717</b>	<b>1,513</b>	<b>1,597</b>	<b>52.5</b>	<b>52.6</b>	<b>56.1</b>
Advanced Micro Devices	248	201	160	7.6	7.0	5.6
Applied Micro Circuits Corp.	32	29	26	1.0	1.0	0.9
AT&T	48	60	60	1.5	2.1	2.1
Atmel	1	1	1	0	0	0
Chips & Technologies	16	3	3	0.5	0.1	0.1
Harris	33	9	9	1.0	0.3	0.3
Intel	4	1	1	0.1	0	0
Motorola	377	381	430	11.5	13.3	15.1
National Semiconductor	311	266	280	9.5	9.3	9.8
Raytheon	45	41	21	1.4	1.4	0.7
Texas Instruments	580	502	591	17.7	17.5	20.8
Other North American Companies	19	19	15	0.6	0.7	0.5
<b>Japanese Companies</b>	<b>1,223</b>	<b>1,037</b>	<b>976</b>	<b>37.4</b>	<b>36.1</b>	<b>34.3</b>
Fujitsu	396	323	290	12.1	11.2	10.2
Hitachi	362	331	306	11.1	11.5	10.7
Matsushita	13	11	26	0.4	0.4	0.9
Mitsubishi	81	66	63	2.5	2.3	2.2
NEC	225	195	185	6.9	6.8	6.5
OKI	39	33	31	1.2	1.1	1.1
Sony	1	1	0	0	0	0
Toshiba	105	77	75	3.2	2.7	2.6
<b>European Companies</b>	<b>310</b>	<b>301</b>	<b>231</b>	<b>9.5</b>	<b>10.5</b>	<b>8.1</b>
GEC Plessey	41	40	23	1.3	1.4	0.8
Philips	209	214	149	6.4	7.4	5.2
SGS-Thomson	1	3	14	0	0.1	0.5
Siemens	41	40	41	1.3	1.4	1.4
Other European Companies	4	4	4	0.1	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>22</b>	<b>24</b>	<b>44</b>	<b>0.7</b>	<b>0.8</b>	<b>1.5</b>
Goldstar	22	24	44	0.7	0.8	1.5

NA = Not available

Source: Dataquest (February 1994)

**Table 1-8**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	34,315	39,709	56,603	100.0	100.0	100.0
North American Companies	14,377	17,717	26,782	41.9	44.6	47.3
ACC Microelectronics	NA	26	36	0	0.1	0.1
Actel	37	44	60	0.1	0.1	0.1
Adaptec	NA	89	122	0	0.2	0.2
Advanced Micro Devices	832	1,157	1,307	2.4	2.9	2.3
Allegro MicroSystems	2	4	4	0	0	0
Alliance Semiconductor	NA	13	41	0	0	0.1
Altera	107	102	140	0.3	0.3	0.2
Analog Devices	20	39	69	0.1	0.1	0.1
Appian Technology	15	10	10	0	0	0
Applied Micro Circuits Corp.	6	10	22	0	0	0
AT&T	391	533	671	1.1	1.3	1.2
Atmel	118	138	223	0.3	0.3	0.4
California Micro Devices	3	5	6	0	0	0
Catalyst	32	40	54	0.1	0.1	0.1
Chips & Technologies	165	116	86	0.5	0.3	0.2
Cirrus Logic	151	246	371	0.4	0.6	0.7
Cypress Semiconductor	281	267	300	0.8	0.7	0.5
Cyrix	NA	63	125	0	0.2	0.2
Dallas Semiconductor	62	89	104	0.2	0.2	0.2
DSP Semiconductor	10	10	8	0	0	0
ETEQ Microsystems	NA	20	19	0	0.1	0
Gould AMI	40	49	63	0.1	0.1	0.1
Harris	246	205	204	0.7	0.5	0.4
Hewlett-Packard	206	214	230	0.6	0.5	0.4
Hughes	32	25	24	0.1	0.1	0
IBM	NA	NA	2,510	0	0	4.4
IMI	14	15	18	0	0	0
Integrated Circuit Systems	NA	35	29	0	0.1	0.1
Integrated Device Technology	198	220	303	0.6	0.6	0.5
Integrated Information Tech.	NA	42	40	0	0.1	0.1
Intel	4,006	5,080	7,957	11.7	12.8	14.1
IMP	26	21	8	0.1	0.1	0
ITT	195	130	132	0.6	0.3	0.2
Lattice	68	90	127	0.2	0.2	0.2

(Continued)

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Logic Devices	NA	12	12	0	0	0
LSI Logic	670	615	719	2.0	1.5	1.3
Micrel	0	5	5	0	0	0
Microchip Technology	81	83	140	0.2	0.2	0.2
Micron Technology	455	557	925	1.3	1.4	1.6
Motorola	2,144	2,706	3,612	6.2	6.8	6.4
NCR	117	178	230	0.3	0.4	0.4
National Semiconductor	589	714	900	1.7	1.8	1.6
Oak Technology	NA	50	50	0	0.1	0.1
OPTi	NA	98	86	0	0.2	0.2
Paradigm	8	7	34	0	0	0.1
Performance Semiconductor	54	46	41	0.2	0.1	0.1
Q Logic	NA	NA	21	0	0	0
Quality Semiconductor	14	18	22	0	0	0
Rockwell	20	17	21	0.1	0	0
S3	NA	31	113	0	0.1	0.2
SEEQ Technology	39	26	20	0.1	0.1	0
Sierra Semiconductor	7	7	6	0	0	0
Standard Microsystems	45	40	47	0.1	0.1	0.1
Supertex	5	5	5	0	0	0
Symphony Laboratories	NA	26	66	0	0.1	0.1
Texas Instruments	1,630	2,019	2,789	4.8	5.1	4.9
Trident Microsystems	NA	80	60	0	0.2	0.1
Tseng Labs	NA	74	71	0	0.2	0.1
Universal	10	10	9	0	0	0
VLSI Technology	414	427	515	1.2	1.1	0.9
WaferScale Integration	33	29	25	0.1	0.1	0
Weitek	39	26	33	0.1	0.1	0.1
Western Digital	209	190	218	0.6	0.5	0.4
Xicor	91	93	105	0.3	0.2	0.2
Xilinx	130	163	231	0.4	0.4	0.4
Zilog	110	146	203	0.3	0.4	0.4
Other North American Companies	200	72	25	0.6	0.2	0
Japanese Companies	15,615	16,267	21,501	45.5	41.0	38.0
Fuji Electric	24	26	36	0.1	0.1	0.1
Fujitsu	1,738	1,709	2,093	5.1	4.3	3.7

(Continued)

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Hitachi	2,280	2,461	3,513	6.6	6.2	6.2
Matsushita	915	834	1,037	2.7	2.1	1.8
Mitsubishi	1,395	1,423	1,867	4.1	3.6	3.3
NEC	3,443	3,599	4,768	10.0	9.1	8.4
New JRC	11	10	12	0	0	0
NMB Semiconductor	60	120	148	0.2	0.3	0.3
OKI	871	862	1,085	2.5	2.2	1.9
Ricoh	91	86	135	0.3	0.2	0.2
Rohm	97	90	112	0.3	0.2	0.2
Sanyo	320	386	571	0.9	1.0	1.0
Seiko Epson	208	219	241	0.6	0.6	0.4
Sharp	890	938	1,255	2.6	2.4	2.2
Sony	431	435	612	1.3	1.1	1.1
Toshiba	2,692	2,879	3,636	7.8	7.3	6.4
Yamaha	148	190	304	0.4	0.5	0.5
Other Japanese Companies	1	0	76	0	0	0.1
<b>European Companies</b>	<b>2,130</b>	<b>2,267</b>	<b>2,826</b>	<b>6.2</b>	<b>5.7</b>	<b>5.0</b>
Austria Mikro Systeme	39	29	36	0.1	0.1	0.1
Ericsson	16	15	15	0	0	0
European Silicon Structures	28	30	36	0.1	0.1	0.1
Eurosil	22	23	0	0.1	0.1	0
GEC Plessey	131	118	111	0.4	0.3	0.2
Matra MHS	99	114	0	0.3	0.3	0
Mietec	22	22	25	0.1	0.1	0
Philips	546	646	737	1.6	1.6	1.3
SGS-Thomson	558	609	813	1.6	1.5	1.4
Siemens	607	632	894	1.8	1.6	1.6
Telefunken Electronic	12	7	0	0	0	0
TEMIC	NA	NA	132	0	0	0.2
TCS	NA	22	27	0	0.1	0
<b>Asia/Pacific Companies</b>	<b>2,193</b>	<b>3,458</b>	<b>5,494</b>	<b>6.4</b>	<b>8.7</b>	<b>9.7</b>
Acer Labs	NA	NA	50	0	0	0.1
Daewoo	6	7	11	0	0	0
Goldstar	273	587	862	0.8	1.5	1.5
Holtek	NA	NA	38	0	0	0.1

(Continued)



**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Hualon Microelectronics Corp.	70	74	76	0.2	0.2	0.1
Hyundai	248	556	853	0.7	1.4	1.5
Macronix	31	69	144	0.1	0.2	0.3
MOSel/Vitellic	NA	161	223	0	0.4	0.4
Samsung	1,269	1,664	2,731	3.7	4.2	4.8
Silicon Integrated Systems	28	40	71	0.1	0.1	0.1
United Microelectronics	200	198	309	0.6	0.5	0.5
Winbond Electronics	68	102	126	0.2	0.3	0.2

NA = Not available

Source: Dataquest (February 1994)

**Table 1-9**  
**Each Company's Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
<b>Total Market</b>	12,841	15,308	23,316	100.0	100.0	100.0
<b>North American Companies</b>	3,298	3,593	6,261	25.7	23.5	26.9
Advanced Micro Devices	270	282	427	2.1	1.8	1.8
Alliance Semiconductor	NA	13	41	0	0.1	0.2
AT&T	4	33	10	0	0.2	0
Atmel	78	99	181	0.6	0.6	0.8
Catalyst	32	40	54	0.2	0.3	0.2
Cypress Semiconductor	186	187	235	1.4	1.2	1.0
Dallas Semiconductor	21	24	38	0.2	0.2	0.2
Gould AMI	11	15	23	0.1	0.1	0.1
Harris	23	20	19	0.2	0.1	0.1
IBM	NA	NA	1,133	0	0	4.9
Integrated Device Technology	128	138	189	1.0	0.9	0.8
Intel	395	324	468	3.1	2.1	2.0
IMP	6	5	2	0	0	0
ITT	10	8	11	0.1	0.1	0
Logic Devices	NA	4	4	0	0	0
Microchip Technology	57	47	64	0.4	0.3	0.3
Micron Technology	455	557	925	3.5	3.6	4.0
Motorola	412	610	762	3.2	4.0	3.3
NCR	3	2	2	0	0	0
National Semiconductor	112	128	180	0.9	0.8	0.8
Paradigm	8	7	34	0.1	0	0.1
Performance Semiconductor	18	16	8	0.1	0.1	0
Quality Semiconductor	6	9	12	0	0.1	0.1
SEEQ Technology	33	21	16	0.3	0.1	0.1
Texas Instruments	738	874	1,275	5.7	5.7	5.5
WaferScale Integration	23	22	20	0.2	0.1	0.1
Xicor	91	93	105	0.7	0.6	0.5
Other North American Companies	178	15	23	1.4	0.1	0.1
<b>Japanese Companies</b>	7,141	8,008	11,180	55.6	52.3	47.9
Fujitsu	909	927	1,135	7.1	6.1	4.9
Hitachi	1,330	1,519	2,369	10.4	9.9	10.2
Matsushita	217	217	305	1.7	1.4	1.3
Mitsubishi	762	878	1,206	5.9	5.7	5.2

(Continued)

**Table 1-9 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
NEC	1,242	1,422	2,173	9.7	9.3	9.3
NMB Semiconductor	60	120	148	0.5	0.8	0.6
OKI	380	424	486	3.0	2.8	2.1
Ricoh	8	8	21	0.1	0.1	0.1
Rohm	28	27	39	0.2	0.2	0.2
Sanyo	82	95	155	0.6	0.6	0.7
Seiko Epson	37	36	38	0.3	0.2	0.2
Sharp	476	519	697	3.7	3.4	3.0
Sony	183	197	287	1.4	1.3	1.2
Toshiba	1,425	1,618	2,101	11.1	10.6	9.0
Yamaha	2	1	1	0	0	0
Other Japanese Companies	0	0	19	0	0	0.1
<b>European Companies</b>	<b>682</b>	<b>724</b>	<b>1,091</b>	<b>5.3</b>	<b>4.7</b>	<b>4.7</b>
Eurosil	1	2	0	0	0	0
GEC Plessey	0	5	3	0	0	0
Matra MHS	35	37	0	0.3	0.2	0
Philips	75	40	32	0.6	0.3	0.1
SGS-Thomson	273	304	475	2.1	2.0	2.0
Siemens	298	336	550	2.3	2.2	2.4
TEMIC	NA	NA	31	0	0	0.1
<b>Asia/Pacific Companies</b>	<b>1,720</b>	<b>2,983</b>	<b>4,784</b>	<b>13.4</b>	<b>19.5</b>	<b>20.5</b>
Daewoo	0	1	1	0	0	0
Goldstar	249	557	804	1.9	3.6	3.4
Hualon Microelectronics Corp.	27	29	36	0.2	0.2	0.2
Hyundai	248	556	851	1.9	3.6	3.6
Macronix	31	57	129	0.2	0.4	0.6
MOSel/Vitellic	NA	136	223	0	0.9	1.0
Samsung	1,066	1,516	2,512	8.3	9.9	10.8
Silicon Integrated Systems	15	21	5	0.1	0.1	0
United Microelectronics	58	64	146	0.5	0.4	0.6
Winbond Electronics	26	46	77	0.2	0.3	0.3

NA = Not available

Source: Dataquest (February 1994)

**Table 1-10**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent**  
**ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	11,774	14,359	19,970	100.0	100.0	100.0
North American Companies	7,256	9,879	14,416	61.6	68.8	72.2
ACC Microelectronics	NA	26	36	0	0.2	0.2
Adaptec	NA	89	122	0	0.6	0.6
Advanced Micro Devices	395	642	563	3.4	4.5	2.8
Analog Devices	20	39	69	0.2	0.3	0.3
Appian Technology	8	6	7	0.1	0	0
AT&T	33	115	246	0.3	0.8	1.2
Atmel	2	5	5	0	0	0
California Micro Devices	3	5	6	0	0	0
Chips & Technologies	165	116	86	1.4	0.8	0.4
Cirrus Logic	151	246	371	1.3	1.7	1.9
Cypress Semiconductor	48	40	8	0.4	0.3	0
Cyrix	NA	63	125	0	0.4	0.6
Dallas Semiconductor	41	55	56	0.3	0.4	0.3
DSP Semiconductor	10	10	8	0.1	0.1	0
ETEQ Microsystems	NA	20	19	0	0.1	0.1
Harris	65	57	47	0.6	0.4	0.2
Hughes	2	2	3	0	0	0
IBM	NA	NA	337	0	0	1.7
Integrated Device Technology	20	31	48	0.2	0.2	0.2
Integrated Information Tech.	NA	42	40	0	0.3	0.2
Intel	3,578	4,721	7,444	30.4	32.9	37.3
IMP	0	0	6	0	0	0
ITT	35	29	25	0.3	0.2	0.1
LSI Logic	115	51	77	1.0	0.4	0.4
Microchip Technology	15	32	72	0.1	0.2	0.4
Motorola	1,171	1,464	2,065	9.9	10.2	10.3
NCR	39	71	63	0.3	0.5	0.3
National Semiconductor	286	383	498	2.4	2.7	2.5
Oak Technology	NA	50	50	0	0.3	0.3
OPTi	NA	98	86	0	0.7	0.4
Performance Semiconductor	28	21	18	0.2	0.1	0.1
Q Logic	NA	NA	21	0	0	0.1
Rockwell	20	13	17	0.2	0.1	0.1
S3	NA	31	113	0	0.2	0.6

(Continued)

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
SEEQ Technology	6	5	4	0.1	0	0
Sierra Semiconductor	1	1	0	0	0	0
Standard Microsystems	40	35	43	0.3	0.2	0.2
Supertex	2	2	2	0	0	0
Symphony Laboratories	NA	26	66	0	0.2	0.3
Texas Instruments	419	530	781	3.6	3.7	3.9
Trident Microsystems	NA	80	60	0	0.6	0.3
Tseng Labs	NA	74	71	0	0.5	0.4
VLSI Technology	165	141	173	1.4	1.0	0.9
WaferScale Integration	7	6	5	0.1	0	0
Weitek	39	26	33	0.3	0.2	0.2
Western Digital	209	190	218	1.8	1.3	1.1
Zilog	110	146	203	0.9	1.0	1.0
Other North American Companies	8	44	0	0.1	0.3	0
<b>Japanese Companies</b>	<b>3,824</b>	<b>3,649</b>	<b>4,585</b>	<b>32.5</b>	<b>25.4</b>	<b>23.0</b>
Fuji Electric	1	1	1	0	0	0
Fujitsu	244	233	282	2.1	1.6	1.4
Hitachi	583	596	718	5.0	4.2	3.6
Matsushita	321	275	286	2.7	1.9	1.4
Mitsubishi	543	456	532	4.6	3.2	2.7
NEC	1,149	1,130	1,341	9.8	7.9	6.7
OKI	137	124	180	1.2	0.9	0.9
Ricoh	62	56	89	0.5	0.4	0.4
Rohm	23	20	23	0.2	0.1	0.1
Sanyo	69	100	145	0.6	0.7	0.7
Seiko Epson	16	16	17	0.1	0.1	0.1
Sharp	134	129	170	1.1	0.9	0.9
Sony	88	73	112	0.7	0.5	0.6
Toshiba	454	440	540	3.9	3.1	2.7
Yamaha	0	0	149	0	0	0.7
<b>European Companies</b>	<b>567</b>	<b>637</b>	<b>642</b>	<b>4.8</b>	<b>4.4</b>	<b>3.2</b>
GEC Plessey	5	8	7	0	0.1	0
Matra MHS	37	47	0	0.3	0.3	0
Philips	212	287	305	1.8	2.0	1.5
SGS-Thomson	167	167	162	1.4	1.2	0.8

(Continued)

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Siemens	134	116	109	1.1	0.8	0.5
TEMIC	NA	NA	44	0	0	0.2
TCS	NA	12	15	0	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>127</b>	<b>194</b>	<b>327</b>	<b>1.1</b>	<b>1.4</b>	<b>1.6</b>
Acer Labs	NA	NA	50	0	0	0.3
Daewoo	0	4	7	0	0	0
Goldstar	11	14	12	0.1	0.1	0.1
Holtek	NA	NA	18	0	0	0.1
Hualon Microelectronics Corp.	9	10	10	0.1	0.1	0.1
Macronix	0	12	15	0	0.1	0.1
Samsung	27	24	46	0.2	0.2	0.2
Silicon Integrated Systems	4	19	26	0	0.1	0.1
United Microelectronics	62	69	113	0.5	0.5	0.6
Winbond Electronics	14	42	30	0.1	0.3	0.2

NA = Not available

Source: Dataquest (February 1994)

**Table 1-11**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	9,700	10,042	13,317	100.0	100.0	100.0
North American Companies	3,823	4,245	6,105	39.4	42.3	45.8
Actel	37	44	60	0.4	0.4	0.5
Advanced Micro Devices	167	233	317	1.7	2.3	2.4
Allegro MicroSystems	2	4	4	0	0	0
Altera	107	102	140	1.1	1.0	1.1
Appian Technology	7	4	3	0.1	0	0
Applied Micro Circuits Corp.	6	10	22	0.1	0.1	0.2
AT&T	354	385	415	3.6	3.8	3.1
Atmel	38	34	37	0.4	0.3	0.3
Cypress Semiconductor	47	40	57	0.5	0.4	0.4
Dallas Semiconductor	0	10	10	0	0.1	0.1
Gould AMI	29	34	40	0.3	0.3	0.3
Harris	158	128	138	1.6	1.3	1.0
Hewlett-Packard	206	214	230	2.1	2.1	1.7
Hughes	30	23	21	0.3	0.2	0.2
IBM	NA	NA	1,040	0	0	7.8
IMI	14	15	18	0.1	0.1	0.1
Integrated Circuit Systems	NA	35	29	0	0.3	0.2
Integrated Device Technology	50	51	66	0.5	0.5	0.5
Intel	33	35	45	0.3	0.3	0.3
IMP	20	16	0	0.2	0.2	0
ITT	150	93	96	1.5	0.9	0.7
Lattice	68	90	127	0.7	0.9	1.0
Logic Devices	NA	8	8	0	0.1	0.1
LSI Logic	555	564	642	5.7	5.6	4.8
Micrel	0	5	5	0	0	0
Microchip Technology	9	4	4	0.1	0	0
Motorola	561	632	785	5.8	6.3	5.9
NCR	75	105	165	0.8	1.0	1.2
National Semiconductor	191	203	222	2.0	2.0	1.7
Performance Semiconductor	8	9	15	0.1	0.1	0.1
Quality Semiconductor	8	9	10	0.1	0.1	0.1
Rockwell	0	4	4	0	0	0
Sierra Semiconductor	6	6	6	0.1	0.1	0
Standard Microsystems	5	5	4	0.1	0	0

(Continued)

**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Supertex	3	3	3	0	0	0
Texas Instruments	473	615	733	4.9	6.1	5.5
Universal	10	10	9	0.1	0.1	0.1
VLSI Technology	249	286	342	2.6	2.8	2.6
WaferScale Integration	3	1	0	0	0	0
Xilinx	130	163	231	1.3	1.6	1.7
Other North American Companies	14	13	2	0.1	0.1	0
<b>Japanese Companies</b>	<b>4,650</b>	<b>4,610</b>	<b>5,736</b>	<b>47.9</b>	<b>45.9</b>	<b>43.1</b>
Fuji Electric	23	25	35	0.2	0.2	0.3
Fujitsu	585	549	676	6.0	5.5	5.1
Hitachi	367	346	426	3.8	3.4	3.2
Matsushita	377	342	446	3.9	3.4	3.3
Mitsubishi	90	89	129	0.9	0.9	1.0
NEC	1,052	1,047	1,254	10.8	10.4	9.4
New JRC	11	10	12	0.1	0.1	0.1
OKI	354	314	419	3.6	3.1	3.1
Ricoh	21	22	25	0.2	0.2	0.2
Rohm	46	43	50	0.5	0.4	0.4
Sanyo	169	191	271	1.7	1.9	2.0
Seiko Epson	155	167	186	1.6	1.7	1.4
Sharp	280	290	388	2.9	2.9	2.9
Sony	160	165	213	1.6	1.6	1.6
Toshiba	813	821	995	8.4	8.2	7.5
Yamaha	146	189	154	1.5	1.9	1.2
Other Japanese Companies	1	0	57	0	0	0.4
<b>European Companies</b>	<b>881</b>	<b>906</b>	<b>1,093</b>	<b>9.1</b>	<b>9.0</b>	<b>8.2</b>
Austria Mikro Systeme	39	29	36	0.4	0.3	0.3
Ericsson	16	15	15	0.2	0.1	0.1
European Silicon Structures	28	30	36	0.3	0.3	0.3
Eurosil	21	21	0	0.2	0.2	0
GEC Plessey	126	105	101	1.3	1.0	0.8
Matra MHS	27	30	0	0.3	0.3	0
Mietec	22	22	25	0.2	0.2	0.2
Philips	259	319	400	2.7	3.2	3.0
SGS-Thomson	118	138	176	1.2	1.4	1.3

(Continued)



**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Siemens	175	180	235	1.8	1.8	1.8
Telefunken Electronic	12	7	0	0.1	0.1	0
TEMIC	NA	NA	57	0	0	0.4
TCS	NA	10	12	0	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>346</b>	<b>281</b>	<b>383</b>	<b>3.6</b>	<b>2.8</b>	<b>2.9</b>
Daewoo	6	2	3	0.1	0	0
Goldstar	13	16	46	0.1	0.2	0.3
Holtek	NA	NA	20	0	0	0.2
Hualon Microelectronics Corp.	34	35	30	0.4	0.3	0.2
Hyundai	0	0	2	0	0	0
MOSel/Vitellic	NA	25	0	0	0.2	0
Samsung	176	124	173	1.8	1.2	1.3
Silicon Integrated Systems	9	0	40	0.1	0	0.3
United Microelectronics	80	65	50	0.8	0.6	0.4
Winbond Electronics	28	14	19	0.3	0.1	0.1

NA = Not available

Source: Dataquest (February 1994)

**Table 1-12**  
**Each Company's Factory Revenue from Shipments of Monolithic Analog ICs**  
**to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	9,518	10,180	12,356	100.0	100.0	100.0
North American Companies	4,107	4,651	5,628	43.1	45.7	45.5
Advanced Micro Devices	94	110	154	1.0	1.1	1.2
Allegro MicroSystems	91	100	104	1.0	1.0	0.8
Analog Devices	400	428	526	4.2	4.2	4.3
AT&T	241	275	334	2.5	2.7	2.7
Atmel	1	1	1	0	0	0
Brooktree	84	96	117	0.9	0.9	0.9
Burr-Brown	80	73	88	0.8	0.7	0.7
California Micro Devices	5	7	8	0.1	0.1	0.1
Catalyst	0	1	1	0	0	0
Cherry Semiconductor	37	46	55	0.4	0.5	0.4
Cirrus Logic	1	29	80	0	0.3	0.6
Comlinear	6	7	8	0.1	0.1	0.1
Dallas Semiconductor	13	8	8	0.1	0.1	0.1
Elantec	11	14	21	0.1	0.1	0.2
Exar	107	123	158	1.1	1.2	1.3
Gennum	23	27	30	0.2	0.3	0.2
Gould AMI	14	30	38	0.1	0.3	0.3
Harris	226	217	250	2.4	2.1	2.0
Honeywell	20	21	26	0.2	0.2	0.2
Hughes	8	12	16	0.1	0.1	0.1
IMI	3	3	3	0	0	0
Integrated Circuit Systems	NA	0	12	0	0	0.1
Intel	9	10	12	0.1	0.1	0.1
IMP	6	11	29	0.1	0.1	0.2
International Rectifier	1	1	3	0	0	0
ITT	35	18	23	0.4	0.2	0.2
Kulite	26	24	24	0.3	0.2	0.2
Linear Technology	107	132	173	1.1	1.3	1.4
Linfinitiy	29	27	34	0	0	0.3
Maxim	76	93	111	0.8	0.9	0.9
Micrel	6	10	13	0.1	0.1	0.1
Micro Linear	36	33	45	0.4	0.3	0.4
Micro Power Systems	26	22	23	0.3	0.2	0.2
Mitel	35	39	55	0.4	0.4	0.4

(Continued)

**Table 1-12 (Continued)**  
**Each Company's Factory Revenue from Shipments of Monolithic Analog ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Motorola	420	528	707	4.4	5.2	5.7
NCR	28	50	45	0.3	0.5	0.4
National Semiconductor	600	705	836	6.3	6.9	6.8
Novasensor	11	13	16	0.1	0.1	0.1
Raytheon	24	38	68	0.3	0.4	0.6
Rockwell	165	155	155	1.7	1.5	1.3
SEEQ Technology	8	9	9	0.1	0.1	0.1
Semtech	6	2	2	0.1	0	0
Sierra Semiconductor	79	85	90	0.8	0.8	0.7
Silicon Systems	184	241	265	1.9	2.4	2.1
Siliconix	64	55	0	0.7	0.5	0
Sipex	3	3	3	0	0	0
Supertex	12	10	10	0.1	0.1	0.1
Tektronix	35	34	41	0.4	0.3	0.3
Teledyne	18	26	26	0.2	0.3	0.2
Texas Instruments	439	492	617	4.6	4.8	5.0
Unitrode	34	52	64	0.4	0.5	0.5
Universal	4	4	5	0	0	0
VLSI Technology	0	2	2	0	0	0
VTC	20	45	70	0.2	0.4	0.6
Other North American Companies	90	54	14	0.9	0.5	0.1
<b>Japanese Companies</b>	<b>3,359</b>	<b>3,234</b>	<b>3,903</b>	<b>35.3</b>	<b>31.8</b>	<b>31.6</b>
Fuji Electric	9	9	16	0.1	0.1	0.1
Fujitsu	119	115	122	1.3	1.1	1.0
Hitachi	255	242	280	2.7	2.4	2.3
Matsushita	412	403	473	4.3	4.0	3.8
Mitsubishi	354	315	377	3.7	3.1	3.1
NEC	331	331	377	3.5	3.3	3.1
New JRC	122	113	158	1.3	1.1	1.3
OKI	20	16	22	0.2	0.2	0.2
Ricoh	6	7	8	0.1	0.1	0.1
Rohm	272	238	258	2.9	2.3	2.1
Sanyo	439	470	633	4.6	4.6	5.1
Seiko Epson	12	11	11	0.1	0.1	0.1
Sharp	66	64	87	0.7	0.6	0.7
Sony	358	339	425	3.8	3.3	3.4

(Continued)

**Table 1-12 (Continued)**  
**Each Company's Factory Revenue from Shipments of Monolithic Analog ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Toko	23	22	28	0.2	0.2	0.2
Toshiba	551	528	615	5.8	5.2	5.0
Yamaha	10	11	13	0.1	0.1	0.1
<b>European Companies</b>	<b>1,794</b>	<b>2,026</b>	<b>2,482</b>	<b>18.8</b>	<b>19.9</b>	<b>20.1</b>
ABB-HAFO	0	25	20	0	0.2	0.2
Austria Mikro Systeme	31	45	49	0.3	0.4	0.4
Dialog Semiconductor	NA	17	0	0	0.2	0
EM Microelectronics Marin	NA	45	50	0	0.4	0.4
Ericsson	58	57	45	0.6	0.6	0.4
Eurosil	7	7	0	0.1	0.1	0
GEC Plessey	142	154	114	1.5	1.5	0.9
Matra MHS	5	8	0	0.1	0.1	0
Micronas	NA	10	14	0	0.1	0.1
Mietec	83	91	123	0.9	0.9	1.0
Philips	584	603	752	6.1	5.9	6.1
SGS-Thomson	576	658	860	6.1	6.5	7.0
Siemens	181	175	175	1.9	1.7	1.4
Telefunken Electronic	112	121	0	1.2	1.2	0
TEMIC	NA	NA	262	0	0	2.1
TCS	NA	10	16	0	0.1	0.1
Zetex	0	0	2	0	0	0
<b>Asia/Pacific Companies</b>	<b>258</b>	<b>269</b>	<b>343</b>	<b>2.7</b>	<b>2.6</b>	<b>2.8</b>
Daewoo	14	17	20	0.1	0.2	0.2
Goldstar	12	20	40	0.1	0.2	0.3
Holtek	NA	NA	15	0	0	0.1
Hualon Microelectronics Corp.	1	1	7	0	0	0.1
Korean Electronic Co.	33	30	37	0.3	0.3	0.3
Samsung	112	117	166	1.2	1.1	1.3
Winbond Electronics	16	15	58	0.2	0.1	0.5
Other Asia/Pacific Companies	70	69	0	0.7	0.7	0

NA = Not available

Source: Dataquest (February 1994)

**Table 1-13**  
**Each Company's Factory Revenue from Shipments of Hybrid ICs**  
**to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	1,395	1,335	1,482	100.0	100.0	100.0
North American Companies	282	340	389	20.2	25.5	26.2
Analog Devices	44	47	40	3.2	3.5	2.7
Burr-Brown	72	54	70	5.2	4.0	4.7
Comlinear	8	8	8	0.6	0.6	0.5
Elantec	5	2	2	0.4	0.1	0.1
Linfinitiy	NA	NA	3	0	0	0.2
Maxim	4	4	4	0.3	0.3	0.3
Mitel	15	13	14	1.1	1.0	0.9
Motorola	36	123	171	2.6	9.2	11.5
National Semiconductor	29	34	33	2.1	2.5	2.2
Semtech	0	2	0	0	0.1	0
Sipex	18	17	17	1.3	1.3	1.1
Solitron	9	7	0	0.6	0.5	0
Tektronix	30	8	8	2.2	0.6	0.5
Unitrode	7	14	14	0.5	1.0	0.9
Other North American Companies	1	5	5	0.1	0.4	0.3
Japanese Companies	969	869	988	69.5	65.1	66.7
Fuji Electric	22	16	21	1.6	1.2	1.4
Fujitsu	60	57	62	4.3	4.3	4.2
Hitachi	103	97	102	7.4	7.3	6.9
Mitsubishi	124	102	106	8.9	7.6	7.2
NEC	91	83	98	6.5	6.2	6.6
OKI	12	11	12	0.9	0.8	0.8
Rohm	69	63	68	4.9	4.7	4.6
Sancken	171	153	202	12.3	11.5	13.6
Sanyo	160	149	166	11.5	11.2	11.2
Shindengen Electric	50	44	49	3.6	3.3	3.3
Sony	36	33	36	2.6	2.5	2.4
Toko	10	8	8	0.7	0.6	0.5
Toshiba	61	53	58	4.4	4.0	3.9

(Continued)

**Table 1-13 (Continued)**  
**Each Company's Factory Revenue from Shipments of Hybrid ICs**  
**to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
European Companies	144	126	105	10.3	9.4	7.1
Ericsson	0	0	12	0	0	0.8
GEC Plessey	43	38	21	3.1	2.8	1.4
Philips	80	72	55	5.7	5.4	3.7
Telefunken Electronic	6	2	0	0.4	0.1	0
TEMIC	NA	NA	2	0	0	0.1
Other European Companies	12	14	15	0.9	1.0	1.0

NA = Not available

Source: Dataquest (February 1994)

**Table 1-14**  
**Each Company's Factory Revenue from Shipments of Discrete Semiconductors**  
**to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	8,035	8,155	9,101	100.0	100.0	100.0
North American Companies	1,919	2,139	2,180	23.9	26.2	24.0
Allegro MicroSystems	11	11	10	0.1	0.1	0.1
AT&T	0	4	4	0	0	0
General Instrument	200	220	239	2.5	2.7	2.6
Harris	107	115	138	1.3	1.4	1.5
Hewlett-Packard	45	48	49	0.6	0.6	0.5
International Rectifier	237	270	285	2.9	3.3	3.1
ITT	110	106	107	1.4	1.3	1.2
Microsemi	71	84	97	0.9	1.0	1.1
Motorola	794	857	994	9.9	10.5	10.9
National Semiconductor	60	70	77	0.7	0.9	0.8
Optek	0	2	2	0	0	0
Powerex	78	80	58	1.0	1.0	0.6
Raytheon	8	7	8	0.1	0.1	0.1
Semtech	21	16	17	0.3	0.2	0.2
Siliconix	76	101	0	0.9	1.2	0
Solitron	21	8	11	0.3	0.1	0.1
Supertex	10	9	10	0.1	0.1	0.1
Teccor Electronics	NA	46	45	0	0.6	0.5
Texas Instruments	28	29	29	0.3	0.4	0.3
Unitrode	39	10	0	0.5	0.1	0
Other North American Companies	0	46	0	0	0.6	0
Japanese Companies	4,296	4,117	4,861	53.5	50.5	53.4
Fuji Electric	263	246	293	3.3	3.0	3.2
Fujitsu	152	142	157	1.9	1.7	1.7
Hitachi	598	566	662	7.4	6.9	7.3
Matsushita	379	379	450	4.7	4.6	4.9
Mitsubishi	325	284	380	4.0	3.5	4.2
NEC	544	532	579	6.8	6.5	6.4
New JRC	3	3	3	0	0	0
OKI	9	8	9	0.1	0.1	0.1
Rohm	374	343	380	4.7	4.2	4.2
Sanken	259	253	299	3.2	3.1	3.3
Sanyo	250	244	336	3.1	3.0	3.7

(Continued)

**Table 1-14 (Continued)**  
**Each Company's Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Shindengen Electric	134	126	162	1.7	1.5	1.8
Sony	91	79	89	1.1	1.0	1.0
Toko	31	29	45	0.4	0.4	0.5
Toshiba	884	883	1,017	11.0	10.8	11.2
<b>European Companies</b>	<b>1,588</b>	<b>1,623</b>	<b>1,785</b>	<b>19.8</b>	<b>19.9</b>	<b>19.6</b>
ABB-HAFO	6	7	6	0.1	0.1	0.1
ABB-IXYS	54	49	38	0.7	0.6	0.4
Eupec	93	83	82	1.2	1.0	0.9
Fagor	29	25	19	0.4	0.3	0.2
GEC Plessey	35	31	21	0.4	0.4	0.2
Philips	531	551	604	6.6	6.8	6.6
Semikron	108	103	94	1.3	1.3	1.0
SGS-Thomson	299	335	401	3.7	4.1	4.4
Siemens	245	219	230	3.0	2.7	2.5
TAG	30	31	0	0.4	0.4	0
Telefunken Electronic	89	81	0	1.1	1.0	0
TEMIC	NA	NA	175	0	0	1.9
TCS	NA	1	1	0	0	0
Westcode	NA	35	35	0	0.4	0.4
Zetex	25	26	29	0.3	0.3	0.3
Other European Companies	41	46	50	0.5	0.6	0.5
<b>Asia/Pacific Companies</b>	<b>232</b>	<b>276</b>	<b>275</b>	<b>2.9</b>	<b>3.4</b>	<b>3.0</b>
Dongsung Semiconductor	30	11	2	0.4	0.1	0
Goldstar	0	11	0	0	0.1	0
Korean Electronic Co.	95	110	130	1.2	1.3	1.4
Samsung	92	119	143	1.1	1.5	1.6
Other Asia/Pacific Companies	15	25	0	0.2	0.3	0

NA = Not available

Source: Dataquest (February 1994)



**Table 1-15**  
**Each Company's Factory Revenue from Shipments of Optoelectronic**  
**Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Total Market	2,804	2,688	3,006	100.0	100.0	100.0
North American Companies	449	495	523	16.0	18.4	17.4
AT&T	32	39	41	1.1	1.5	1.4
Hewlett-Packard	191	187	190	6.8	7.0	6.3
Honeywell	25	27	27	0.9	1.0	0.9
Motorola	28	36	41	1.0	1.3	1.4
Optek	52	55	54	1.9	2.0	1.8
Quality Technologies	34	46	47	1.2	1.7	1.6
Tektronix	5	5	5	0.2	0.2	0.2
Texas Instruments	58	42	54	2.1	1.6	1.8
Other North American Companies	15	58	64	0.5	2.2	2.1
Japanese Companies	1,992	1,849	2,162	71.0	68.8	71.9
Fujitsu	127	117	123	4.5	4.4	4.1
Hitachi	68	60	67	2.4	2.2	2.2
Matsushita	318	315	358	11.3	11.7	11.9
Mitsubishi	25	23	30	0.9	0.9	1.0
NEC	121	110	118	4.3	4.1	3.9
New JRC	14	12	13	0.5	0.4	0.4
OKI	30	26	28	1.1	1.0	0.9
Rohm	122	110	112	4.4	4.1	3.7
Sanken	21	20	32	0.7	0.7	1.1
Sanyo	193	136	137	6.9	5.1	4.6
Sharp	362	352	418	12.9	13.1	13.9
Sony	279	216	236	10.0	8.0	7.9
Toshiba	286	255	326	10.2	9.5	10.8
Other Japanese Companies	25	97	164	0.9	3.6	5.5
European Companies	334	296	264	11.9	11.0	8.8
ABB-HAFO	8	8	8	0.3	0.3	0.3
Siemens	189	179	170	6.7	6.7	5.7
Telefunken Electronic	74	78	0	2.6	2.9	0
TEMIC	NA	NA	54	0	0	1.8
TCS	NA	20	21	0	0.7	0.7
Zetex	1	1	1	0	0	0
Other European Companies	9	10	10	0.3	0.4	0.3

(Continued)

**Table 1-15 (Continued)**  
**Each Company's Factory Revenue from Shipments of Optoelectronic Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1991	1992	1993	1991	1992	1993
Asia/Pacific Companies	29	48	57	1.0	1.8	1.9
Korean Electronic Co.	8	8	10	0.3	0.3	0.3
Samsung	0	0	4	0	0	0.1
Other Asia/Pacific Companies	21	40	43	0.7	1.5	1.4

NA = Not available

Source: Dataquest (February 1994)

## Section 2: Final 1993 Worldwide Semiconductor Market Share Rankings

**Table 2-1**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World, Including Hybrids (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Intel	5,091	7,970	57	9.3
2	2	NEC	4,869	6,141	26	7.2
3	4	Motorola	4,634	5,957	29	7.0
4	3	Toshiba	4,675	5,727	23	6.7
5	5	Hitachi	3,851	5,015	30	5.9
6	6	Texas Instruments	3,087	4,083	32	4.8
7	11	Samsung	1,900	3,044	60	3.6
8	7	Fujitsu	2,553	2,928	15	3.4
9	8	Mitsubishi	2,213	2,823	28	3.3
10	NA	IBM	NA	2,510		2.9
11	10	Matsushita	1,942	2,344	21	2.7
12	9	Philips	2,113	2,300	9	2.7
13	12	National Semiconductor	1,797	2,132	19	2.5
14	13	SGS-Thomson	1,605	2,088	30	2.4
15	15	Sanyo	1,385	1,843	33	2.2
16	16	Sharp	1,354	1,760	30	2.1
17	14	Advanced Micro Devices	1,514	1,660	10	1.9
18	17	Siemens	1,245	1,510	21	1.8
19	18	Sony	1,103	1,398	27	1.6
20	19	OKI	956	1,187	24	1.4
21	20	AT&T	911	1,110	22	1.3
22	22	Goldstar	642	946	47	1.1
23	21	Rohm	844	930	10	1.1
24	25	Micron Technology	557	925	66	1.1
25	26	Hyundai	556	853	53	1.0
26	23	LSI Logic	615	719	17	0.8
27	27	Analog Devices	514	635	24	0.7
28	NA	TEMIC	0	625		0.7
29	24	Harris	559	605	8	0.7
30	30	Sanken	426	533	25	0.6
31	29	VLSI Technology	429	517	21	0.6
32	28	Hewlett-Packard	449	469	4	0.5
33	34	Cirrus Logic	275	451	64	0.5

(Continued)

**Table 2-1 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World, Including Hybrids (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
34	32	Fuji Electric	297	366	23	0.4
35	43	Yamaha	201	317	58	0.4
36	44	United Microelectronics	198	309	56	0.4
37	41	Integrated Device Technology	220	303	38	0.4
38	36	Cypress Semiconductor	267	300	12	0.4
39	31	GEC Plessey	381	290	-24	0.3
40	35	International Rectifier	271	288	6	0.3
		All Others	8,761	9,730	11	11.4
		North American Companies	26,943	37,159	38	43.4
		Japanese Companies	27,576	34,573	25	40.4
		European Companies	6,666	7,696	15	9.0
		Asia/Pacific Companies	4,075	6,213	52	7.3
		Total Market	65,260	85,641	31	100.0
		Without IBM				
		North American Companies	26,943	34,649	29	41.7
		Japanese Companies	27,576	34,573	25	41.6
		European Companies	6,666	7,696	15	9.3
		Asia/Pacific Companies	4,075	6,213	52	7.5
		Total Market	65,260	83,131	27	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-2**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World, Excluding Hybrids (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Intel	5,091	7,970	57	9.5
2	2	NEC	4,786	6,043	26	7.2
3	4	Motorola	4,511	5,786	28	6.9
4	3	Toshiba	4,622	5,669	23	6.7
5	5	Hitachi	3,754	4,913	31	5.8
6	6	Texas Instruments	3,087	4,083	32	4.9
7	11	Samsung	1,900	3,044	60	3.6
8	7	Fujitsu	2,496	2,866	15	3.4
9	8	Mitsubishi	2,111	2,717	29	3.2
10	NA	IBM	NA	2,510		3.0
11	10	Matsushita	1,942	2,344	21	2.8
12	9	Philips	2,041	2,245	10	2.7
13	12	National Semiconductor	1,763	2,099	19	2.5
14	13	SGS-Thomson	1,605	2,088	30	2.5
15	15	Sharp	1,354	1,760	30	2.1
16	17	Sanyo	1,236	1,677	36	2.0
17	14	Advanced Micro Devices	1,514	1,660	10	2.0
18	16	Siemens	1,245	1,510	21	1.8
19	18	Sony	1,070	1,362	27	1.6
20	19	OKI	945	1,175	24	1.4
21	20	AT&T	911	1,110	22	1.3
22	22	Goldstar	642	946	47	1.1
23	25	Micron Technology	557	925	66	1.1
24	21	Rohm	781	862	10	1.0
25	26	Hyundai	556	853	53	1.0
26	23	LSI Logic	615	719	17	0.9
27	NA	TEMIC	0	623		0.7
28	24	Harris	559	605	8	0.7
29	27	Analog Devices	467	595	27	0.7
30	29	VLSI Technology	429	517	21	0.6
31	28	Hewlett-Packard	449	469	4	0.6
32	33	Cirrus Logic	275	451	64	0.5
33	32	Fuji Electric	281	345	23	0.4
34	34	Sanken	273	331	21	0.4
35	43	Yamaha	201	317	58	0.4
36	44	United Microelectronics	198	309	56	0.4
37	41	Integrated Device Technology	220	303	38	0.4

(Continued)

**Table 2-2 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World, Excluding Hybrids (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	36	Cypress Semiconductor	267	300	12	0.4
39	35	International Rectifier	271	288	6	0.3
40	40	NCR	228	275	21	0.3
		All Others	8,672	9,495	9	11.3
		North American Companies	26,603	36,770	38	43.7
		Japanese Companies	26,707	33,585	26	39.9
		European Companies	6,540	7,591	16	9.0
		Asia/Pacific Companies	4,075	6,213	52	7.4
		Total Market	63,925	84,159	32	100.0
		Without IBM				
		North American Companies	26,603	34,260	29	42.0
		Japanese Companies	26,707	33,585	26	41.1
		European Companies	6,540	7,591	16	9.3
		Asia/Pacific Companies	4,075	6,213	52	7.6
		Total Market	63,925	81,649	28	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-3**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Intel	5,091	7,970	57	10.8
2	2	NEC	4,227	5,444	29	7.4
3	3	Motorola	3,741	4,922	32	6.7
4	4	Toshiba	3,537	4,384	24	6.0
5	5	Hitachi	3,225	4,286	33	5.8
6	6	Texas Instruments	3,016	4,000	33	5.4
7	9	Samsung	1,781	2,897	63	3.9
8	7	Fujitsu	2,294	2,648	15	3.6
9	NA	IBM	NA	2,510		3.4
10	8	Mitsubishi	1,906	2,413	27	3.3
11	10	National Semiconductor	1,727	2,055	19	2.8
12	11	Philips	1,562	1,696	9	2.3
13	13	SGS-Thomson	1,270	1,687	33	2.3
14	12	Advanced Micro Devices	1,514	1,660	10	2.3
15	14	Matsushita	1,248	1,536	23	2.1
16	15	Sanyo	1,005	1,370	36	1.9
17	16	Sharp	1,002	1,342	34	1.8
18	17	OKI	922	1,150	25	1.6
19	19	Siemens	847	1,110	31	1.5
20	20	Sony	808	1,073	33	1.5
21	18	AT&T	868	1,065	23	1.4
22	21	Goldstar	631	946	50	1.3
23	23	Micron Technology	557	925	66	1.3
24	24	Hyundai	556	853	53	1.2
25	22	LSI Logic	615	719	17	1.0
26	25	Analog Devices	514	635	24	0.9
27	27	VLSI Technology	429	517	21	0.7
28	26	Harris	444	467	5	0.6
29	30	Cirrus Logic	275	451	64	0.6
30	28	Rohm	391	438	12	0.6
31	NA	TEMIC	0	396		0.5
32	37	Yamaha	201	317	58	0.4
33	38	United Microelectronics	198	309	56	0.4
34	35	Integrated Device Technology	220	303	38	0.4
35	31	Cypress Semiconductor	267	300	12	0.4
36	34	NCR	228	275	21	0.4
37	29	GEC Plessey	350	269	-23	0.4

(Continued)

**Table 2-3 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	32	Silicon Systems	241	265	10	0.4
39	33	Seiko Epson	230	252	10	0.3
40	41	Xilinx	163	231	42	0.3
		All Others	6,316	7,448	18	10.1
		North American Companies	24,309	34,456	42	46.9
		Japanese Companies	21,610	27,550	27	37.5
		European Companies	4,747	5,647	19	7.7
		Asia/Pacific Companies	3,751	5,881	57	8.0
		Total Market	54,417	73,534	35	100.0
		Without IBM				
		North American Companies	24,309	31,946	31	45.0
		Japanese Companies	21,610	27,550	27	38.8
		European Companies	4,747	5,647	19	8.0
		Asia/Pacific Companies	3,751	5,881	57	8.3
		Total Market	54,417	71,024	31	100.0

NA = Not available

Source: Dataquest (February 1994)



**Table 2-4**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits**  
**to the World, Excluding Hybrids (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Intel	5,091	7,970	57	11.1
2	2	NEC	4,144	5,346	29	7.4
3	3	Motorola	3,618	4,751	31	6.6
4	4	Toshiba	3,484	4,326	24	6.0
5	5	Hitachi	3,128	4,184	34	5.8
6	6	Texas Instruments	3,016	4,000	33	5.6
7	9	Samsung	1,781	2,897	63	4.0
8	7	Fujitsu	2,237	2,586	16	3.6
9	NA	IBM	NA	2,510		3.5
10	8	Mitsubishi	1,804	2,307	28	3.2
11	10	National Semiconductor	1,693	2,022	19	2.8
12	13	SGS-Thomson	1,270	1,687	33	2.3
13	11	Advanced Micro Devices	1,514	1,660	10	2.3
14	12	Philips	1,490	1,641	10	2.3
15	14	Matsushita	1,248	1,536	23	2.1
16	15	Sharp	1,002	1,342	34	1.9
17	18	Sanyo	856	1,204	41	1.7
18	16	OKI	911	1,138	25	1.6
19	19	Siemens	847	1,110	31	1.5
20	17	AT&T	868	1,065	23	1.5
21	20	Sony	775	1,037	34	1.4
22	21	Goldstar	631	946	50	1.3
23	23	Micron Technology	557	925	66	1.3
24	24	Hyundai	556	853	53	1.2
25	22	LSI Logic	615	719	17	1.0
26	25	Analog Devices	467	595	27	0.8
27	27	VLSI Technology	429	517	21	0.7
28	26	Harris	444	467	5	0.6
29	30	Cirrus Logic	275	451	64	0.6
30	NA	TEMIC	0	394		0.5
31	28	Rohm	328	370	13	0.5
32	37	Yamaha	201	317	58	0.4
33	38	United Microelectronics	198	309	56	0.4
34	35	Integrated Device Technology	220	303	38	0.4
35	31	Cypress Semiconductor	267	300	12	0.4
36	34	NCR	228	275	21	0.4
37	32	Silicon Systems	241	265	10	0.4

(Continued)

**Table 2-4 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	33	Seiko Epson	230	252	10	0.3
39	29	GEC Plessey	312	248	-21	0.3
40	41	Xilinx	163	231	42	0.3
		All Others	5,943	6,996	18	9.7
		North American Companies	23,969	34,067	42	47.3
		Japanese Companies	20,741	26,562	28	36.9
		European Companies	4,621	5,542	20	7.7
		Asia/Pacific Companies	3,751	5,881	57	8.2
		Total Market	53,082	72,052	36	100.0
		Without IBM				
		North American Companies	23,969	31,557	32	45.4
		Japanese Companies	20,741	26,562	28	38.2
		European Companies	4,621	5,542	20	8.0
		Asia/Pacific Companies	3,751	5,881	57	8.5
		Total Market	53,082	69,542	31	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-5**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Digital ICs**  
**to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Texas Instruments	505	594	18	19.2
2	4	Motorola	384	432	13	14.0
3	2	Hitachi	425	391	-8	12.6
4	3	Fujitsu	413	371	-10	12.0
5	5	National Semiconductor	274	286	4	9.2
6	8	NEC	214	201	-6	6.5
7	6	Advanced Micro Devices	247	199	-19	6.4
8	7	Philips	241	152	-37	4.9
9	9	Toshiba	77	75	-3	2.4
10	10	Mitsubishi	66	63	-5	2.0
11	11	AT&T	60	60	0	1.9
12	17	Goldstar	24	44	83	1.4
13	13	Siemens	40	41	3	1.3
14	15	OKI	33	31	-6	1.0
15	12	Raytheon	51	27	-47	0.9
16	16	Applied Micro Circuits Corp.	29	26	-10	0.8
17	19	Matsushita	11	26	136	0.8
18	14	GEC Plessey	40	23	-43	0.7
19	20	SGS-Thomson	3	14	367	0.5
20	18	Harris	22	13	-41	0.4
		All Others	34	24	-29	0.8
		North American Companies	1,601	1,657	3	53.6
		Japanese Companies	1,240	1,158	-7	37.4
		European Companies	328	234	-29	7.6
		Asia/Pacific Companies	24	44	83	1.4
		<b>Total Market</b>	<b>3,193</b>	<b>3,093</b>	<b>-3</b>	<b>100.0</b>

Source: Dataquest (February 1994)

**Table 2-6**  
**Top 10 Companies' Factory Revenue from Shipments of Bipolar Digital Memory ICs to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Hitachi	94	85	-10	34.7
2	2	Fujitsu	90	81	-10	33.1
3	3	Advanced Micro Devices	46	39	-15	15.9
4	5	NEC	19	16	-16	6.5
5	7	Raytheon	10	6	-40	2.4
6	8	National Semiconductor	8	6	-25	2.4
7	6	Harris	13	4	-69	1.6
8	4	Philips	27	3	-89	1.2
9	9	Texas Instruments	3	3	0	1.2
10	10	Motorola	3	2	-33	0.8
		All Others	5	0	-100	0
		North American Companies	88	60	-32	24.5
		Japanese Companies	203	182	-10	74.3
		European Companies	27	3	-89	1.2
		Asia/Pacific Companies	0	0		0
		Total Market	318	245	-23	100.0

Source: Dataquest (February 1994)

**Table 2-7**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Logic ICs**  
**to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Texas Instruments	502	591	18	20.8
2	2	Motorola	381	430	13	15.1
3	3	Hitachi	331	306	-8	10.7
4	4	Fujitsu	323	290	-10	10.2
5	5	National Semiconductor	266	280	5	9.8
6	8	NEC	195	185	-5	6.5
7	7	Advanced Micro Devices	201	160	-20	5.6
8	6	Philips	214	149	-30	5.2
9	9	Toshiba	77	75	-3	2.6
10	10	Mitsubishi	66	63	-5	2.2
11	11	AT&T	60	60	0	2.1
12	17	Goldstar	24	44	83	1.5
13	13	Siemens	40	41	3	1.4
14	15	OKI	33	31	-6	1.1
15	16	Applied Micro Circuits Corp.	29	26	-10	0.9
16	18	Matsushita	11	26	136	0.9
17	14	GEC Plessey	40	23	-43	0.8
18	12	Raytheon	41	21	-49	0.7
19	20	SGS-Thomson	3	14	367	0.5
20	19	Harris	9	9	0	0.3
		All Others	29	24	-17	0.8
		North American Companies	1,513	1,597	6	56.1
		Japanese Companies	1,037	976	-6	34.3
		European Companies	301	231	-23	8.1
		Asia/Pacific Companies	24	44	83	1.5
		Total Market	2,875	2,848	-1	100.0

Source: Dataquest (February 1994)

**Table 2-8**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital ICs**  
**to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Intel	5,080	7,957	57	14.1
2	2	NEC	3,599	4,768	32	8.4
3	3	Toshiba	2,879	3,636	26	6.4
4	4	Motorola	2,706	3,612	33	6.4
5	5	Hitachi	2,461	3,513	43	6.2
6	6	Texas Instruments	2,019	2,789	38	4.9
7	8	Samsung	1,664	2,731	64	4.8
8	NA	IBM	NA	2,510		4.4
9	7	Fujitsu	1,709	2,093	22	3.7
10	9	Mitsubishi	1,423	1,867	31	3.3
11	10	Advanced Micro Devices	1,157	1,307	13	2.3
12	11	Sharp	938	1,255	34	2.2
13	12	OKI	862	1,085	26	1.9
14	13	Matsushita	834	1,037	24	1.8
15	20	Micron Technology	557	925	66	1.6
16	14	National Semiconductor	714	900	26	1.6
17	16	Siemens	632	894	41	1.6
18	19	Goldstar	587	862	47	1.5
19	21	Hyundai	556	853	53	1.5
20	18	SGS-Thomson	609	813	33	1.4
21	15	Philips	646	737	14	1.3
22	17	LSI Logic	615	719	17	1.3
23	22	AT&T	533	671	26	1.2
24	23	Sony	435	612	41	1.1
25	25	Sanyo	386	571	48	1.0
26	24	VLSI Technology	427	515	21	0.9
27	27	Cirrus Logic	246	371	51	0.7
28	32	United Microelectronics	198	309	56	0.5
29	33	Yamaha	190	304	60	0.5
30	28	Integrated Device Technology	220	303	38	0.5
31	26	Cypress Semiconductor	267	300	12	0.5
32	29	Seiko Epson	219	241	10	0.4
33	36	Xilinx	163	231	42	0.4
34	30	Hewlett-Packard	214	230	7	0.4
35	35	NCR	178	230	29	0.4
36	37	MOSel/Vitelic	161	223	39	0.4
37	39	Atmel	138	223	62	0.4

(Continued)

**Table 2-8 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital ICs**  
**to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	34	Western Digital	190	218	15	0.4
39	31	Harris	205	204	-0	0.4
40	38	Zilog	146	203	39	0.4
		All Others	2,946	3,781	28	6.7
		North American Companies	17,717	26,782	51	47.3
		Japanese Companies	16,267	21,501	32	38.0
		European Companies	2,267	2,826	25	5.0
		Asia/Pacific Companies	3,458	5,494	59	9.7
		Total Market	39,709	56,603	43	100.0
		Without IBM				
		North American Companies	17,717	24,272	37	44.9
		Japanese Companies	16,267	21,501	32	39.7
		European Companies	2,267	2,826	25	5.2
		Asia/Pacific Companies	3,458	5,494	59	10.2
		Total Market	39,709	54,093	36	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-9**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory**  
**ICs to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	3	Samsung	1,516	2,512	66	10.8
2	2	Hitachi	1,519	2,369	56	10.2
3	4	NEC	1,422	2,173	53	9.3
4	1	Toshiba	1,618	2,101	30	9.0
5	7	Texas Instruments	874	1,275	46	5.5
6	6	Mitsubishi	878	1,206	37	5.2
7	5	Fujitsu	927	1,135	22	4.9
8	NA	IBM	NA	1,133		4.9
9	9	Micron Technology	557	925	66	4.0
10	11	Hyundai	556	851	53	3.6
11	10	Goldstar	557	804	44	3.4
12	8	Motorola	610	762	25	3.3
13	12	Sharp	519	697	34	3.0
14	14	Siemens	336	550	64	2.4
15	13	OKI	424	486	15	2.1
16	16	SGS-Thomson	304	475	56	2.0
17	15	Intel	324	468	44	2.0
18	17	Advanced Micro Devices	282	427	51	1.8
19	18	Matsushita	217	305	41	1.3
20	19	Sony	197	287	46	1.2
21	20	Cypress Semiconductor	187	235	26	1.0
22	22	MOSel/Vitellic	136	223	64	1.0
23	21	Integrated Device Technology	138	189	37	0.8
24	25	Atmel	99	181	83	0.8
25	23	National Semiconductor	128	180	41	0.8
26	26	Sanyo	95	155	63	0.7
27	24	Nittetsu Semiconductor	120	148	23	0.6
28	28	United Microelectronics	64	146	128	0.6
29	29	Macronix	57	129	126	0.6
30	27	Xicor	93	105	13	0.5
31	31	Winbond	46	77	67	0.3
32	30	Microchip Technology	47	64	36	0.3
33	32	Catalyst	40	54	35	0.2
34	46	Alliance	13	41	215	0.2
35	38	Rohm	27	39	44	0.2
36	35	Seiko Epson	36	38	6	0.2
37	39	Dallas Semiconductor	24	38	58	0.2

(Continued)



**Table 2-9 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory**  
**ICs to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	37	Hualon Microelectronic Corporation	29	36	24	0.2
39	50	Paradigm	7	34	386	0.1
40	33	Philips	40	32	-20	0.1
		All Others	245	231	-6	1.0
		North American Companies	3,593	6,261	74	26.9
		Japanese Companies	8,008	11,180	40	47.9
		European Companies	724	1,091	51	4.7
		Asia/Pacific Companies	2,983	4,784	60	20.5
		Total Market	15,308	23,316	52	100.0
		Without IBM				
		North American Companies	3,593	5,128	43	23.1
		Japanese Companies	8,008	11,180	40	50.4
		European Companies	724	1,091	51	4.9
		Asia/Pacific Companies	2,983	4,784	60	21.6
		Total Market	15,308	22,183	45	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-10**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Intel	4,721	7,444	58	37.3
2	2	Motorola	1,464	2,065	41	10.3
3	3	NEC	1,130	1,341	19	6.7
4	6	Texas Instruments	530	781	47	3.9
5	5	Hitachi	596	718	20	3.6
6	4	Advanced Micro Devices	642	563	-12	2.8
7	8	Toshiba	440	540	23	2.7
8	7	Mitsubishi	456	532	17	2.7
9	9	National Semiconductor	383	498	30	2.5
10	12	Cirrus Logic	246	371	51	1.9
11	NA	IBM	NA	337		1.7
12	10	Philips	287	305	6	1.5
13	11	Matsushita	275	286	4	1.4
14	13	Fujitsu	233	282	21	1.4
15	22	AT&T	115	246	114	1.2
16	14	Western Digital	190	218	15	1.1
17	16	Zilog	146	203	39	1.0
18	19	OKI	124	180	45	0.9
19	17	VLSI Technology	141	173	23	0.9
20	18	Sharp	129	170	32	0.9
21	15	SGS-Thomson	167	162	-3	0.8
22	NA	Yamaha	NA	149		0.7
23	23	Sanyo	100	145	45	0.7
24	31	Cyrix	63	125	98	0.6
25	25	Adaptec	89	122	37	0.6
26	30	United Microelectronics	69	113	64	0.6
27	44	S3	31	113	265	0.6
28	28	Sony	73	112	53	0.6
29	20	Siemens	116	109	-6	0.5
30	33	Ricoh	56	89	59	0.4
31	21	Chips & Technologies	116	86	-26	0.4
32	24	OPTi	98	86	-12	0.4
33	35	LSI Logic	51	77	51	0.4
34	43	Microchip Technology	32	72	125	0.4
35	27	Tseng Labs	74	71	-4	0.4
36	41	Analog Devices	39	69	77	0.3
37	47	Symphony Laboratories	26	66	154	0.3

(Continued)

**Table 2-10 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	29	NCR	71	63	-11	0.3
39	26	Trident Microsystems	80	60	-25	0.3
40	34	Dallas Semiconductor	55	56	2	0.3
		All Others	705	772	10	3.9
		North American Companies	9,879	14,416	46	72.2
		Japanese Companies	3,649	4,585	26	23.0
		European Companies	637	642	1	3.2
		Asia/Pacific Companies	194	327	69	1.6
		Total Market	14,359	19,970	39	100.0
		Without IBM				
		North American Companies	9,879	14,079	43	71.7
		Japanese Companies	3,649	4,585	26	23.4
		European Companies	637	642	1	3.3
		Asia/Pacific Companies	194	327	69	1.7
		Total Market	14,359	19,633	37	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-11**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	NEC	1,047	1,254	20	9.4
2	NA	IBM	NA	1,040		7.8
3	2	Toshiba	821	995	21	7.5
4	3	Motorola	632	785	24	5.9
5	4	Texas Instruments	615	733	19	5.5
6	6	Fujitsu	549	676	23	5.1
7	5	LSI Logic	564	642	14	4.8
8	9	Matsushita	342	446	30	3.3
9	8	Hitachi	346	426	23	3.2
10	11	OKI	314	419	33	3.1
11	7	AT&T	385	415	8	3.1
12	10	Philips	319	400	25	3.0
13	12	Sharp	290	388	34	2.9
14	13	VLSI Technology	286	342	20	2.6
15	14	Advanced Micro Devices	233	317	36	2.4
16	17	Sanyo	191	271	42	2.0
17	19	Siemens	180	235	31	1.8
18	22	Xilinx	163	231	42	1.7
19	15	Hewlett-Packard	214	230	7	1.7
20	16	National Semiconductor	203	222	9	1.7
21	21	Sony	165	213	29	1.6
22	20	Seiko Epson	167	186	11	1.4
23	23	SGS-Thomson	138	176	28	1.3
24	25	Samsung	124	173	40	1.3
25	26	NCR	105	165	57	1.2
26	18	Yamaha	189	154	-19	1.2
27	28	Altera	102	140	37	1.1
28	24	Harris	128	138	8	1.0
29	31	Mitsubishi	89	129	45	1.0
30	30	Lattice	90	127	41	1.0
31	27	GEC Plessey	105	101	-4	0.8
32	29	ITT	93	96	3	0.7
33	33	Integrated Device Technology	51	66	29	0.5
34	34	Actel	44	60	36	0.5
35	36	Cypress Semiconductor	40	57	43	0.4
36	NA	TEMIC	0	57		0.4
37	32	United Microelectronics	65	50	-23	0.4

(Continued)

**Table 2-11 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	35	Rohm	43	50	16	0.4
39	51	Goldstar	16	46	188	0.3
40	37	Intel	35	45	29	0.3
		All Others	559	621	11	4.7
		North American Companies	4,245	6,105	44	45.8
		Japanese Companies	4,610	5,736	24	43.1
		European Companies	906	1,093	21	8.2
		Asia/Pacific Companies	281	383	36	2.9
		Total Market	10,042	13,317	33	100.0
		Without IBM				
		North American Companies	4,245	5,065	19	41.3
		Japanese Companies	4,610	5,736	24	46.7
		European Companies	906	1,093	21	8.9
		Asia/Pacific Companies	281	383	36	3.1
		Total Market	10,042	12,277	22	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-12**  
**Top 40 Companies' Factory Revenue from Shipments of Monolithic Analog ICs**  
**to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	2	SGS-Thomson	658	860	31	7.0
2	1	National Semiconductor	705	836	19	6.8
3	3	Philips	603	752	25	6.1
4	4	Motorola	528	707	34	5.7
5	7	Sanyo	470	633	35	5.1
6	6	Texas Instruments	492	617	25	5.0
7	5	Toshiba	528	615	16	5.0
8	8	Analog Devices	428	526	23	4.3
9	9	Matsushita	403	473	17	3.8
10	10	Sony	339	425	25	3.4
11	11	NEC	331	377	14	3.1
12	12	Mitsubishi	315	377	20	3.1
13	13	AT&T	275	334	21	2.7
14	14	Hitachi	242	280	16	2.3
15	15	Silicon Systems	241	265	10	2.1
16	NA	TEMIC	0	262		2.1
17	16	Rohm	238	258	8	2.1
18	17	Harris	217	250	15	2.0
19	18	Siemens	175	175	0	1.4
20	21	Linear Technology	132	173	31	1.4
21	24	Samsung	117	166	42	1.3
22	22	Exar	123	158	28	1.3
23	26	New JRC	113	158	40	1.3
24	19	Rockwell	155	155	0	1.3
25	27	Advanced Micro Devices	110	154	40	1.2
26	31	Mietec	91	123	35	1.0
27	25	Fujitsu	115	122	6	1.0
28	29	Brooktree	96	117	22	0.9
29	20	GEC Plessey	154	114	-26	0.9
30	30	Maxim	93	111	19	0.9
31	28	Allegro MicroSystems	100	104	4	0.8
32	32	Sierra Semiconductor	85	90	6	0.7
33	33	Burr-Brown	73	88	21	0.7
34	34	Sharp	64	87	36	0.7
35	49	Cirrus Logic	29	80	176	0.6
36	40	VTC	45	70	56	0.6
37	44	Raytheon	38	68	79	0.6

(Continued)

**Table 2-12 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Monolithic Analog ICs to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	37	Unitrode	52	64	23	0.5
39	63	Winbond	15	58	287	0.5
40	39	Cherry Semiconductor	46	55	20	0.4
		All Others	1,146	1,019	-11	8.2
		North American Companies	4,651	5,628	21	45.5
		Japanese Companies	3,234	3,903	21	31.6
		European Companies	2,026	2,482	23	20.1
		Asia/Pacific Companies	269	343	28	2.8
		Total Market	10,180	12,356	21	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-13**  
**Top 10 Companies' Factory Revenue from Shipments of Hybrid ICs**  
**to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Sanken	153	202	32	13.6
2	3	Motorola	123	171	39	11.5
3	2	Sanyo	149	166	11	11.2
4	4	Mitsubishi	102	106	4	7.2
5	5	Hitachi	97	102	5	6.9
6	6	NEC	83	98	18	6.6
7	10	Burr-Brown	54	70	30	4.7
8	8	Rohm	63	68	8	4.6
9	9	Fujitsu	57	62	9	4.2
10	11	Toshiba	53	58	9	3.9
		All Others	401	379	-5	25.6
		North American Companies	340	389	14	26.2
		Japanese Companies	869	988	14	66.7
		European Companies	126	105	-17	7.1
		Asia/Pacific Companies	0	0		0
		Total Market	1,335	1,482	11	100.0

Source: Dataquest (February 1994)



**Table 2-14**  
**Top 40 Companies' Factory Revenue from Shipments of Discrete Semiconductors**  
**to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Toshiba	883	1,017	15	11.2
2	2	Motorola	857	994	16	10.9
3	3	Hitachi	566	662	17	7.3
4	4	Philips	551	604	10	6.6
5	5	NEC	532	579	9	6.4
6	6	Matsushita	379	450	19	4.9
7	8	SGS-Thomson	335	401	20	4.4
8	7	Rohm	343	380	11	4.2
9	9	Mitsubishi	284	380	34	4.2
10	13	Sanyo	244	336	38	3.7
11	11	Sanken	253	299	18	3.3
12	12	Fuji Electric	246	293	19	3.2
13	10	International Rectifier	270	285	6	3.1
14	14	General Instrument	220	239	9	2.6
15	15	Siemens	219	230	5	2.5
16	NA	TEMIC	0	175		1.9
17	17	Shindengen Electric	126	162	29	1.8
18	16	Fujitsu	142	157	11	1.7
19	18	Samsung	119	143	20	1.6
20	19	Harris	115	138	20	1.5
21	20	Korean Electronic Co.	110	130	18	1.4
22	21	ITT	106	107	1	1.2
23	24	Microsemi	84	97	15	1.1
24	22	Semikron	103	94	-9	1.0
25	28	Sony	79	89	13	1.0
26	25	Eupec	83	82	-1	0.9
27	29	National Semiconductor	70	77	10	0.8
28	27	Powerex	80	58	-28	0.6
29	31	Hewlett-Packard	48	49	2	0.5
30	32	Teccor Electronics	46	45	-2	0.5
31	36	Toko	29	45	55	0.5
32	30	ABB-IXYS	49	38	-22	0.4
33	33	Westcode	35	35	0	0.4
34	37	Texas Instruments	29	29	0	0.3
35	38	Zetex	26	29	12	0.3
36	34	GEC Plessey	31	21	-32	0.2
37	39	Fagor	25	19	-24	0.2

(Continued)

**Table 2-14 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
38	40	Semtech	16	17	6	0.2
39	46	Solitron	8	11	38	0.1
40	41	Allegro MicroSystems	11	10	-9	0.1
		All Others	403	95	-76	1.0
		North American Companies	2,139	2,180	2	24.0
		Japanese Companies	4,117	4,861	18	53.4
		European Companies	1,623	1,785	10	19.6
		Asia/Pacific Companies	276	275	-0	3.0
		Total Market	8,155	9,101	12	100.0

NA = Not available

Source: Dataquest (February 1994)

**Table 2-15**  
**Top 20 Companies' Factory Revenue from Shipments of Optoelectronic Semiconductors to the World (Millions of U.S. Dollars)**

1993 Rank	1992 Rank		1992 Revenue	1993 Revenue	Percent Change	1993 Market Share (%)
1	1	Sharp	352	418	19	13.9
2	2	Matsushita	315	358	14	11.9
3	3	Toshiba	255	326	28	10.8
4	4	Sony	216	236	9	7.9
5	5	Hewlett-Packard	187	190	2	6.3
6	6	Siemens	179	170	-5	5.7
7	7	Sanyo	136	137	1	4.6
8	8	Fujitsu	117	123	5	4.1
9	9	NEC	110	118	7	3.9
10	10	Rohm	110	112	2	3.7
11	12	Hitachi	60	67	12	2.2
12	13	Optek	55	54	-2	1.8
13	15	Texas Instruments	42	54	29	1.8
14	28	TEMIC	0	54		1.8
15	14	Quality Technologies	46	47	2	1.6
16	16	AT&T	39	41	5	1.4
17	17	Motorola	36	41	14	1.4
18	21	Sanken	20	32	60	1.1
19	20	Mitsubishi	23	30	30	1.0
20	19	OKI	26	28	8	0.9
		All Others	364	370	2	12.3
		North American Companies	495	523	6	17.4
		Japanese Companies	1,849	2,162	17	71.9
		European Companies	296	264	-11	8.8
		Asia/Pacific Companies	48	57	19	1.9
		Total Market	2,688	3,006	12	100.0

Source: Dataquest (February 1994)

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**For More Information...**

**Clint McClellan, Market Research Analyst .....(408) 437-8505**  
**Via fax.....(408) 437-0292**

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**DB** a company of  
The Dun & Bradstreet Corporation

Corporate Headquarters  
Dataquest Incorporated  
1290 Ridder Park Drive  
San Jose, California 95131-2398  
United States  
Phone: 01-408-437-8000  
Facsimile: 01-408-437-0292

Dataquest Incorporated  
550 Cochituate Road  
Framingham, Massachusetts 01701-9324  
United States  
Phone: 01-508-370-5555  
Facsimile: 01-508-370-6262

Invitational Computer Conferences (ICC)  
3990 Westerly Place, Suite 100  
Newport Beach, California 92660  
United States  
Phone: 01-714-476-9117  
Facsimile: 01-714-476-9969

Dataquest Japan Limited  
Shinkawa Sanko Building  
1-3-17, Shinkawa, Chuo-ku  
Tokyo 104  
Japan  
Phone: 81-3-5566-0411  
Facsimile: 81-3-5566-0425

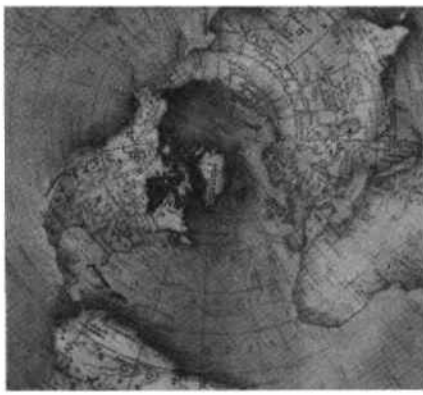
Dataquest Korea  
Trade Tower, Suite 3806  
159 Samsung-dong  
Kangnam-gu, Seoul 135-729  
Korea  
Phone: 82-2-551-1331  
Facsimile: 82-2-551-1330

European Headquarters  
Dataquest Europe Limited  
Holmers Farm Way  
High Wycombe, Bucks  
HP12 4UL  
England  
Phone: 44-494-422722  
Facsimile: 44-494-422742

Dataquest GmbH  
Kronstadter Strasse 9  
81677 München  
Germany  
Phone: 49-89-930-9090  
Facsimile: 49-89-930-3277

Dataquest Europe SA  
Tour Franklin  
Cedex 11  
92042 Paris-La-Défense  
France  
Phone: 33-1-41-25-18-00  
Facsimile: 33-1-41-25-18-18

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# Dataquest


## Final 1994 Worldwide Semiconductor Market Share



### Market Statistics

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**Program:** Semiconductors Worldwide  
**Product Code:** SEMI-WW-MS-9501  
**Publication Date:** March 27, 1995  
**Filing:** Market Analysis



# Final 1994 Worldwide Semiconductor Market Share



Market Statistics

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**Program:** Semiconductors Worldwide  
**Product Code:** SEMI-WW-MS-9501  
**Publication Date:** March 27, 1995  
**Filing:** Market Analysis

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Note: All tables show estimated data.

# Chapter 1 Final 1994 Worldwide Semiconductor Market Share

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## Introduction

This document contains detailed information on Dataquest's view of the semiconductor market. Included in this document are the following:

- 1992-1994 market share estimates
- 1993-1994 market share rankings

Worldwide market share estimates combine data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. market consumption or revenue are based on the average exchange rate for the given year. Refer to the section entitled "Exchange Rates" for more information regarding these average rates. As a rule, Dataquest's estimates are calculated in local currencies and then converted to U.S. dollars.

More detailed data on this market may be requested through Dataquest's client inquiry service. Qualitative analysis of this data is provided in other Dataquest documents.

## Segmentation

This section outlines the market segments that are specific to this document. Dataquest's objective is to provide data along lines of segmentation that is logical, appropriate to the industry in question, and immediately useful to clients.

Dataquest defines the semiconductor industry as the group of competing companies primarily engaged in manufacturing semiconductors and related solid-state devices. Important products of the semiconductor industry include integrated circuits, discrete devices, and optoelectronic devices.

For market share purposes, Dataquest defines the semiconductor market according to the following functional segmentation scheme:

- Total Semiconductor (Including Hybrids)
- Total Semiconductor (Excluding Hybrids)
- Total Integrated Circuit (Including Hybrids)
- Total Integrated Circuit (Excluding Hybrids)
  - Bipolar Digital IC
  - Bipolar Memory
  - Bipolar Logic
  - MOS Digital IC
  - MOS Memory
  - MOS Microcomponent
  - MOS Logic
  - Monolithic Analog IC
  - Hybrid IC
  - Discrete Semiconductor
  - Optoelectronic Semiconductor

## Definitions

This section lists the definitions that are used by Dataquest to present the data in this document. For a complete listing of all semiconductor market segments tracked by Dataquest, please refer to the *Dataquest Semiconductor Market Definitions Guide*.

## Product Definitions

**Total Semiconductor (Total Integrated Circuit + Total Discrete + Total Optoelectronic).** Defined as an active semiconductor product that contains semiconducting material (such as silicon, germanium, or gallium arsenide, but excluding ceramics) and reacts dynamically to an input signal, either by modifying its shape or adding energy to it. This definition excludes standalone passive components, such as capacitors, resistors, inductors, oscillators, crystals, transformers, and relays.

**Total Integrated Circuit (Digital Monolithic Bipolar IC + Digital Monolithic MOS IC + Analog IC).** An IC is defined as a large number of passive and/or active discrete semiconductor circuits integrated into a single package. A monolithic IC is one in which discrete circuits are integrated onto a single die.

**Bipolar Digital IC (Bipolar Digital Memory + Bipolar Digital Microcomponent + Bipolar Digital Logic).** A bipolar digital IC is defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, 100 percent of the die area is manufactured using bipolar semiconductor technology. A digital function is one in which data-carrying signals vary in discrete values.

**Bipolar Digital Memory.** Defined as a bipolar digital semiconductor product in which binary data is stored and electronically retrieved. Includes ECL random-access memory (RAM), read-only memory (ROM), programmable ROM (PROM), last-in/first-out (LIFO) memory, and first-in/first-out (FIFO) memory. Not included are products made with mixed bipolar CMOS (that is, BiCMOS) with TTL or ECL outputs, which are classified as MOS.

**Bipolar Digital Logic (Bipolar Application-Specific IC + Bipolar Digital Standard Logic + Other Bipolar Logic).** Defined as a bipolar digital semiconductor product in which more than 50 percent of the die area performs logic functions. Excludes bipolar digital microcomponent ICs.

**MOS Digital IC (MOS Digital Memory + MOS Digital Microcomponent + MOS Digital Logic).** Defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, where any portion of the die area is manufactured using metal oxide semiconductor (MOS) technology. A digital function is one in which data carrying signals vary in discrete values. Includes mixed technology manufacturing, such as BiMOS and BiCMOS, where there is some MOS technology employed.

**MOS Digital Memory (DRAM + SRAM + EPROM + EEPROM + Flash Memory + Mask ROM + Other MOS Digital Memory).** Defined as a MOS digital IC in which binary data is stored and electronically retrieved.

**MOS Digital Microcomponent IC (MOS Digital Microprocessor + MOS Digital Microcontroller + MOS Digital Microperipheral + Programmable Digital Signal Processor).** Defined as a MOS digital IC that contains a data processing unit or serves as an interface to such a unit.

**MOS Digital Logic IC (MOS Digital Logic Application-Specific IC + MOS Digital Standard Logic IC + Other MOS Digital Logic IC).** Defined as an MOS digital IC in which more than 50 percent of the die area performs logic functions. Excludes MOS digital microcomponent ICs.

**Total Analog IC (Amplifier/Comparator IC + Voltage Regulator/Reference IC + Data Converter/Switch/Multiplexer IC + Interface IC + Telecom IC + Disk Drive IC + Other Special Function IC + Linear Array/ASIC + Mixed-Signal ASIC + Total Special Consumer IC + Special Automotive IC + Smart Power IC).** An analog IC is a semiconductor product that deals in the realm of electrical signal processing, power control, or electrical drive capability. It is one in which some of the inputs or outputs can be defined in terms of continuously or linearly variable voltages, currents, or frequencies. Includes only monolithic analog ICs manufactured using bipolar, MOS, or BiCMOS technologies. A monolithic IC is a single die contained in a single package.

**Hybrid Integrated Circuit.** Defined as a semiconductor product consisting of more than one die contained in a single package. A hybrid IC may perform 100 percent linear, 100 percent digital, or mixed-signal (both linear and digital) functions. Includes hybrid implementation of all monolithic IC functions described in the following categories. Includes all hybrid ICs manufactured using bipolar, MOS, or BiCMOS technologies.

**Total Discrete (Transistor + Diode + Thyristor + Other Discrete).** A discrete semiconductor is defined as a unit building block performing a fundamental semiconductor function.

**Total Optoelectronic (LED Lamp/Display + Optocoupler + CCD + Laser Diode + Photosensor + Other Optoelectronic).** Defined as a semiconductor product in which photons induce the flow of electrons, or vice versa. Other functions may also be integrated onto the product. This category does not include LCD, incandescent displays, fluorescent displays, cathode ray tubes (CRTs), or plasma displays.

**Merchant versus Captive Consumption.** Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. The data excludes completely captive suppliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

## Regional Definitions

**North America:** Includes Canada, Mexico, and the United States.

**Japan:** Japan is the only single-country region.

**Western Europe:** Includes Austria, Belgium, Denmark, Eire (Ireland), Finland, France, Germany (including former East Germany), Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and rest of western Europe (Andorra, Cyprus, Gibraltar, Liechtenstein, Monaco, San Marino, Vatican City, Iceland, Malta, and Turkey).

**Eastern Europe:** Includes Albania, Bulgaria, the Czech Republic and Slovakia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the republics of the former Yugoslavia, and the republics of the former USSR (Belarus, Russian Federation, Ukraine, Georgia, Moldavia, Armenia, Azerbaijan, Kazakhstan, Uzbekistan, Tadjikistan, Kyrgyzstan, and Turkmenistan).

**Asia/Pacific:** Includes Asia/Pacific's newly industrialized economies (NIEs) and the Rest of Asia/Pacific regions. NIEs include Hong Kong, Singapore, Korea, and Taiwan. The Rest of Asia/Pacific region includes Australia, Brunei, Bangladesh, Cambodia, China, India, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam.

**Rest of World:** Includes Africa, Caribbean, Central America, Middle East, Oceania, and South America.

## Line Item Definitions

Factory revenue is defined as the money value received by a semiconductor manufacturer for its products. Revenue from the sale of semiconductors sold either as finished goods, die, or wafers to another semiconductor vendor for resale is attributed to the semiconductor vendor that sells the product to a distributor or equipment manufacturer.

## Market Share Methodology

Dataquest uses both primary and secondary sources to produce market statistics data. In the fourth quarter of each year, Dataquest surveys all major participants within each industry. Selected companies are resurveyed during the first quarter of the following year to verify final annual results. This primary research is supplemented with additional primary research and secondary research to verify market size, shipment totals, and pricing information. Sources of data used by Dataquest include the following:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons

- Government data or trade association data (such as WSTS, MITI, and U.S. DOC)
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and CD-ROM data banks
- Articles in both the general and trade press
- Reports from financial analysts
- End-user surveys

Dataquest believes that the estimates presented in this document are the most accurate and meaningful statistics available.

Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Dataquest and those provided by other suppliers.

## Notes on Market Share

In the process of conducting data collection and preparing market statistics information, Dataquest will sometimes consolidate or revise a particular company, model, series, or industry's numbers. In this section, we explain any such changes contained within this document for your reference.

### Notes to Market Share Tables

1. Analog Devices' revenue includes Precision Monolithics' revenue from 1991 forward.
2. Cirrus Logic's revenue includes Acumos and Crystal Semiconductor's revenue from 1992 forward.
3. Cypress Semiconductor acquired the logic division of Performance Semiconductor in 1993.
4. Dialog, Eurosil, Matra, Telefunken, and Siliconix are now known as TEMIC.
5. Fujitsu acquired Ross Semiconductor from Cypress Semiconductor in 1993.
6. IBM's merchant revenue were included in our Market Statistics beginning in 1993, which was the first complete year that IBM sold product on the merchant market.

7. IMP was formerly known as International Microelectronic Products.
8. Inmos' revenue is included in SGS-Thomson revenue.
9. Linfinity was formerly known as Silicon General.
10. Macronix revenue, beginning in 1991, was moved from the North American Companies area and is now included under the Asia/Pacific Companies section.
11. Mitsubishi's revenue includes Powerex's European revenue beginning in 1993.
12. MOSeI and Vitelic merged in 1992 to form MOSeI/Vitelic Corporation. In 1993, MOSeI/Vitelic was moved to the Asia/Pacific-Rest of World region.
13. Nittetsu Semiconductor was formerly known as NMB Semiconductor.
14. Philips' revenue includes Signetics' revenue.
15. SGS-Thomson's revenue includes TAG in 1993.
16. Quality Technologies acquired Philips' Optocoupler Division in 1992.
17. Raytheon's revenue includes that of TRW's LSI Division from 1992 forward.
18. Thomson Semiconductors Specific (TCS) was formed through the merger of Thomson Composants Microndes (TCM) and Thomson Composants Militaires et Spatiaux (TMS).
19. Unirode's revenue includes that of Microsemi's Semiconductor Products Division from 1992 forward.
20. Vertex's (formerly known as Integrated CMOS Systems) revenue is included in Toshiba's revenue from 1991 forward.
21. Xilinx acquired Plus Logic in 1992.
22. The following companies were added to worldwide market share tables starting in 1994, and may result in higher 1994 market growth rates in certain product areas:
  - Integrated Silicon Solution Inc.
  - Ramtron
  - Quick Logic
  - International CMOS Technology
23. In 1994, three-fourths of Intel's PLD Division's revenue is included in Intel's revenue, and the last quarter's revenue is included in Altera's revenue to accurately reflect the sale of the PLD Division.



24. Telcom was formerly known as Teledyne Semiconductor.
25. National Semiconductor, SGS-Thomson, and Siemens' revenue for 1993 was re-evaluated and restated.
26. Tektronix's revenue is now included with Maxim's revenue.

## Exchange Rates

Dataquest uses an average annual exchange rate in converting revenue to U.S. dollar amounts. Table 1 outlines these rates for 1992 through 1994.

**Table 1**  
**Exchange Rates**

	1992	1993	1994
Japan (Yen/U.S.\$)	126.45	111.20	101.81
France (Franc/U.S.\$)	5.27	5.67	5.54
Germany (Deutsche Mark/U.S.\$)	1.56	1.66	1.62
United Kingdom (U.S.\$/Pound Sterling)	1.77	1.50	1.53

Source: Dataquest (March 1995)

## Section 1: Final 1994 Semiconductor Market Share Worldwide

Table 1-1

Each Company's Factory Revenue from Shipments of Semiconductors to the World, Including Hybrids (Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	65,260	85,518	110,580	100.0	100.0	100.0
North American Companies	26,943	37,087	46,118	41.3	43.4	41.7
ACC Microelectronics	26	36	49	0	0	0
Actel	44	60	76	0.1	0.1	0.1
Adaptec	89	122	125	0.1	0.1	0.1
Advanced Micro Devices	1,514	1,660	2,134	2.3	1.9	1.9
Allegro MicroSystems	115	118	148	0.2	0.1	0.1
Alliance Semiconductor	13	41	90	0	0	0.1
Altera	102	140	199	0.2	0.2	0.2
Analog Devices	514	635	739	0.8	0.7	0.7
Appian Technology	10	10	7	0	0	0
Applied Micro Circuits Corporation	39	48	48	0.1	0.1	0
AT&T	911	1,110	1,307	1.4	1.3	1.2
Atmel	140	225	375	0.2	0.3	0.3
Brooktree	96	117	109	0.1	0.1	0.1
Burr-Brown	127	158	165	0.2	0.2	0.1
California Micro Devices	12	14	10	0	0	0
Catalyst	41	55	50	0.1	0.1	0
Cherry Semiconductor	46	55	77	0.1	0.1	0.1
Chips & Technologies	119	89	89	0.2	0.1	0.1
Cirrus Logic	275	451	781	0.4	0.5	0.7
Comlinear	15	16	16	0	0	0
Cypress Semiconductor	267	300	400	0.4	0.4	0.4
Cyrix	63	125	241	0.1	0.1	0.2
Dallas Semiconductor	97	112	154	0.1	0.1	0.1
DSP Semiconductor	10	8	18	0	0	0
Elantec	16	23	24	0	0	0
Electronic Designs	9	23	26	0	0	0
ETEQ Microsystems	20	19	6	0	0	0
Exar	123	158	169	0.2	0.2	0.2
General Instrument	220	239	262	0.3	0.3	0.2
Gennum	27	30	31	0	0	0
Gould AMI	79	101	136	0.1	0.1	0.1
Harris	559	605	665	0.9	0.7	0.6

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Hewlett-Packard	449	469	714	0.7	0.5	0.6
Honeywell	48	53	55	0.1	0.1	0
Hughes	37	40	40	0.1	0	0
IBM	NA	2,510	3,035	0	2.9	2.7
IMI	18	21	20	0	0	0
Integrated Circuit Systems	35	41	81	0.1	0	0.1
Integrated Device Technology	220	303	385	0.3	0.4	0.3
Integrated Information Technology	42	40	35	0.1	0	0
Integrated Silicon Solution	NA	NA	60	0	0	0.1
Intel	5,091	7,970	10,099	7.8	9.3	9.1
IMP	32	37	49	0	0	0
International CMOS Technology	NA	NA	12	0	0	0
International Rectifier	271	288	361	0.4	0.3	0.3
ITT	254	262	241	0.4	0.3	0.2
Kulite	24	24	20	0	0	0
Lattice	90	127	134	0.1	0.1	0.1
Linear Technology	132	173	225	0.2	0.2	0.2
Linfinity	29	37	44	0	0	0
Logic Devices	12	12	14	0	0	0
LSI Logic	615	719	901	0.9	0.8	0.8
Maxim	97	115	169	0.1	0.1	0.2
Micrel	15	18	25	0	0	0
Micro Linear	33	45	41	0.1	0.1	0
Micro Power Systems	22	23	23	0	0	0
Microchip Technology	83	140	212	0.1	0.2	0.2
Micron Technology	557	925	1,492	0.9	1.1	1.3
Microsemi	84	97	100	0.1	0.1	0.1
Mitel	52	69	100	0.1	0.1	0.1
Motorola	4,634	5,957	7,238	7.1	7.0	6.5
NCR	228	275	354	0.3	0.3	0.3
National Semiconductor	1,797	2,060	2,023	2.8	2.4	1.8
Novasensor	13	16	13	0	0	0
Oak Technology	50	50	62	0.1	0.1	0.1
Optek	57	56	56	0.1	0.1	0.1
OPTi	98	86	130	0.2	0.1	0.1
Paradigm	7	34	36	0	0	0
Performance Semiconductor	46	41	20	0.1	0	0

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Powerex	80	58	76	0.1	0.1	0.1
Q Logic	NA	21	45	0	0	0
Quality Semiconductor	18	22	22	0	0	0
QuickLogic	NA	NA	8	0	0	0
Quality Technologies	46	47	49	0.1	0.1	0
Ramtron	NA	NA	15	0	0	0
Raytheon	96	103	108	0.1	0.1	0.1
Rockwell	172	176	177	0.3	0.2	0.2
S3	31	113	130	0	0.1	0.1
SEEQ Technology	35	29	22	0.1	0	0
Semtech	20	19	25	0	0	0
Sierra Semiconductor	92	96	120	0.1	0.1	0.1
Silicon Systems	241	265	298	0.4	0.3	0.3
Sipex	20	20	16	0	0	0
Solitron	15	11	7	0	0	0
Standard Microsystems	40	47	100	0.1	0.1	0.1
Supertex	24	25	30	0	0	0
Symphony Laboratories	26	<del>66</del>	12	0	0.1	0
Teccor Electronics	46	45	60	0.1	0.1	0.1
Telcom	NA	NA	18	0	0	0
Teledyne	26	26	0	0	0	0
Tektronix	47	54	0	0.1	0.1	0
Texas Instruments	3,087	4,083	5,552	4.7	4.8	5.0
Trident Microsystems	80	60	87	0.1	0.1	0.1
Tseng Labs	74	71	83	0.1	0.1	0.1
Unitrode	76	78	88	0.1	0.1	0.1
Universal	14	14	13	0	0	0
VLSI Technology	429	517	588	0.7	0.6	0.5
VTC	45	70	70	0.1	0.1	0.1
WaferScale Integration	29	25	21	0	0	0
Weitek	26	33	28	0	0	0
Western Digital	190	218	184	0.3	0.3	0.2
Xicor	93	105	100	0.1	0.1	0.1
Xilinx	163	231	321	0.2	0.3	0.3
Zilog	146	203	222	0.2	0.2	0.2
Other North American Companies	406	100	78	0.6	0.1	0.1

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Japanese Companies	27,576	34,573	44,778	42.3	40.4	40.5
Fuji Electric	297	366	446	0.5	0.4	0.4
Fujitsu	2,553	2,928	3,869	3.9	3.4	3.5
Hitachi	3,851	5,015	6,644	5.9	5.9	6.0
Matsushita	1,942	2,344	2,896	3.0	2.7	2.6
Mitsubishi	2,213	2,823	3,772	3.4	3.3	3.4
NEC	4,869	6,141	7,961	7.5	7.2	7.2
New JRC	138	186	218	0.2	0.2	0.2
Nittetsu Semiconductor	120	148	160	0.2	0.2	0.1
Oki	956	1,187	1,471	1.5	1.4	1.3
Ricoh	93	143	182	0.1	0.2	0.2
Rohm	844	930	1,345	1.3	1.1	1.2
Sanken	426	533	608	0.7	0.6	0.5
Sanyo	1,385	1,843	2,321	2.1	2.2	2.1
Seiko Epson	230	252	273	0.4	0.3	0.2
Shindengen Electric	170	211	242	0.3	0.2	0.2
Sharp	1,354	1,760	2,188	2.1	2.1	2.0
Sony	1,103	1,398	1,876	1.7	1.6	1.7
Toko	59	81	91	0.1	0.1	0.1
Toshiba	4,675	5,727	7,556	7.2	6.7	6.8
Yamaha	201	317	382	0.3	0.4	0.3
Other Japanese Companies	97	240	277	0.1	0.3	0.3
European Companies	6,666	7,645	9,835	10.2	8.9	8.9
ABB-HAFO	40	34	40	0.1	0	0
ABB-DXYS	49	38	55	0.1	0	0
Austria Mikro Systeme	74	85	110	0.1	0.1	0.1
Elex	NA	NA	20	0	0	0
Elmos	NA	NA	15	0	0	0
EM Microelectronics Marin	45	50	65	0.1	0.1	0.1
Ericsson	72	72	113	0.1	0.1	0.1
Eupec	83	82	98	0.1	0.1	0.1
European Silicon Structures	30	36	40	0	0	0
Fagor	25	19	27	0	0	0
GEC Plessey	381	290	314	0.6	0.3	0.3
Micronas	10	14	20	0	0	0
Mietec	113	148	178	0.2	0.2	0.2

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Philips	2,113	2,300	2,920	3.2	2.7	2.6
Semikron	103	94	112	0.2	0.1	0.1
SGS-Thomson	1,605	2,038	2,640	2.5	2.4	2.4
Siemens	1,245	1,509	2,090	1.9	1.8	1.9
TEMIC	NA	625	720	0	0.7	0.7
TCS	53	65	78	0.1	0.1	0.1
Thesys	0	0	15	0	0	0
Westcode	35	35	41	0.1	0	0
Zetex	27	32	40	0	0	0
Other European Companies	563	79	84	0.9	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>4,075</b>	<b>6,213</b>	<b>9,849</b>	<b>6.2</b>	<b>7.3</b>	<b>8.9</b>
Acer Labs	NA	50	70	0	0.1	0.1
Daewoo	24	31	38	0	0	0
Dongsung Semiconductor	11	2	0	0	0	0
Goldstar	642	946	1,697	1.0	1.1	1.5
Holtek	0	53	70	0	0.1	0.1
Hualon Microelectronics Corporation	75	83	89	0.1	0.1	0.1
Hyundai	556	853	1,521	0.9	1.0	1.4
Korean Electronic Co.	148	177	225	0.2	0.2	0.2
Macronix	69	144	221	0.1	0.2	0.2
MOSel/Vitellic	161	223	259	0.2	0.3	0.2
Samsung	1,900	3,044	4,832	2.9	3.6	4.4
Silicon Integrated Systems	40	71	101	0.1	0.1	0.1
United Microelectronics	198	309	418	0.3	0.4	0.4
Winbond Electronics	117	184	308	0.2	0.2	0.3
Other Asia/Pacific Companies	134	43	0	0.2	0.1	0

NA = Not available

Source: Dataquest (March 1995)

**Table 1-2**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	63,925	84,055	108,916	100.0	100.0	100.0
North American Companies	26,603	36,717	45,694	41.6	43.7	42.0
ACC Microelectronics	26	36	49	0	0	0
Actel	44	60	76	0.1	0.1	0.1
Adaptec	89	122	125	0.1	0.1	0.1
Advanced Micro Devices	1,514	1,660	2,134	2.4	2.0	2.0
Allegro MicroSystems	115	118	148	0.2	0.1	0.1
Alliance Semiconductor	13	41	90	0	0	0.1
Altera	102	140	199	0.2	0.2	0.2
Analog Devices	467	595	687	0.7	0.7	0.6
Appian Technology	10	10	7	0	0	0
Applied Micro Circuits Corporation	39	48	48	0.1	0.1	0
AT&T	911	1,110	1,307	1.4	1.3	1.2
Atmel	140	225	375	0.2	0.3	0.3
Brooktree	96	117	109	0.2	0.1	0.1
Burr-Brown	73	88	105	0.1	0.1	0.1
California Micro Devices	12	14	10	0	0	0
Catalyst	41	55	50	0.1	0.1	0
Cherry Semiconductor	46	55	77	0.1	0.1	0.1
Chips & Technologies	119	89	89	0.2	0.1	0.1
Cirrus Logic	275	451	781	0.4	0.5	0.7
Comlinear	7	8	9	0	0	0
Cypress Semiconductor	267	300	400	0.4	0.4	0.4
Cyrix	63	125	241	0.1	0.1	0.2
Dallas Semiconductor	97	112	154	0.2	0.1	0.1
DSP Semiconductor	10	8	18	0	0	0
Elantec	14	21	21	0	0	0
Electronic Designs	9	23	26	0	0	0
ETEQ Microsystems	20	19	6	0	0	0
Exar	123	158	169	0.2	0.2	0.2
General Instrument	220	239	262	0.3	0.3	0.2
Gerrnum	27	30	29	0	0	0
Gould AMI	79	101	136	0.1	0.1	0.1
Harris	559	605	665	0.9	0.7	0.6
Hewlett-Packard	449	469	714	0.7	0.6	0.7
Honeywell	48	53	55	0.1	0.1	0.1

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Hughes	37	40	40	0.1	0	0
IBM	NA	2,510	3,035	0	3.0	2.8
IMI	18	21	20	0	0	0
Integrated Circuit Systems	35	41	81	0.1	0	0.1
Integrated Device Technology	220	303	385	0.3	0.4	0.4
Integrated Information Technology	42	40	35	0.1	0	0
Integrated Silicon Solution	NA	NA	60	0	0	0.1
Intel	5,091	7,970	10,099	8.0	9.5	9.3
IMP	32	37	49	0.1	0	0
International CMOS Technology	NA	NA	12	0	0	0
International Rectifier	271	288	361	0.4	0.3	0.3
ITT	254	262	241	0.4	0.3	0.2
Kulite	24	24	20	0	0	0
Lattice	90	127	134	0.1	0.2	0.1
Linear Technology	132	173	225	0.2	0.2	0.2
Linfinity	27	34	41	0	0	0
Logic Devices	12	12	14	0	0	0
LSI Logic	615	719	901	1.0	0.9	0.8
Maxim	93	111	165	0.1	0.1	0.2
Micrel	15	18	25	0	0	0
Micro Linear	33	45	41	0.1	0.1	0
Micro Power Systems	22	23	23	0	0	0
Microchip Technology	83	140	212	0.1	0.2	0.2
Micron Technology	557	925	1,492	0.9	1.1	1.4
Microsemi	84	97	100	0.1	0.1	0.1
Mitel	39	55	70	0.1	0.1	0.1
Motorola	4,511	5,786	7,012	7.1	6.9	6.4
NCR	228	275	354	0.4	0.3	0.3
National Semiconductor	1,763	2,046	2,017	2.8	2.4	1.9
Novasensor	13	16	13	0	0	0
Oak Technology	50	50	62	0.1	0.1	0.1
Optek	57	56	56	0.1	0.1	0.1
OPTi	98	86	130	0.2	0.1	0.1
Paradigm	7	34	36	0	0	0
Performance Semiconductor	46	41	20	0.1	0	0
Powerex	80	58	76	0.1	0.1	0.1
Q Logic	NA	21	45	0	0	0

(Continued)



**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Quality Semiconductor	18	22	22	0	0	0
QuickLogic	NA	NA	8	0	0	0
Quality Technologies	46	47	49	0.1	0.1	0
Ramtron	NA	NA	15	0	0	0
Raytheon	96	103	108	0.2	0.1	0.1
Rockwell	172	176	177	0.3	0.2	0.2
S3	31	113	130	0	0.1	0.1
SEEQ Technology	35	29	22	0.1	0	0
Semtech	18	19	25	0	0	0
Sierra Semiconductor	92	96	120	0.1	0.1	0.1
Silicon Systems	241	265	298	0.4	0.3	0.3
Sipex	3	3	2	0	0	0
Solitron	8	11	5	0	0	0
Standard Microsystems	40	47	100	0.1	0.1	0.1
Supertex	24	25	30	0	0	0
Symphony Laboratories	26	66	12	0	0.1	0
Teccor Electronics	46	45	60	0.1	0.1	0.1
Telcom	NA	NA	18	0	0	0
Teledyne	26	26	0	0	0	0
Tektronix	39	46	0	0.1	0.1	0
Texas Instruments	3,087	4,083	5,552	4.8	4.9	5.1
Trident Microsystems	80	60	87	0.1	0.1	0.1
Tseng Labs	74	71	83	0.1	0.1	0.1
Unitrode	62	64	73	0.1	0.1	0.1
Universal	14	14	13	0	0	0
VLSI Technology	429	517	588	0.7	0.6	0.5
VTC	45	70	70	0.1	0.1	0.1
WaferScale Integration	29	25	21	0	0	0
Weitek	26	33	28	0	0	0
Western Digital	190	218	184	0.3	0.3	0.2
Xicor	93	105	100	0.1	0.1	0.1
Xilinx	163	231	321	0.3	0.3	0.3
Zilog	146	203	222	0.2	0.2	0.2
Other North American Companies	401	95	78	0.6	0.1	0.1

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
<b>Japanese Companies</b>	<b>26,707</b>	<b>33,585</b>	<b>43,642</b>	<b>41.8</b>	<b>40.0</b>	<b>40.1</b>
Fuji Electric	281	345	424	0.4	0.4	0.4
Fujitsu	2,496	2,866	3,753	3.9	3.4	3.4
Hitachi	3,754	4,913	6,508	5.9	5.8	6.0
Matsushita	1,942	2,344	2,896	3.0	2.8	2.7
Mitsubishi	2,111	2,717	3,663	3.3	3.2	3.4
NEC	4,786	6,043	7,863	7.5	7.2	7.2
New JRC	138	186	218	0.2	0.2	0.2
Nittetsu Semiconductor	120	148	160	0.2	0.2	0.1
Oki	945	1,175	1,458	1.5	1.4	1.3
Ricoh	93	143	182	0.1	0.2	0.2
Rohm	781	862	1,273	1.2	1.0	1.2
Sanken	273	331	368	0.4	0.4	0.3
Sanyo	1,236	1,677	2,147	1.9	2.0	2.0
Seiko Epson	230	252	273	0.4	0.3	0.3
Shindengen Electric	126	162	194	0.2	0.2	0.2
Sharp	1,354	1,760	2,188	2.1	2.1	2.0
Sony	1,070	1,362	1,835	1.7	1.6	1.7
Toko	51	73	83	0.1	0.1	0.1
Toshiba	4,622	5,669	7,497	7.2	6.7	6.9
Yamaha	201	317	382	0.3	0.4	0.4
Other Japanese Companies	97	240	277	0.2	0.3	0.3
<b>European Companies</b>	<b>6,540</b>	<b>7,540</b>	<b>9,731</b>	<b>10.2</b>	<b>9.0</b>	<b>8.9</b>
ABB-HAFO	40	34	32	0.1	0	0
ABB-IXYS	49	38	55	0.1	0	0.1
Austria Mikro Systeme	74	85	110	0.1	0.1	0.1
Elex	NA	NA	20	0	0	0
Elmos	NA	NA	15	0	0	0
EM Microelectronics Marin	45	50	65	0.1	0.1	0.1
Ericsson	72	60	94	0.1	0.1	0.1
Eupec	83	82	98	0.1	0.1	0.1
European Silicon Structures	30	36	40	0	0	0
Fagor	25	19	27	0	0	0
GEC Plessey	343	269	308	0.5	0.3	0.3
Micronas	10	14	20	0	0	0
Mietec	113	148	178	0.2	0.2	0.2

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Semiconductors to the World,**  
**Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Philips	2,041	2,245	2,866	3.2	2.7	2.6
Semikron	103	94	112	0.2	0.1	0.1
SGS-Thomson	1,605	2,038	2,640	2.5	2.4	2.4
Siemens	1,245	1,509	2,090	1.9	1.8	1.9
TEMIC	NA	623	720	0	0.7	0.7
TCS	53	65	78	0.1	0.1	0.1
Thesys	0	0	15	0	0	0
Westcode	35	35	41	0.1	0	0
Zetex	27	32	40	0	0	0
Other European Companies	547	64	67	0.9	0.1	0.1
<b>Asia/Pacific Companies</b>	<b>4,075</b>	<b>6,213</b>	<b>9,849</b>	<b>6.4</b>	<b>7.4</b>	<b>9.0</b>
Acer Labs	NA	50	70	0	0.1	0.1
Daewoo	24	31	38	0	0	0
Dongsung Semiconductor	11	2	0	0	0	0
Goldstar	642	946	1,697	1.0	1.1	1.6
Holtek	0	53	70	0	0.1	0.1
Hualon Microelectronics Corporation	75	83	89	0.1	0.1	0.1
Hyundai	556	853	1,521	0.9	1.0	1.4
Korean Electronic Co.	148	177	225	0.2	0.2	0.2
Macronix	69	144	221	0.1	0.2	0.2
MOSel/Vitellic	161	223	259	0.3	0.3	0.2
Samsung	1,900	3,044	4,832	3.0	3.6	4.4
Silicon Integrated Systems	40	71	101	0.1	0.1	0.1
United Microelectronics	198	309	418	0.3	0.4	0.4
Winbond Electronics	117	184	308	0.2	0.2	0.3
Other Asia/Pacific Companies	134	43	0	0.2	0.1	0

NA = Not available

Source: Dataquest (March 1995)

**Table 1-3**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	54,417	73,429	95,928	100.0	100.0	100.0
North American Companies	24,309	34,384	42,881	44.7	46.8	44.7
ACC Microelectronics	26	36	49	0	0	0.1
Actel	44	60	76	0.1	0.1	0.1
Adaptec	89	122	125	0.2	0.2	0.1
Advanced Micro Devices	1,514	1,660	2,134	2.8	2.3	2.2
Allegro MicroSystems	104	108	139	0.2	0.1	0.1
Alliance Semiconductor	13	41	90	0	0.1	0.1
Altera	102	140	199	0.2	0.2	0.2
Analog Devices	514	635	739	0.9	0.9	0.8
Appian Technology	10	10	7	0	0	0
Applied Micro Circuits Corporation	39	48	48	0.1	0.1	0.1
AT&T	868	1,065	1,250	1.6	1.5	1.3
Atmel	140	225	375	0.3	0.3	0.4
Brooktree	96	117	109	0.2	0.2	0.1
Burr-Brown	127	158	165	0.2	0.2	0.2
California Micro Devices	12	14	10	0	0	0
Catalyst	41	55	50	0.1	0.1	0.1
Cherry Semiconductor	46	55	77	0.1	0.1	0.1
Chips & Technologies	119	89	89	0.2	0.1	0.1
Cirrus Logic	275	451	781	0.5	0.6	0.8
Comlinear	15	16	16	0	0	0
Cypress Semiconductor	267	300	400	0.5	0.4	0.4
Cyrix	63	125	241	0.1	0.2	0.3
Dallas Semiconductor	97	112	154	0.2	0.2	0.2
DSP Semiconductor	10	8	18	0	0	0
Elantec	16	23	24	0	0	0
Electronic Designs	9	23	26	0	0	0
ETEQ Microsystems	20	19	6	0	0	0
Exar	123	158	169	0.2	0.2	0.2
Gennum	27	30	31	0	0	0
Gould AMI	79	101	136	0.1	0.1	0.1
Harris	444	467	478	0.8	0.6	0.5
Hewlett-Packard	214	230	255	0.4	0.3	0.3
Honeywell	21	26	23	0	0	0
Hughes	37	40	40	0.1	0.1	0

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
IBM	NA	2,510	3,035	0	3.4	3.2
IMI	18	21	20	0	0	0
Integrated Circuit Systems	35	41	81	0.1	0.1	0.1
Integrated Device Technology	220	303	385	0.4	0.4	0.4
Integrated Information Technology	42	40	35	0.1	0.1	0
Integrated Silicon Solution	NA	NA	60	0	0	0.1
Intel	5,091	7,970	10,099	9.4	10.9	10.5
IMP	32	37	49	0.1	0.1	0.1
International CMOS Technology	NA	NA	12	0	0	0
International Rectifier	1	3	8	0	0	0
ITT	148	155	127	0.3	0.2	0.1
Kulite	24	24	20	0	0	0
Lattice	90	127	134	0.2	0.2	0.1
Linear Technology	132	173	225	0.2	0.2	0.2
Linfinity	29	37	44	0.1	0.1	0
Logic Devices	12	12	14	0	0	0
LSI Logic	615	719	901	1.1	1.0	0.9
Maxim	97	115	169	0.2	0.2	0.2
Micrel	15	18	25	0	0	0
Micro Linear	33	45	41	0.1	0.1	0
Micro Power Systems	22	23	23	0	0	0
Microchip Technology	83	140	212	0.2	0.2	0.2
Micron Technology	557	925	1,492	1.0	1.3	1.6
Mitel	52	69	100	0.1	0.1	0.1
Motorola	3,741	4,922	6,096	6.9	6.7	6.4
NCR	228	275	354	0.4	0.4	0.4
National Semiconductor	1,727	1,983	1,929	3.2	2.7	2.0
Novasensor	13	16	13	0	0	0
Oak Technology	50	50	62	0.1	0.1	0.1
Optek	0	0	7	0	0	0
OPTi	98	86	130	0.2	0.1	0.1
Paradigm	7	34	36	0	0	0
Performance Semiconductor	46	41	20	0.1	0.1	0
Q Logic	NA	21	45	0	0	0
Quality Semiconductor	18	22	22	0	0	0
QuickLogic	NA	NA	8	0	0	0
Ramtron	NA	NA	15	0	0	0

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Raytheon	89	95	100	0.2	0.1	0.1
Rockwell	172	176	177	0.3	0.2	0.2
S3	31	113	130	0.1	0.2	0.1
SEEQ Technology	35	29	22	0.1	0	0
Semtech	4	2	5	0	0	0
Sierra Semiconductor	92	96	120	0.2	0.1	0.1
Silicon Systems	241	265	298	0.4	0.4	0.3
Sipex	20	20	16	0	0	0
Solitron	7	0	2	0	0	0
Standard Microsystems	40	47	100	0.1	0.1	0.1
Supertex	15	15	19	0	0	0
Symphony Laboratories	26	66	12	0	0.1	0
Telcom	NA	NA	18	0	0	0
Teledyne	26	26	0	0	0	0
Tektronix	42	49	0	0.1	0.1	0
Texas Instruments	3,016	4,000	5,471	5.5	5.4	5.7
Trident Microsystems	80	60	87	0.1	0.1	0.1
Tseng Labs	74	71	83	0.1	0.1	0.1
Unitrode	66	78	88	0.1	0.1	0.1
Universal	14	14	13	0	0	0
VLSI Technology	429	517	588	0.8	0.7	0.6
VTC	45	70	70	0.1	0.1	0.1
WaferScale Integration	29	25	21	0.1	0	0
Weitek	26	33	28	0	0	0
Western Digital	190	218	184	0.3	0.3	0.2
Xicor	93	105	100	0.2	0.1	0.1
Xilinx	163	231	321	0.3	0.3	0.3
Zilog	146	203	222	0.3	0.3	0.2
Other North American Companies	201	36	9	0.4	0	0
Japanese Companies	21,610	27,550	36,288	39.7	37.5	37.8
Fuji Electric	51	73	89	0.1	0.1	0.1
Fujitsu	2,294	2,648	3,542	4.2	3.6	3.7
Hitachi	3,225	4,286	5,757	5.9	5.8	6.0
Matsushita	1,248	1,536	1,968	2.3	2.1	2.1
Mitsubishi	1,906	2,413	3,172	3.5	3.3	3.3
NEC	4,227	5,444	7,159	7.8	7.4	7.5

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
New JRC	123	170	205	0.2	0.2	0.2
Nittetsu Semiconductor	120	148	160	0.2	0.2	0.2
Oki	922	1,150	1,437	1.7	1.6	1.5
Ricoh	93	143	182	0.2	0.2	0.2
Rohm	391	438	643	0.7	0.6	0.7
Sanken	153	202	240	0.3	0.3	0.3
Sanyo	1,005	1,370	1,782	1.8	1.9	1.9
Seiko Epson	230	252	273	0.4	0.3	0.3
Shindengen Electric	44	49	48	0.1	0.1	0.1
Sharp	1,002	1,342	1,678	1.8	1.8	1.7
Sony	808	1,073	1,513	1.5	1.5	1.6
Toko	30	36	40	0.1	0	0
Toshiba	3,537	4,384	5,931	6.5	6.0	6.2
Yamaha	201	317	382	0.4	0.4	0.4
Other Japanese Companies	0	76	87	0	0.1	0.1
<b>European Companies</b>	<b>4,747</b>	<b>5,614</b>	<b>7,278</b>	<b>8.7</b>	<b>7.6</b>	<b>7.6</b>
ABB-HAFO	25	20	28	0	0	0
Austria Mikro Systeme	74	85	110	0.1	0.1	0.1
Elex	NA	NA	20	0	0	0
Elmos	NA	NA	15	0	0	0
EM Microelectronics Marin	45	50	65	0.1	0.1	0.1
Ericsson	72	72	83	0.1	0.1	0.1
European Silicon Structures	30	36	40	0.1	0	0
GEC Plessey	350	269	286	0.6	0.4	0.3
Micronas	10	14	20	0	0	0
Mietec	113	148	178	0.2	0.2	0.2
Philips	1,562	1,696	2,159	2.9	2.3	2.3
SGS-Thomson	1,270	1,654	2,207	2.3	2.3	2.3
Siemens	847	1,110	1,586	1.6	1.5	1.7
TEMIC	NA	396	391	0	0.5	0.4
TCS	32	43	51	0.1	0.1	0.1
Thesys	0	0	15	0	0	0
Zetex	0	2	3	0	0	0
Other European Companies	317	19	21	0.6	0	0

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Asia/Pacific Companies	3,751	5,881	9,481	6.9	8.0	9.9
Acer Labs	NA	50	70	0	0.1	0.1
Daewoo	24	31	38	0	0	0
Goldstar	631	946	1,697	1.2	1.3	1.8
Holttek	0	53	70	0	0.1	0.1
Hualon Microelectronics Corporation	75	83	89	0.1	0.1	0.1
Hyundai	556	853	1,521	1.0	1.2	1.6
Korean Electronic Co.	30	37	47	0.1	0.1	0
Macronix	69	144	221	0.1	0.2	0.2
MOSel/Vitellic	161	223	259	0.3	0.3	0.3
Samsung	1,781	2,897	4,642	3.3	3.9	4.8
Silicon Integrated Systems	40	71	101	0.1	0.1	0.1
United Microelectronics	198	309	418	0.4	0.4	0.4
Winbond Electronics	117	184	308	0.2	0.3	0.3
Other Asia/Pacific Companies	69	0	0	0.1	0	0

NA = Not available

Source: Dataquest (March 1995)



**Table 1-4**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the**  
**World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	53,082	71,966	94,264	100.0	100.0	100.0
North American Companies	23,969	34,014	42,457	45.2	47.3	45.0
ACC Microelectronics	26	36	49	0	0.1	0.1
Actel	44	60	76	0.1	0.1	0.1
Adaptec	89	122	125	0.2	0.2	0.1
Advanced Micro Devices	1,514	1,660	2,134	2.9	2.3	2.3
Allegro Microsystems	104	108	139	0.2	0.2	0.1
Alliance Semiconductor	13	41	90	0	0.1	0.1
Altera	102	140	199	0.2	0.2	0.2
Analog Devices	467	595	687	0.9	0.8	0.7
Appian Technology	10	10	7	0	0	0
Applied Micro Circuits Corporation	39	48	48	0.1	0.1	0.1
AT&T	868	1,065	1,250	1.6	1.5	1.3
Atmel	140	225	375	0.3	0.3	0.4
Brooktree	96	117	109	0.2	0.2	0.1
Burr-Brown	73	88	105	0.1	0.1	0.1
California Micro Devices	12	14	10	0	0	0
Catalyst	41	55	50	0.1	0.1	0.1
Cherry Semiconductor	46	55	77	0.1	0.1	0.1
Chips & Technologies	119	89	89	0.2	0.1	0.1
Cirrus Logic	275	451	781	0.5	0.6	0.8
Comlinear	7	8	9	0	0	0
Cypress Semiconductor	267	300	400	0.5	0.4	0.4
Cyrix	63	125	241	0.1	0.2	0.3
Dallas Semiconductor	97	112	154	0.2	0.2	0.2
DSP Semiconductor	10	8	18	0	0	0
Elantec	14	21	21	0	0	0
Electronic Designs	9	23	26	0	0	0
ETEQ Microsystems	20	19	6	0	0	0
Exar	123	158	169	0.2	0.2	0.2
Gennum	27	30	29	0.1	0	0
Gould AMI	79	101	136	0.1	0.1	0.1
Harris	444	467	478	0.8	0.6	0.5
Hewlett-Packard	214	230	255	0.4	0.3	0.3
Honeywell	21	26	23	0	0	0
Hughes	37	40	40	0.1	0.1	0

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
IBM	NA	2,510	3,035	0	3.5	3.2
IMI	18	21	20	0	0	0
Integrated Circuit Systems	35	41	81	0.1	0.1	0.1
Integrated Device Technology	220	303	385	0.4	0.4	0.4
Integrated Information Technology	42	40	35	0.1	0.1	0
Integrated Silicon Solution	NA	NA	60	0	0	0.1
Intel	5,091	7,970	10,099	9.6	11.1	10.7
IMP	32	37	49	0.1	0.1	0.1
International CMOS Technology	NA	NA	12	0	0	0
International Rectifier	1	3	8	0	0	0
ITT	148	155	127	0.3	0.2	0.1
Kulite	24	24	20	0	0	0
Lattice	90	127	134	0.2	0.2	0.1
Linear Technology	132	173	225	0.2	0.2	0.2
Linfinity	27	34	41	0.1	0	0
Logic Devices	12	12	14	0	0	0
LSI Logic	615	719	901	1.2	1.0	1.0
Maxim	93	111	165	0.2	0.2	0.2
Micrel	15	18	25	0	0	0
Micro Linear	33	45	41	0.1	0.1	0
Micro Power Systems	22	23	23	0	0	0
Microchip Technology	83	140	212	0.2	0.2	0.2
Micron Technology	557	925	1,492	1.0	1.3	1.6
Mitel	39	55	70	0.1	0.1	0.1
Motorola	3,618	4,751	5,870	6.8	6.6	6.2
NCR	228	275	354	0.4	0.4	0.4
National Semiconductor	1,693	1,969	1,923	3.2	2.7	2.0
Novasensor	13	16	13	0	0	0
Oak Technology	50	50	62	0.1	0.1	0.1
Optek	0	0	7	0	0	0
OPTi	98	86	130	0.2	0.1	0.1
Paradigm	7	34	36	0	0	0
Performance Semiconductor	46	41	20	0.1	0.1	0
Q Logic	NA	21	45	0	0	0
Quality Semiconductor	18	22	22	0	0	0
QuickLogic	NA	NA	8	0	0	0
Ramtron	NA	NA	15	0	0	0

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Raytheon	89	95	100	0.2	0.1	0.1
Rockwell	172	176	177	0.3	0.2	0.2
S3	31	113	130	0.1	0.2	0.1
SEEQ Technology	35	29	22	0.1	0	0
Semtech	2	2	5	0	0	0
Sierra Semiconductor	92	96	120	0.2	0.1	0.1
Silicon Systems	241	265	298	0.5	0.4	0.3
Sipex	3	3	2	0	0	0
Standard Microsystems	40	47	100	0.1	0.1	0.1
Supertex	15	15	19	0	0	0
Symphony Laboratories	26	66	12	0	0.1	0
Telcom	NA	NA	18	0	0	0
Teledyne	26	26	0	0	0	0
Tektronix	34	41	0	0.1	0.1	0
Texas Instruments	3,016	4,000	5,471	5.7	5.6	5.8
Trident Microsystems	80	60	87	0.2	0.1	0.1
Tseng Labs	74	71	83	0.1	0.1	0.1
Unitrode	52	64	73	0.1	0.1	0.1
Universal	14	14	13	0	0	0
VLSI Technology	429	517	588	0.8	0.7	0.6
VTC	45	70	70	0.1	0.1	0.1
WaferScale Integration	29	25	21	0.1	0	0
Weitek	26	33	28	0	0	0
Western Digital	190	218	184	0.4	0.3	0.2
Xicor	93	105	100	0.2	0.1	0.1
Xilinx	163	231	321	0.3	0.3	0.3
Zilog	146	203	222	0.3	0.3	0.2
Other North American Companies	196	31	9	0.4	0	0
<b>Japanese Companies</b>	<b>20,741</b>	<b>26,562</b>	<b>35,152</b>	<b>39.1</b>	<b>36.9</b>	<b>37.3</b>
Fuji Electric	35	52	67	0.1	0.1	0.1
Fujitsu	2,237	2,586	3,426	4.2	3.6	3.6
Hitachi	3,128	4,184	5,621	5.9	5.8	6.0
Matsushita	1,248	1,536	1,968	2.4	2.1	2.1
Mitsubishi	1,804	2,307	3,063	3.4	3.2	3.2
NEC	4,144	5,346	7,061	7.8	7.4	7.5
New JRC	123	170	205	0.2	0.2	0.2

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Nittetsu Semiconductor	120	148	160	0.2	0.2	0.2
Oki	911	1,138	1,424	1.7	1.6	1.5
Ricoh	93	143	182	0.2	0.2	0.2
Rohm	328	370	571	0.6	0.5	0.6
Sanyo	856	1,204	1,608	1.6	1.7	1.7
Seiko Epson	230	252	273	0.4	0.4	0.3
Sharp	1,002	1,342	1,678	1.9	1.9	1.8
Sony	775	1,037	1,472	1.5	1.4	1.6
Toko	22	28	32	0	0	0
Toshiba	3,484	4,326	5,872	6.6	6.0	6.2
Yamaha	201	317	382	0.4	0.4	0.4
Other Japanese Companies	0	76	87	0	0.1	0.1
<b>European Companies</b>	<b>4,621</b>	<b>5,509</b>	<b>7,174</b>	<b>8.7</b>	<b>7.7</b>	<b>7.6</b>
ABB-HAFO	25	20	20	0	0	0
Austria Mikro Systeme	74	85	110	0.1	0.1	0.1
Elex	NA	NA	20	0	0	0
Elmos	NA	NA	15	0	0	0
EM Microelectronics Marin	45	50	65	0.1	0.1	0.1
Ericsson	72	60	64	0.1	0.1	0.1
European Silicon Structures	30	36	40	0.1	0.1	0
GEC Plessey	312	248	280	0.6	0.3	0.3
Micronas	10	14	20	0	0	0
Mietec	113	148	178	0.2	0.2	0.2
Philips	1,490	1,641	2,105	2.8	2.3	2.2
SGS-Thomson	1,270	1,654	2,207	2.4	2.3	2.3
Siemens	847	1,110	1,586	1.6	1.5	1.7
TEMIC	NA	394	391	0	0.5	0.4
TCS	32	43	51	0.1	0.1	0.1
Thesys	0	0	15	0	0	0
Zetex	0	2	3	0	0	0
Other European Companies	301	4	4	0.6	0	0
<b>Asia/Pacific Companies</b>	<b>3,751</b>	<b>5,881</b>	<b>9,481</b>	<b>7.1</b>	<b>8.2</b>	<b>10.1</b>
Acer Labs	NA	50	70	0	0.1	0.1
Daewoo	24	31	38	0	0	0
Goldstar	631	946	1,697	1.2	1.3	1.8

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Holtek	0	53	70	0	0.1	0.1
Hualon Microelectronics Corporation	75	83	89	0.1	0.1	0.1
Hyundai	556	853	1,521	1.0	1.2	1.6
Korean Electronic Co.	30	37	47	0.1	0.1	0
Macronix	69	144	221	0.1	0.2	0.2
MOSel/Vitellic	161	223	259	0.3	0.3	0.3
Samsung	1,781	2,897	4,642	3.4	4.0	4.9
Silicon Integrated Systems	40	71	101	0.1	0.1	0.1
United Microelectronics	198	309	418	0.4	0.4	0.4
Winbond Electronics	117	184	308	0.2	0.3	0.3
Other Asia/Pacific Companies	69	0	0	0.1	0	0

NA = Not available

Source: Dataquest (March 1995)

**Table 1-5**  
**Each Company's Factory Revenue from Shipments of Bipolar Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	3,193	3,079	2,960	100.0	100.0	100.0
North American Companies	1,601	1,650	1,467	50.1	53.6	50.5
Advanced Micro Devices	247	199	143	7.7	6.5	4.9
Applied Micro Circuits Corporation	29	26	20	0.9	0.8	0.7
AT&T	60	60	63	1.9	1.9	2.2
Atmel	1	1	0	0	0	0
Chips & Technologies	3	3	0	0.1	0.1	0
Harris	22	13	6	0.7	0.4	0.2
Intel	1	1	0	0	0	0
Motorola	384	432	421	12.0	14.0	14.5
National Semiconductor	274	279	215	8.6	9.1	7.4
Raytheon	51	27	22	1.6	0.9	0.8
Texas Instruments	505	594	577	15.8	19.3	19.9
Other North American Companies	24	15	0	0.8	0.5	0
Japanese Companies	1,240	1,158	1,207	38.8	37.6	41.5
Fujitsu	413	371	395	12.9	12.0	13.6
Hitachi	425	391	465	13.3	12.7	16.0
Matsushita	11	26	29	0.3	0.8	1.0
Mitsubishi	66	63	23	2.1	2.0	0.8
NEC	214	201	194	6.7	6.5	6.7
Oki	33	31	33	1.0	1.0	1.1
Sony	1	0	0	0	0	0
Toshiba	77	75	68	2.4	2.4	2.3
European Companies	328	227	186	10.3	7.4	6.4
GEC Plessey	40	23	16	1.3	0.7	0.6
Philips	241	152	121	7.5	4.9	4.2
SGS-Thomson	3	7	12	0.1	0.2	0.4
Siemens	40	41	33	1.3	1.3	1.1
Other European Companies	4	4	4	0.1	0.1	0.1
Asia/Pacific Companies	24	44	46	0.8	1.4	1.6
Goldstar	24	44	46	0.8	1.4	1.6

Source: Dataquest (March 1995)

**Table 1-6**  
**Each Company's Factory Revenue from Shipments of Bipolar Memory ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	318	244	198	100.0	100.0	100.0
North American Companies	88	59	43	27.7	24.2	21.7
Advanced Micro Devices	46	39	28	14.5	16.0	14.1
Harris	13	4	0	4.1	1.6	0
Motorola	3	2	1	0.9	0.8	0.5
National Semiconductor	8	5	4	2.5	2.0	2.0
Raytheon	10	6	5	3.1	2.5	2.5
Texas Instruments	3	3	5	0.9	1.2	2.5
Other North American Companies	5	0	0	1.6	0	0
Japanese Companies	203	182	141	63.8	74.6	71.2
Fujitsu	90	81	32	28.3	33.2	16.2
Hitachi	94	85	93	29.6	34.8	47.0
NEC	19	16	16	6.0	6.6	8.1
European Companies	27	3	14	8.5	1.2	7.1
Philips	27	3	14	8.5	1.2	7.1

Source: Dataquest (March 1995)

**Table 1-7**  
**Each Company's Factory Revenue from Shipments of Bipolar Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	2,875	2,835	2,708	100.0	100.0	100.0
North American Companies	1,513	1,591	1,424	52.6	56.1	52.6
Advanced Micro Devices	201	160	115	7.0	5.6	4.2
Applied Micro Circuits Corporation	29	26	20	1.0	0.9	0.7
AT&T	60	60	63	2.1	2.1	2.3
Atmel	1	1	0	0	0	0
Chips & Technologies	3	3	0	0.1	0.1	0
Harris	9	9	6	0.3	0.3	0.2
Intel	1	1	0	0	0	0
Motorola	381	430	420	13.3	15.2	15.5
National Semiconductor	266	274	211	9.3	9.7	7.8
Raytheon	41	21	17	1.4	0.7	0.6
Texas Instruments	502	591	572	17.5	20.8	21.1
Other North American Companies	19	15	0	0.7	0.5	0
Japanese Companies	1,037	976	1,066	36.1	34.4	39.4
Fujitsu	323	290	363	11.2	10.2	13.4
Hitachi	331	306	372	11.5	10.8	13.7
Matsushita	11	26	29	0.4	0.9	1.1
Mitsubishi	66	63	23	2.3	2.2	0.8
NEC	195	185	178	6.8	6.5	6.6
Oki	33	31	33	1.1	1.1	1.2
Sony	1	0	0	0	0	0
Toshiba	77	75	68	2.7	2.6	2.5
European Companies	301	224	172	10.5	7.9	6.4
GEC Plessey	40	23	16	1.4	0.8	0.6
Philips	214	149	107	7.4	5.3	4.0
SGS-Thomson	3	7	12	0.1	0.2	0.4
Siemens	40	41	33	1.4	1.4	1.2
Other European Companies	4	4	4	0.1	0.1	0.1
Asia/Pacific Companies	24	44	46	0.8	1.6	1.7
Goldstar	24	44	46	0.8	1.6	1.7

Source: Dataquest (March 1995)



**Table 1-8**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	39,709	56,374	75,951	100.0	100.0	100.0
North American Companies	17,717	26,784	34,386	44.6	47.5	45.3
ACC Microelectronics	26	36	49	0.1	0.1	0.1
Actel	44	60	76	0.1	0.1	0.1
Adaptec	89	122	125	0.2	0.2	0.2
Advanced Micro Devices	1,157	1,307	1,804	2.9	2.3	2.4
Allegro MicroSystems	4	4	5	0	0	0
Alliance Semiconductor	13	41	90	0	0.1	0.1
Altera	102	140	199	0.3	0.2	0.3
Analog Devices	39	69	85	0.1	0.1	0.1
Appian Technology	10	10	7	0	0	0
Applied Micro Circuits Corporation	10	22	21	0	0	0
AT&T	533	671	785	1.3	1.2	1.0
Atmel	138	223	363	0.3	0.4	0.5
California Micro Devices	5	6	5	0	0	0
Catalyst	40	54	49	0.1	0.1	0.1
Chips & Technologies	116	86	89	0.3	0.2	0.1
Cirrus Logic	246	371	681	0.6	0.7	0.9
Cypress Semiconductor	267	300	400	0.7	0.5	0.5
Cyrix	63	125	241	0.2	0.2	0.3
Dallas Semiconductor	89	104	154	0.2	0.2	0.2
DSP Semiconductor	10	8	18	0	0	0
Electronic Designs	9	23	26	0	0	0
ETEQ Microsystems	20	19	6	0.1	0	0
Gould AMI	49	63	105	0.1	0.1	0.1
Harris	205	204	188	0.5	0.4	0.2
Hewlett-Packard	214	230	255	0.5	0.4	0.3
Hughes	25	24	21	0.1	0	0
IBM	NA	2,510	3,035	0	4.5	4.0
IMI	15	18	18	0	0	0
Integrated Circuit Systems	35	29	42	0.1	0.1	0.1
Integrated Device Technology	220	303	385	0.6	0.5	0.5
Integrated Information Technology	42	40	35	0.1	0.1	0
Integrated Silicon Solution	NA	NA	60	0	0	0.1
Intel	5,080	7,957	10,079	12.8	14.1	13.3
IMP	21	8	9	0.1	0	0

(Continued)

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
International CMOS Technology	NA	NA	12	0	0	0
ITT	130	132	103	0.3	0.2	0.1
Lattice	90	127	134	0.2	0.2	0.2
Logic Devices	12	12	14	0	0	0
LSI Logic	615	719	901	1.5	1.3	1.2
Micrel	5	5	7	0	0	0
Micro Linear	0	0	6	0	0	0
Microchip Technology	83	140	212	0.2	0.2	0.3
Micron Technology	557	925	1,492	1.4	1.6	2.0
Motorola	2,706	3,612	4,525	6.8	6.4	6.0
NCR	178	230	298	0.4	0.4	0.4
National Semiconductor	714	902	817	1.8	1.6	1.1
Oak Technology	50	50	62	0.1	0.1	0.1
OPTi	98	86	130	0.2	0.2	0.2
Paradigm	7	34	36	0	0.1	0
Performance Semiconductor	46	41	20	0.1	0.1	0
Q Logic	NA	21	45	0	0	0.1
Quality Semiconductor	18	22	22	0	0	0
QuickLogic	NA	NA	8	0	0	0
Ramtron	NA	NA	15	0	0	0
Rockwell	17	21	17	0	0	0
S3	31	113	130	0.1	0.2	0.2
SEEQ Technology	26	20	22	0.1	0	0
Sierra Semiconductor	7	6	35	0	0	0
Standard Microsystems	40	47	100	0.1	0.1	0.1
Supertex	5	5	6	0	0	0
Symphony Laboratories	26	66	12	0.1	0.1	0
Texas Instruments	2,019	2,789	4,052	5.1	4.9	5.3
Trident Microsystems	80	60	87	0.2	0.1	0.1
Tseng Labs	74	71	83	0.2	0.1	0.1
Universal	10	9	7	0	0	0
VLSI Technology	427	515	588	1.1	0.9	0.8
WaferScale Integration	29	25	21	0.1	0	0
Weitek	26	33	28	0.1	0.1	0
Western Digital	190	218	184	0.5	0.4	0.2
Xicor	93	105	100	0.2	0.2	0.1
Xilinx	163	231	321	0.4	0.4	0.4
Zilog	146	203	222	0.4	0.4	0.3
Other North American Companies	63	2	2	0.2	0	0

(Continued)

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
<b>Japanese Companies</b>	16,267	21,501	29,034	41.0	38.1	38.2
Fuji Electric	26	36	40	0.1	0.1	0.1
Fujitsu	1,709	2,093	2,876	4.3	3.7	3.8
Hitachi	2,461	3,513	4,799	6.2	6.2	6.3
Matsushita	834	1,037	1,328	2.1	1.8	1.7
Mitsubishi	1,423	1,867	2,584	3.6	3.3	3.4
NEC	3,599	4,768	6,361	9.1	8.5	8.4
New JRC	10	12	32	0	0	0
Nittetsu Semiconductor	120	148	160	0.3	0.3	0.2
Oki	862	1,085	1,365	2.2	1.9	1.8
Ricoh	86	135	168	0.2	0.2	0.2
Rohm	90	112	210	0.2	0.2	0.3
Sanyo	386	571	797	1.0	1.0	1.1
Seiko Epson	219	241	260	0.6	0.4	0.3
Sharp	938	1,255	1,582	2.4	2.2	2.1
Sony	435	612	1,007	1.1	1.1	1.3
Toshiba	2,879	3,636	5,015	7.3	6.4	6.6
Yamaha	190	304	363	0.5	0.5	0.5
Other Japanese Companies	0	76	87	0	0.1	0.1
<b>European Companies</b>	2,267	2,595	3,499	5.7	4.6	4.6
Austria Mikro Systeme	29	36	46	0.1	0.1	0.1
Elex	NA	NA	20	0	0	0
Elmos	NA	NA	15	0	0	0
Ericsson	15	15	15	0	0	0
European Silicon Structures	30	36	40	0.1	0.1	0.1
GEC Plessey	118	111	129	0.3	0.2	0.2
Mietec	22	25	32	0.1	0	0
Philips	646	737	1,027	1.6	1.3	1.4
SGS-Thomson	609	789	998	1.5	1.4	1.3
Siemens	632	687	1,007	1.6	1.2	1.3
TEMIC	NA	132	124	0	0.2	0.2
TCS	22	27	31	0.1	0	0
Thesys	0	0	15	0	0	0
Other European Companies	144	0	0	0.4	0	0

(Continued)

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Asia/Pacific Companies	3,458	5,494	9,032	8.7	9.7	11.9
Acer Labs	NA	50	70	0	0.1	0.1
Daewoo	7	11	21	0	0	0
Goldstar	587	862	1,606	1.5	1.5	2.1
Holttek	0	38	70	0	0.1	0.1
Hualon Microelectronics Corporation	74	76	80	0.2	0.1	0.1
Hyundai	556	853	1,521	1.4	1.5	2.0
Macronix	69	144	221	0.2	0.3	0.3
MOSEL/Vitelco	161	223	259	0.4	0.4	0.3
Samsung	1,664	2,731	4,409	4.2	4.8	5.8
Silicon Integrated Systems	40	71	101	0.1	0.1	0.1
United Microelectronics	198	309	418	0.5	0.5	0.6
Winbond Electronics	102	126	256	0.3	0.2	0.3

NA = Not available

Source: Dataquest (March 1995)

**Table 1-9**  
**Each Company's Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	15,308	23,306	33,481	100.0	100.0	100.0
North American Companies	3,593	6,253	8,406	23.5	26.8	25.1
Advanced Micro Devices	282	427	442	1.8	1.8	1.3
Alliance Semiconductor	13	41	90	0.1	0.2	0.3
AT&T	33	10	3	0.2	0	0
Atmel	99	181	331	0.6	0.8	1.0
Catalyst	40	54	49	0.3	0.2	0.1
Cypress Semiconductor	187	235	285	1.2	1.0	0.9
Dallas Semiconductor	24	38	30	0.2	0.2	0.1
Electronic Designs	9	23	26	0.1	0.1	0.1
Gould AMI	15	23	44	0.1	0.1	0.1
Harris	20	19	12	0.1	0.1	0
IBM	NA	1,133	1,520	0	4.9	4.5
Integrated Device Technology	138	189	252	0.9	0.8	0.8
Integrated Silicon Solution	NA	NA	60	0	0	0.2
Intel	324	468	458	2.1	2.0	1.4
IMP	5	2	1	0	0	0
International CMOS Technology	NA	NA	0	0	0	0
ITT	8	11	10	0.1	0	0
Logic Devices	4	4	2	0	0	0
Microchip Technology	47	64	82	0.3	0.3	0.2
Micron Technology	557	925	1,492	3.6	4.0	4.5
Motorola	610	762	948	4.0	3.3	2.8
NCR	2	2	0	0	0	0
National Semiconductor	128	172	155	0.8	0.7	0.5
Paradigm	7	34	36	0	0.1	0.1
Performance Semiconductor	16	8	5	0.1	0	0
Quality Semiconductor	9	12	7	0.1	0.1	0
Ramtron	NA	NA	15	0	0	0
SEEQ Technology	21	16	5	0.1	0.1	0
Texas Instruments	874	1,275	1,931	5.7	5.5	5.8
WaferScale Integration	22	20	15	0.1	0.1	0
Xicor	93	105	100	0.6	0.5	0.3
Other North American Companies	6	0	0	0	0	0

(Continued)

**Table 1-9 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Memory ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
<b>Japanese Companies</b>	8,008	11,180	15,519	52.3	48.0	46.4
Fujitsu	927	1,135	1,692	6.1	4.9	5.1
Hitachi	1,519	2,369	3,232	9.9	10.2	9.7
Matsushita	217	305	396	1.4	1.3	1.2
Mitsubishi	878	1,206	1,652	5.7	5.2	4.9
NEC	1,422	2,173	3,096	9.3	9.3	9.2
Nittetsu Semiconductor	120	148	160	0.8	0.6	0.5
Oki	424	486	697	2.8	2.1	2.1
Ricoh	8	21	19	0.1	0.1	0.1
Rohm	27	39	56	0.2	0.2	0.2
Sanyo	95	155	183	0.6	0.7	0.5
Seiko Epson	36	38	42	0.2	0.2	0.1
Sharp	519	697	867	3.4	3.0	2.6
Sony	197	287	387	1.3	1.2	1.2
Toshiba	1,618	2,101	3,018	10.6	9.0	9.0
Yamaha	1	1	1	0	0	0
Other Japanese Companies	0	19	21	0	0.1	0.1
<b>European Companies</b>	724	1,089	1,484	4.7	4.7	4.4
GEC Plessey	5	3	0	0	0	0
Philips	40	32	14	0.3	0.1	0
SGS-Thomson	304	467	589	2.0	2.0	1.8
Siemens	336	556	858	2.2	2.4	2.6
TEMIC	NA	31	23	0	0.1	0.1
Other European Companies	39	0	0	0.3	0	0
<b>Asia/Pacific Companies</b>	2,983	4,784	8,072	19.5	20.5	24.1
Daewoo	1	1	0	0	0	0
Goldstar	557	804	1,525	3.6	3.4	4.6
Hualon Microelectronics Corporation	29	36	46	0.2	0.2	0.1
Hyundai	556	851	1,515	3.6	3.7	4.5
Macronix	57	129	200	0.4	0.6	0.6
MOSEL/Vitellic	136	223	259	0.9	1.0	0.8
Samsung	1,516	2,512	4,194	9.9	10.8	12.6
Silicon Integrated Systems	21	5	0	0.1	0	0
United Microelectronics	64	146	191	0.4	0.6	0.6
Winbond Electronics	46	77	142	0.3	0.3	0.3

NA = Not available

Source: Dataquest (March 1995)

**Table 1-10**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	14,359	19,947	25,868	100.0	100.0	100.0
North American Companies	9,879	14,395	18,303	68.8	72.2	70.8
ACC Microelectronics	26	36	49	0.2	0.2	0.2
Adaptec	89	122	125	0.6	0.6	0.5
Advanced Micro Devices	642	563	1,021	4.5	2.8	3.9
Analog Devices	39	69	85	0.3	0.3	0.3
Appian Technology	6	7	7	0	0	0
AT&T	115	246	305	0.8	1.2	1.2
Atmel	5	5	5	0	0	0
California Micro Devices	5	6	5	0	0	0
Chips & Technologies	116	86	89	0.8	0.4	0.3
Cirrus Logic	246	371	681	1.7	1.9	2.6
Cypress Semiconductor	40	8	40	0.3	0	0.2
Cyrix	63	125	241	0.4	0.6	0.9
Dallas Semiconductor	55	56	22	0.4	0.3	0.1
DSP Semiconductor	10	8	18	0.1	0	0.1
ETEQ Microsystems	20	19	0	0.1	0.1	0
Harris	57	47	52	0.4	0.2	0.2
Hughes	2	3	3	0	0	0
IBM	NA	337	399	0	1.7	1.5
Integrated Device Technology	31	48	51	0.2	0.2	0.2
Integrated Information Technology	42	40	35	0.3	0.2	0.1
Intel	4,721	7,444	9,595	32.9	37.3	37.1
IMP	0	6	8	0	0	0
ITT	29	25	12	0.2	0.1	0
LSI Logic	51	77	78	0.4	0.4	0.3
Micro Linear	0	0	6	0	0	0
Microchip Technology	32	72	130	0.2	0.4	0.5
Motorola	1,464	2,065	2,363	10.2	10.4	9.1
NCR	71	63	81	0.5	0.3	0.3
National Semiconductor	383	477	409	2.7	2.4	1.6
Oak Technology	50	50	62	0.3	0.3	0.2
OPTi	98	86	130	0.7	0.4	0.5
Performance Semiconductor	21	18	15	0.1	0.1	0.1
Q Logic	NA	21	45	0	0.1	0.2
Rockwell	13	17	12	0.1	0.1	0

(Continued)

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
S3	31	113	130	0.2	0.6	0.5
SEEQ Technology	5	4	17	0	0	0.1
Sierra Semiconductor	1	0	35	0	0	0.1
Standard Microsystems	35	43	100	0.2	0.2	0.4
Supertex	2	2	1	0	0	0
Symphony Laboratories	26	66	12	0.2	0.3	0
Texas Instruments	530	781	1,006	3.7	3.9	3.9
Trident Microsystems	80	60	87	0.6	0.3	0.3
Tseng Labs	74	71	83	0.5	0.4	0.3
VLSI Technology	141	173	216	1.0	0.9	0.8
WaferScale Integration	6	5	3	0	0	0
Weitek	26	33	28	0.2	0.2	0.1
Western Digital	190	218	184	1.3	1.1	0.7
Zilog	146	203	222	1.0	1.0	0.9
Other North American Companies	44	0	0	0.3	0	0
<b>Japanese Companies</b>	<b>3,649</b>	<b>4,585</b>	<b>6,137</b>	<b>25.4</b>	<b>23.0</b>	<b>23.7</b>
Fuji Electric	1	1	2	0	0	0
Fujitsu	233	282	390	1.6	1.4	1.5
Hitachi	596	718	998	4.2	3.6	3.9
Matsushita	275	286	460	1.9	1.4	1.8
Mitsubishi	456	532	698	3.2	2.7	2.7
NEC	1,130	1,341	1,678	7.9	6.7	6.5
New JRC	0	0	2	0	0	0
Oki	124	180	217	0.9	0.9	0.8
Ricoh	56	89	83	0.4	0.4	0.3
Rohm	20	23	50	0.1	0.1	0.2
Sanyo	100	145	161	0.7	0.7	0.6
Seiko Epson	16	17	21	0.1	0.1	0.1
Sharp	129	170	192	0.9	0.9	0.7
Sony	73	112	194	0.5	0.6	0.7
Toshiba	440	540	718	3.1	2.7	2.8
Yamaha	0	149	273	0	0.7	1.1
<b>European Companies</b>	<b>637</b>	<b>640</b>	<b>851</b>	<b>4.4</b>	<b>3.2</b>	<b>3.3</b>
Elex	NA	NA	15	0	0	0.1
GEC Plessey	8	7	11	0.1	0	0

(Continued)



**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Philips	287	305	403	2.0	1.5	1.6
SGS-Thomson	167	162	227	1.2	0.8	0.9
Siemens	116	107	128	0.8	0.5	0.5
TEMIC	NA	44	51	0	0.2	0.2
TCS	12	15	16	0.1	0.1	0.1
Other European Companies	47	0	0	0.3	0	0
<b>Asia/Pacific Companies</b>	<b>194</b>	<b>327</b>	<b>577</b>	<b>1.4</b>	<b>1.6</b>	<b>2.2</b>
Acer Labs	NA	50	68	0	0.3	0.3
Daewoo	4	7	17	0	0	0.1
Goldstar	14	12	29	0.1	0.1	0.1
Holtek	0	18	20	0	0.1	0.1
Hualon Microelectronics Corporation	10	10	0	0.1	0.1	0
Hyundai	0	0	2	0	0	0
Macronix	12	15	21	0.1	0.1	0.1
Samsung	24	46	44	0.2	0.2	0.2
Silicon Integrated Systems	19	26	101	0.1	0.1	0.4
United Microelectronics	69	113	227	0.5	0.6	0.9
Winbond Electronics	42	30	48	0.3	0.2	0.2

NA = Not available

Source: Dataquest (March 1995)

**Table 1-11**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	10,042	13,121	16,602	100.0	100.0	100.0
North American Companies	4,245	6,136	7,677	42.3	46.8	46.2
Actel	44	60	76	0.4	0.5	0.5
Advanced Micro Devices	233	317	341	2.3	2.4	2.1
Allegro MicroSystems	4	4	5	0	0	0
Altera	102	140	199	1.0	1.1	1.2
Appian Technology	4	3	0	0	0	0
Applied Micro Circuits Corporation	10	22	21	0.1	0.2	0.1
AT&T	385	415	477	3.8	3.2	2.9
Atmel	34	37	27	0.3	0.3	0.2
Cypress Semiconductor	40	57	75	0.4	0.4	0.5
Dallas Semiconductor	10	10	102	0.1	0.1	0.6
ETEQ Microsystems	0	0	6	0	0	0
Gould AMI	34	40	61	0.3	0.3	0.4
Harris	128	138	124	1.3	1.1	0.7
Hewlett-Packard	214	230	255	2.1	1.8	1.5
Hughes	23	21	18	0.2	0.2	0.1
IBM	NA	1,040	1,116	0	7.9	6.7
IMI	15	18	18	0.1	0.1	0.1
Integrated Circuit Systems	35	29	42	0.3	0.2	0.3
Integrated Device Technology	51	66	82	0.5	0.5	0.5
Intel	35	45	26	0.3	0.3	0.2
IMP	16	0	0	0.2	0	0
International CMOS Technology	NA	NA	12	0	0	0.1
ITT	93	96	81	0.9	0.7	0.5
Lattice	90	127	134	0.9	1.0	0.8
Logic Devices	8	8	12	0.1	0.1	0.1
LSI Logic	564	642	823	5.6	4.9	5.0
Micrel	5	5	7	0	0	0
Microchip Technology	4	4	0	0	0	0
Motorola	632	785	1,214	6.3	6.0	7.3
NCR	105	165	217	1.0	1.3	1.3
National Semiconductor	203	253	253	2.0	1.9	1.5
Performance Semiconductor	9	15	0	0.1	0.1	0
Quality Semiconductor	9	10	15	0.1	0.1	0.1
QuickLogic	NA	NA	8	0	0	0

(Continued)

**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Rockwell	4	4	5	0	0	0
Sierra Semiconductor	6	6	0	0.1	0	0
Standard Microsystems	5	4	0	0	0	0
Supertex	3	3	5	0	0	0
Texas Instruments	615	733	1,115	6.1	5.6	6.7
Universal	10	9	7	0.1	0.1	0
VLSI Technology	286	342	372	2.8	2.6	2.2
WaferScale Integration	1	0	3	0	0	0
Xilinx	163	231	321	1.6	1.8	1.9
Other North American Companies	13	2	2	0.1	0	0
<b>Japanese Companies</b>	<b>4,610</b>	<b>5,736</b>	<b>7,378</b>	<b>45.9</b>	<b>43.7</b>	<b>44.4</b>
Fuji Electric	25	35	38	0.2	0.3	0.2
Fujitsu	549	676	794	5.5	5.2	4.8
Hitachi	346	426	569	3.4	3.2	3.4
Matsushita	342	446	472	3.4	3.4	2.8
Mitsubishi	89	129	234	0.9	1.0	1.4
NEC	1,047	1,254	1,587	10.4	9.6	9.6
New JRC	10	12	30	0.1	0.1	0.2
Oki	314	419	451	3.1	3.2	2.7
Ricoh	22	25	66	0.2	0.2	0.4
Rohm	43	50	104	0.4	0.4	0.6
Sanyo	191	271	453	1.9	2.1	2.7
Seiko Epson	167	186	197	1.7	1.4	1.2
Sharp	290	388	523	2.9	3.0	3.2
Sony	165	213	426	1.6	1.6	2.6
Toshiba	821	995	1,279	8.2	7.6	7.7
Yamaha	189	154	89	1.9	1.2	0.5
Other Japanese Companies	0	57	66	0	0.4	0.4
<b>European Companies</b>	<b>906</b>	<b>866</b>	<b>1,164</b>	<b>9.0</b>	<b>6.6</b>	<b>7.0</b>
Austria Mikro Systeme	29	36	46	0.3	0.3	0.3
Elex	NA	NA	5	0	0	0
Elmos	NA	NA	15	0	0	0.1
Ericsson	15	15	15	0.1	0.1	0.1
European Silicon Structures	30	36	40	0.3	0.3	0.2
GEC Plessey	105	101	118	1.0	0.8	0.7

(Continued)

**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Logic ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Mietec	22	25	32	0.2	0.2	0.2
Philips	319	400	610	3.2	3.0	3.7
SGS-Thomson	138	160	182	1.4	1.2	1.1
Siemens	180	24	21	1.8	0.2	0.1
TEMIC	NA	57	50	0	0.4	0.3
TCS	10	12	15	0.1	0.1	0.1
Thesys	0	0	15	0	0	0.1
Other European Companies	58	0	0	0.6	0	0
Asia/Pacific Companies	281	383	383	2.8	2.9	2.3
Acer Labs	NA	0	2	0	0	0
Daewoo	2	3	4	0	0	0
Goldstar	16	46	52	0.2	0.4	0.3
Holttek	0	20	50	0	0.2	0.3
Hualon Microelectronics Corporation	35	30	34	0.3	0.2	0.2
Hyundai	0	2	4	0	0	0
MOSEL/Vitellic	25	0	0	0.2	0	0
Samsung	124	173	171	1.2	1.3	1.0
Silicon Integrated Systems	0	40	0	0	0.3	0
United Microelectronics	65	50	0	0.6	0.4	0
Winbond Electronics	14	19	66	0.1	0.1	0.4

NA = Not available

Source: Dataquest (March 1995)

**Table 1-12**  
**Each Company's Factory Revenue from Shipments of Monolithic Analog ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	10,180	12,513	15,407	100.0	100.0	100.0
North American Companies	4,651	5,580	6,604	45.7	44.6	42.9
Advanced Micro Devices	110	154	187	1.1	1.2	1.2
Allegro MicroSystems	100	104	134	1.0	0.8	0.9
Analog Devices	428	526	602	4.2	4.2	3.9
Applied Micro Circuits Corporation	0	0	7	0	0	0
AT&T	275	334	402	2.7	2.7	2.6
Atmel	1	1	12	0	0	0.1
Brooktree	96	117	109	0.9	0.9	0.7
Burr-Brown	73	88	105	0.7	0.7	0.7
California Micro Devices	7	8	5	0.1	0.1	0
Catalyst	1	1	1	0	0	0
Cherry Semiconductor	46	55	77	0.5	0.4	0.5
Cirrus Logic	29	80	100	0.3	0.6	0.6
Comlinear	7	8	9	0.1	0.1	0.1
Dallas Semiconductor	8	8	0	0.1	0.1	0
Elantec	14	21	21	0.1	0.2	0.1
Exar	123	158	169	1.2	1.3	1.1
Gennum	27	30	29	0.3	0.2	0.2
Gould AMI	30	38	31	0.3	0.3	0.2
Harris	217	250	284	2.1	2.0	1.8
Honeywell	21	26	23	0.2	0.2	0.1
Hughes	12	16	19	0.1	0.1	0.1
IMI	3	3	2	0	0	0
Integrated Circuit Systems	0	12	39	0	0.1	0.3
Intel	10	12	20	0.1	0.1	0.1
IMP	11	29	40	0.1	0.2	0.3
International Rectifier	1	3	8	0	0	0.1
ITT	18	23	24	0.2	0.2	0.2
Kulite	24	24	20	0.2	0.2	0.1
Linear Technology	132	173	225	1.3	1.4	1.5
Linfinitiy	27	34	41	0.3	0.3	0.3
Maxim	93	111	165	0.9	0.9	1.1
Micrel	10	13	18	0.1	0.1	0.1
Micro Linear	33	45	35	0.3	0.4	0.2
Micro Power Systems	22	23	23	0.2	0.2	0.1

(Continued)

**Table 1-12 (Continued)**  
**Each Company's Factory Revenue from Shipments of Monolithic Analog ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Mitel	39	55	70	0.4	0.4	0.5
Motorola	528	707	924	5.2	5.7	6.0
NCR	50	45	56	0.5	0.4	0.4
National Semiconductor	705	788	891	6.9	6.3	5.8
Novasensor	13	16	13	0.1	0.1	0.1
Optek	0	0	7	0	0	0
Raytheon	38	68	78	0.4	0.5	0.5
Rockwell	155	155	160	1.5	1.2	1.0
SEEQ Technology	9	9	0	0.1	0.1	0
Semtech	2	2	5	0	0	0
Sierra Semiconductor	85	90	85	0.8	0.7	0.6
Silicon Systems	241	265	298	2.4	2.1	1.9
Sipex	3	3	2	0	0	0
Supertex	10	10	13	0.1	0.1	0.1
Telcom	NA	NA	18	0	0	0.1
Teledyne	26	26	0	0.3	0.2	0
Tektronix	34	41	0	0.3	0.3	0
Texas Instruments	492	617	842	4.8	4.9	5.5
Unitrode	52	64	73	0.5	0.5	0.5
Universal	4	5	6	0	0	0
VLSI Technology	2	2	0	0	0	0
VTC	45	70	70	0.4	0.6	0.5
Other North American Companies	109	14	7	1.1	0.1	0
Japanese Companies	3,234	3,903	4,911	31.8	31.2	31.9
Fuji Electric	9	16	27	0.1	0.1	0.2
Fujitsu	115	122	155	1.1	1.0	1.0
Hitachi	242	280	357	2.4	2.2	2.3
Matsushita	403	473	611	4.0	3.8	4.0
Mitsubishi	315	377	456	3.1	3.0	3.0
NEC	331	377	506	3.3	3.0	3.3
New JRC	113	158	173	1.1	1.3	1.1
Nittetsu Semiconductor	0	0	0	0	0	0
Oki	16	22	26	0.2	0.2	0.2
Ricoh	7	8	14	0.1	0.1	0.1
Rohm	238	258	361	2.3	2.1	2.3
Sanyo	470	633	811	4.6	5.1	5.3

(Continued)

**Table 1-12 (Continued)**  
**Each Company's Factory Revenue from Shipments of Monolithic Analog ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Seiko Epson	11	11	13	0.1	0.1	0.1
Sharp	64	87	96	0.6	0.7	0.6
Sony	339	425	465	3.3	3.4	3.0
Toko	22	28	32	0.2	0.2	0.2
Toshiba	528	615	789	5.2	4.9	5.1
Yamaha	11	13	19	0.1	0.1	0.1
<b>European Companies</b>	<b>2,026</b>	<b>2,687</b>	<b>3,489</b>	<b>19.9</b>	<b>21.5</b>	<b>22.6</b>
ABB-HAFO	25	20	20	0.2	0.2	0.1
Austria Mikro Systeme	45	49	64	0.4	0.4	0.4
EM Microelectronics Marin	45	50	65	0.4	0.4	0.4
Ericsson	57	45	49	0.6	0.4	0.3
GEC Plessey	154	114	135	1.5	0.9	0.9
Micronas	10	14	20	0.1	0.1	0.1
Mietec	91	123	146	0.9	1.0	0.9
Philips	603	752	957	5.9	6.0	6.2
SGS-Thomson	658	858	1,197	6.5	6.9	7.8
Siemens	175	382	546	1.7	3.1	3.5
TEMIC	NA	262	267	0	2.1	1.7
TCS	10	16	20	0.1	0.1	0.1
Zetex	0	2	3	0	0	0
Other European Companies	153	0	0	1.5	0	0
<b>Asia/Pacific Companies</b>	<b>269</b>	<b>343</b>	<b>403</b>	<b>2.6</b>	<b>2.7</b>	<b>2.6</b>
Daewoo	17	20	17	0.2	0.2	0.1
Goldstar	20	40	45	0.2	0.3	0.3
Holtek	0	15	0	0	0.1	0
Hualon Microelectronics Corporation	1	7	9	0	0.1	0.1
Korean Electronic Co.	30	37	47	0.3	0.3	0.3
Samsung	117	166	233	1.1	1.3	1.5
Winbond Electronics	15	58	52	0.1	0.5	0.3
Other Asia/Pacific Companies	69	0	0	0.7	0	0

NA = Not available

Source: Dataquest (March 1995)

**Table 1-13**  
**Each Company's Factory Revenue from Shipments of Hybrid ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	1,335	1,463	1,664	100.0	100.0	100.0
North American Companies	340	370	424	25.5	25.3	25.5
Analog Devices	47	40	52	3.5	2.7	3.1
Burr-Brown	54	70	60	4.0	4.8	3.6
Comlinear	8	8	7	0.6	0.5	0.4
Elantec	2	2	3	0.1	0.1	0.2
Gennum	0	0	2	0	0	0.1
Linfinity	2	3	3	0.1	0.2	0.2
Maxim	4	4	4	0.3	0.3	0.2
Mitel	13	14	30	1.0	1.0	1.8
Motorola	123	171	226	9.2	11.7	13.6
National Semiconductor	34	14	6	2.5	1.0	0.4
Semtech	2	0	0	0.1	0	0
Sipex	17	17	14	1.3	1.2	0.8
Solitron	7	0	2	0.5	0	0.1
Tektronix	8	8	0	0.6	0.5	0
Unitrode	14	14	15	1.0	1.0	0.9
Other North American Companies	5	5	0	0.4	0.3	0
Japanese Companies	869	988	1,136	65.1	67.5	68.3
Fuji Electric	16	21	22	1.2	1.4	1.3
Fujitsu	57	62	116	4.3	4.2	7.0
Hitachi	97	102	136	7.3	7.0	8.2
Mitsubishi	102	106	109	7.6	7.2	6.6
NEC	83	98	98	6.2	6.7	5.9
Oki	11	12	13	0.8	0.8	0.8
Rohm	63	68	72	4.7	4.6	4.3
Sanken	153	202	240	11.5	13.8	14.4
Sanyo	149	166	174	11.2	11.3	10.5
Shindengen Electric	44	49	48	3.3	3.3	2.9
Sony	33	36	41	2.5	2.5	2.5
Toko	8	8	8	0.6	0.5	0.5
Toshiba	53	58	59	4.0	4.0	3.5

(Continued)



**Table 1-13 (Continued)**  
**Each Company's Factory Revenue from Shipments of Hybrid ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
European Companies	126	105	104	9.4	7.2	6.3
ABB-HAFO	0	0	8	0	0	0.5
Ericsson	0	12	19	0	0.8	1.1
GEC Plessey	38	21	6	2.8	1.4	0.4
Philips	72	55	54	5.4	3.8	3.2
TEMIC	NA	2	0	0	0.1	0
Other European Companies	16	15	17	1.2	1.0	1.0

NA = Not available

Source: Dataquest (March 1995)

**Table 1-14**  
**Each Company's Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	8,155	9,083	10,758	100.0	100.0	100.0
North American Companies	2,139	2,180	2,534	26.2	24.0	23.6
Allegro MicroSystems	11	10	9	0.1	0.1	0.1
AT&T	4	4	6	0	0	0.1
General Instrument	220	239	262	2.7	2.6	2.4
Harris	115	138	187	1.4	1.5	1.7
Hewlett-Packard	48	49	99	0.6	0.5	0.9
International Rectifier	270	285	353	3.3	3.1	3.3
ITT	106	107	114	1.3	1.2	1.1
Microsemi	84	97	100	1.0	1.1	0.9
Motorola	857	994	1,097	10.5	10.9	10.2
National Semiconductor	70	77	94	0.9	0.8	0.9
Optek	2	2	1	0	0	0
Powerex	80	58	76	1.0	0.6	0.7
Raytheon	7	8	8	0.1	0.1	0.1
Semtech	16	17	20	0.2	0.2	0.2
Solitron	8	11	5	0.1	0.1	0
Supertex	9	10	11	0.1	0.1	0.1
Teccor Electronics	46	45	60	0.6	0.5	0.6
Texas Instruments	29	29	32	0.4	0.3	0.3
Unitrode	10	0	0	0.1	0	0
Other North American Companies	147	0	0	1.8	0	0
Japanese Companies	4,117	4,861	5,692	50.5	53.5	52.9
Fuji Electric	246	293	357	3.0	3.2	3.3
Fujitsu	142	157	192	1.7	1.7	1.8
Hitachi	566	662	798	6.9	7.3	7.4
Matsushita	379	450	511	4.6	5.0	4.7
Mitsubishi	284	380	424	3.5	4.2	3.9
NEC	532	579	652	6.5	6.4	6.1
New JRC	3	3	2	0	0	0
Oki	8	9	10	0.1	0.1	0.1
Rohm	343	380	524	4.2	4.2	4.9
Sanken	253	299	334	3.1	3.3	3.1
Sanyo	244	336	389	3.0	3.7	3.6
Shindengen Electric	126	162	194	1.5	1.8	1.8

(Continued)

**Table 1-14 (Continued)**  
**Each Company's Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Sony	79	89	50	1.0	1.0	0.5
Toko	29	45	51	0.4	0.5	0.5
Toshiba	883	1,017	1,204	10.8	11.2	11.2
<b>European Companies</b>	<b>1,623</b>	<b>1,767</b>	<b>2,178</b>	<b>19.9</b>	<b>19.5</b>	<b>20.2</b>
ABB-HAFO	7	6	0	0.1	0.1	0
ABB-IXYS	49	38	55	0.6	0.4	0.5
Ericsson	0	0	15	0	0	0.1
Eupec	83	82	98	1.0	0.9	0.9
Fagor	25	19	27	0.3	0.2	0.3
GEC Plessey	31	21	28	0.4	0.2	0.3
Philips	551	604	761	6.8	6.6	7.1
Semikron	103	94	112	1.3	1.0	1.0
SGS-Thomson	335	384	433	4.1	4.2	4.0
Siemens	219	229	284	2.7	2.5	2.6
TEMIC	NA	175	235	0	1.9	2.2
TCS	1	1	1	0	0	0
Westcode	35	35	41	0.4	0.4	0.4
Zetex	26	29	36	0.3	0.3	0.3
Other European Companies	158	50	52	1.9	0.6	0.5
<b>Asia/Pacific Companies</b>	<b>276</b>	<b>275</b>	<b>354</b>	<b>3.4</b>	<b>3.0</b>	<b>3.3</b>
Dongsung Semiconductor	11	2	0	0.1	0	0
Goldstar	11	0	0	0.1	0	0
Korean Electronic Co.	110	130	167	1.3	1.4	1.6
Samsung	119	143	187	1.5	1.6	1.7
Other Asia/Pacific Companies	25	0	0	0.3	0	0

NA = Not available

Source: Dataquest (March 1995)

**Table 1-15**  
**Each Company's Factory Revenue from Shipments of Optoelectronic Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Total Market	2,688	3,006	3,894	100.0	100.0	100.0
North American Companies	495	523	703	18.4	17.4	18.1
AT&T	39	41	51	1.5	1.4	1.3
Hewlett-Packard	187	190	360	7.0	6.3	9.2
Honeywell	27	27	32	1.0	0.9	0.8
Motorola	36	41	45	1.3	1.4	1.2
Optek	55	54	48	2.0	1.8	1.2
Quality Technologies	46	47	49	1.7	1.6	1.3
Tektronix	5	5	0	0.2	0.2	0
Texas Instruments	42	54	49	1.6	1.8	1.3
Other North American Companies	58	64	69	2.2	2.1	1.8
Japanese Companies	1,849	2,162	2,798	68.8	71.9	71.9
Fujitsu	117	123	135	4.4	4.1	3.5
Hitachi	60	67	89	2.2	2.2	2.3
Matsushita	315	358	417	11.7	11.9	10.7
Mitsubishi	23	30	176	0.9	1.0	4.5
NEC	110	118	150	4.1	3.9	3.9
New JRC	12	13	11	0.4	0.4	0.3
Oki	26	28	24	1.0	0.9	0.6
Rohm	110	112	178	4.1	3.7	4.6
Sanken	20	32	34	0.7	1.1	0.9
Sanyo	136	137	150	5.1	4.6	3.9
Sharp	352	418	510	13.1	13.9	13.1
Sony	216	236	313	8.0	7.9	8.0
Toshiba	255	326	421	9.5	10.8	10.8
Other Japanese Companies	97	164	190	3.6	5.5	4.9
European Companies	296	264	379	11.0	8.8	9.7
ABB-HAFO	8	8	12	0.3	0.3	0.3
Ericsson	0	0	15	0	0	0.4
Siemens	179	170	220	6.7	5.7	5.6
TEMIC	NA	54	94	0	1.8	2.4
TCS	20	21	26	0.7	0.7	0.7
Zetex	1	1	1	0	0	0
Other European Companies	88	10	11	3.3	0.3	0.3

(Continued)

**Table 1-15 (Continued)**  
**Each Company's Factory Revenue from Shipments of Optoelectronic Semiconductors to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1992	1993	1994	1992	1993	1994
Asia/Pacific Companies	48	57	14	1.8	1.9	0.4
Korean Electronic Co.	8	10	11	0.3	0.3	0.3
Samsung	0	4	3	0	0.1	0.1
Other Asia/Pacific Companies	40	43	0	1.5	1.4	0

NA = Not available

Source: Dataquest (March 1995)

## Section 2: Final 1994 Worldwide Semiconductor Market Share Rankings

**Table 2-1**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World, Including Hybrids (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Intel	7,970	10,099	27	9.1
2	2	NEC	6,141	7,961	30	7.2
3	4	Toshiba	5,727	7,556	32	6.8
4	3	Motorola	5,957	7,238	22	6.6
5	5	Hitachi	5,015	6,644	32	6.0
6	6	Texas Instruments	4,083	5,552	36	5.0
7	7	Samsung	3,044	4,832	59	4.4
8	8	Fujitsu	2,928	3,869	32	3.5
9	9	Mitsubishi	2,823	3,772	34	3.4
10	10	IBM	2,510	3,035	21	2.7
11	12	Philips	2,300	2,920	27	2.6
12	11	Matsushita	2,344	2,896	24	2.6
13	14	SGS-Thomson	2,038	2,640	30	2.4
14	15	Sanyo	1,843	2,321	26	2.1
15	16	Sharp	1,760	2,188	24	2.0
16	17	Advanced Micro Devices	1,660	2,134	29	1.9
17	18	Siemens	1,509	2,090	39	1.9
18	13	National Semiconductor	2,060	2,023	-2	1.8
19	19	Sony	1,398	1,876	34	1.7
20	22	Goldstar	946	1,697	79	1.5
21	25	Hyundai	853	1,521	78	1.4
22	24	Micron Technology	925	1,492	61	1.3
23	20	Oki	1,187	1,471	24	1.3
24	23	Rohm	930	1,345	45	1.2
25	21	AT&T	1,110	1,307	18	1.2
26	26	LSI Logic	719	901	25	0.8
27	33	Cirrus Logic	451	781	73	0.7
28	27	Analog Devices	635	739	16	0.7
29	28	TEMIC	625	720	15	0.7
30	32	Hewlett-Packard	469	714	52	0.6
31	29	Harris	605	665	10	0.6
32	30	Sanken	533	608	14	0.5
33	31	VLSI Technology	517	588	14	0.5
34	34	Fuji Electric	366	446	22	0.4

(Continued)

**Table 2-1 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World, Including Hybrids (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
35	36	United Microelectronics	309	418	35	0.4
36	38	Cypress Semiconductor	300	400	33	0.4
37	37	Integrated Device Technology	303	385	27	0.3
38	35	Yamaha	317	382	21	0.3
39	47	Atmel	225	375	67	0.3
40	40	International Rectifier	288	361	25	0.3
		All Others	9,795	11,618	19	10.5
		North American Companies	37,087	46,118	24	41.7
		Japanese Companies	34,573	44,778	30	40.5
		European Companies	7,645	9,835	29	8.9
		Asia/Pacific Companies	6,213	9,849	59	8.9
		Total Market	85,518	110,580	29	100.0

Source: Dataquest (March 1995)

**Table 2-2**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World, Excluding Hybrids (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Intel	7,970	10,099	27	9.3
2	2	NEC	6,043	7,863	30	7.2
3	4	Toshiba	5,669	7,497	32	6.9
4	3	Motorola	5,786	7,012	21	6.4
5	5	Hitachi	4,913	6,508	32	6.0
6	6	Texas Instruments	4,083	5,552	36	5.1
7	7	Samsung	3,044	4,832	59	4.4
8	8	Fujitsu	2,866	3,753	31	3.4
9	9	Mitsubishi	2,717	3,663	35	3.4
10	10	IBM	2,510	3,035	21	2.8
11	11	Matsushita	2,344	2,896	24	2.7
12	12	Philips	2,245	2,866	28	2.6
13	14	SGS-Thomson	2,038	2,640	30	2.4
14	15	Sharp	1,760	2,188	24	2.0
15	16	Sanyo	1,677	2,147	28	2.0
16	17	Advanced Micro Devices	1,660	2,134	29	2.0
17	18	Siemens	1,509	2,090	39	1.9
18	13	National Semiconductor	2,046	2,017	-1	1.9
19	19	Sony	1,362	1,835	35	1.7
20	22	Goldstar	946	1,697	79	1.6
21	25	Hyundai	853	1,521	78	1.4
22	23	Micron Technology	925	1,492	61	1.4
23	20	Oki	1,175	1,458	24	1.3
24	21	AT&T	1,110	1,307	18	1.2
25	24	Rohm	862	1,273	48	1.2
26	26	LSI Logic	719	901	25	0.8
27	32	Cirrus Logic	451	781	73	0.7
28	27	TEMIC	623	720	16	0.7
29	31	Hewlett-Packard	469	714	52	0.7
30	29	Analog Devices	595	687	15	0.6
31	28	Harris	605	665	10	0.6
32	30	VLSI Technology	517	588	14	0.5
33	33	Fuji Electric	345	424	23	0.4
34	36	United Microelectronics	309	418	35	0.4
35	38	Cypress Semiconductor	300	400	33	0.4
36	37	Integrated Device Technology	303	385	27	0.4
37	35	Yamaha	317	382	21	0.4

(Continued)



**Table 2-2 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Semiconductors to the World, Excluding Hybrids (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	47	Atmel	225	375	67	0.3
39	34	Sanken	331	368	11	0.3
40	39	International Rectifier	288	361	25	0.3
		All Others	9,545	11,372	19	10.4
		North American Companies	36,717	45,694	24	42.0
		Japanese Companies	33,585	43,642	30	40.1
		European Companies	7,540	9,731	29	8.9
		Asia/Pacific Companies	6,213	9,849	59	9.0
		Total Market	84,055	108,916	30	100.0

Source: Dataquest (March 1995)

**Table 2-3**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Intel	7,970	10,099	27	10.5
2	2	NEC	5,444	7,159	32	7.5
3	3	Motorola	4,922	6,096	24	6.4
4	4	Toshiba	4,384	5,931	35	6.2
5	5	Hitachi	4,286	5,757	34	6.0
6	6	Texas Instruments	4,000	5,471	37	5.7
7	7	Samsung	2,897	4,642	60	4.8
8	8	Fujitsu	2,648	3,542	34	3.7
9	10	Mitsubishi	2,413	3,172	31	3.3
10	9	IBM	2,510	3,035	21	3.2
11	14	SGS-Thomson	1,654	2,207	33	2.3
12	12	Philips	1,696	2,159	27	2.3
13	13	Advanced Micro Devices	1,660	2,134	29	2.2
14	15	Matsushita	1,536	1,968	28	2.1
15	11	National Semiconductor	1,983	1,929	-3	2.0
16	16	Sanyo	1,370	1,782	30	1.9
17	22	Goldstar	946	1,697	79	1.8
18	17	Sharp	1,342	1,678	25	1.7
19	19	Siemens	1,110	1,586	43	1.7
20	24	Hyundai	853	1,521	78	1.6
21	20	Sony	1,073	1,513	41	1.6
22	23	Micron Technology	925	1,492	61	1.6
23	18	Oki	1,150	1,437	25	1.5
24	21	AT&T	1,065	1,250	17	1.3
25	25	LSI Logic	719	901	25	0.9
26	29	Cirrus Logic	451	781	73	0.8
27	26	Analog Devices	635	739	16	0.8
28	30	Rohm	438	643	47	0.7
29	27	VLSI Technology	517	588	14	0.6
30	28	Harris	467	478	2	0.5
31	33	United Microelectronics	309	418	35	0.4
32	35	Cypress Semiconductor	300	400	33	0.4
33	31	TEMIC	396	391	-1	0.4
34	34	Integrated Device Technology	303	385	27	0.4
35	32	Yamaha	317	382	21	0.4
36	42	Atmel	225	375	67	0.4
37	36	NCR	275	354	29	0.4

(Continued)

**Table 2-3 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World, Including Hybrids (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	40	Xilinx	231	321	39	0.3
39	47	Winbond	184	308	67	0.3
40	38	Silicon Systems	265	298	12	0.3
		All Others	7,560	8,909	18	9.3
		North American Companies	34,384	42,881	25	44.7
		Japanese Companies	27,550	36,288	32	37.8
		European Companies	5,614	7,278	30	7.6
		Asia/Pacific Companies	5,881	9,481	61	9.9
		Total Market	73,429	95,928	31	100.0

Source: Dataquest (March 1995)

**Table 2-4**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Intel	7,970	10,099	27	10.7
2	2	NEC	5,346	7,061	32	7.5
3	4	Toshiba	4,326	5,872	36	6.3
4	3	Motorola	4,751	5,870	24	6.2
5	5	Hitachi	4,184	5,621	34	6.0
6	6	Texas Instruments	4,000	5,471	37	5.8
7	7	Samsung	2,897	4,642	60	4.9
8	8	Fujitsu	2,586	3,426	32	3.6
9	10	Mitsubishi	2,307	3,063	33	3.2
10	9	IBM	2,510	3,035	21	3.2
11	13	SGS-Thomson	1,654	2,207	33	2.3
12	12	Advanced Micro Devices	1,660	2,134	29	2.3
13	14	Philips	1,641	2,105	28	2.2
14	15	Matsushita	1,536	1,968	28	2.1
15	11	National Semiconductor	1,969	1,923	-2	2.0
16	22	Goldstar	946	1,697	79	1.8
17	16	Sharp	1,342	1,678	25	1.8
18	17	Sanyo	1,204	1,608	34	1.7
19	19	Siemens	1,110	1,586	43	1.7
20	24	Hyundai	853	1,521	78	1.6
21	23	Micron Technology	925	1,492	61	1.6
22	21	Sony	1,037	1,472	42	1.6
23	18	Oki	1,138	1,424	25	1.5
24	20	AT&T	1,065	1,250	17	1.3
25	25	LSI Logic	719	901	25	1.0
26	29	Cirrus Logic	451	781	73	0.8
27	26	Analog Devices	595	687	15	0.7
28	27	VLSI Technology	517	588	14	0.6
29	31	Rohm	370	571	54	0.6
30	28	Harris	467	478	2	0.5
31	33	United Microelectronics	309	418	35	0.4
32	35	Cypress Semiconductor	300	400	33	0.4
33	30	TEMIC	394	391	-1	0.4
34	34	Integrated Device Technology	303	385	27	0.4
35	32	Yamaha	317	382	21	0.4
36	42	Atmel	225	375	67	0.4
37	36	NCR	275	354	29	0.4

(Continued)

**Table 2-4 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Integrated Circuits to the World, Excluding Hybrids (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	40	Xilinx	231	321	39	0.3
39	46	Winbond	184	308	67	0.3
40	37	Silicon Systems	265	298	12	0.3
		All Others	7,087	8,401	19	8.9
		North American Companies	34,014	42,457	25	45.0
		Japanese Companies	26,562	35,152	32	37.3
		European Companies	5,509	7,174	30	7.6
		Asia/Pacific Companies	5,881	9,481	61	10.1
		Total Market	71,966	94,264	31	100.0

Source: Dataquest (March 1995)

**Table 2-5**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Digital ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Texas Instruments	594	577	-3	19.9
2	3	Hitachi	391	465	19	16.0
3	2	Motorola	432	421	-3	14.5
4	4	Fujitsu	371	395	6	13.6
5	5	National Semiconductor	279	215	-23	7.4
6	6	NEC	201	194	-3	6.7
7	7	Advanced Micro Devices	199	143	-28	4.9
8	8	Philips	152	121	-20	4.2
9	9	Toshiba	75	68	-9	2.3
10	11	AT&T	60	63	5	2.2
11	12	Goldstar	44	46	5	1.6
12	13	Siemens	41	33	-20	1.1
13	14	Oki	31	33	6	1.1
14	16	Matsushita	26	29	12	1.0
15	10	Mitsubishi	63	23	-63	0.8
16	15	Raytheon	27	22	-19	0.8
17	17	Applied Micro Circuits Corporation	26	20	-23	0.7
18	18	GEC Plessey	23	16	-30	0.6
19	20	SGS-Thomson	7	12	71	0.4
20	19	Harris	13	6	-54	0.2
		All Others	24	4	-83	0.1
		North American Companies	1,650	1,467	-11	50.5
		Japanese Companies	1,158	1,207	4	41.5
		European Companies	227	186	-18	6.4
		Asia/Pacific Companies	44	46	5	1.6
		Total Market	3,079	2,906	-6	100.0

Source: Dataquest (March 1995)

**Table 2-6**  
**Top 9 Companies' Factory Revenue from Shipments of Bipolar Digital Memory ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Hitachi	85	93	9	47.0
2	2	Fujitsu	81	32	-60	16.2
3	3	Advanced Micro Devices	39	28	-28	14.1
4	4	NEC	16	16	0	8.1
5	8	Philips	3	14	367	7.1
6	5	Raytheon	6	5	-17	2.5
7	9	Texas Instruments	3	5	67	2.5
8	6	National Semiconductor	5	4	-20	2.0
9	10	Motorola	2	1	-50	0.5
		All Others	4	0	-100	0
		North American Companies	59	43	-27	21.7
		Japanese Companies	182	141	-23	71.2
		European Companies	3	14	367	7.1
		Asia/Pacific Companies	0	0		0
		Total Market	244	198	-19	100.0

Source: Dataquest (March 1995)

**Table 2-7**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Logic ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Texas Instruments	591	572	-3	21.1
2	2	Motorola	430	420	-2	15.5
3	3	Hitachi	306	372	22	13.7
4	4	Fujitsu	290	363	25	13.4
5	5	National Semiconductor	274	211	-23	7.8
6	6	NEC	185	178	-4	6.6
7	7	Advanced Micro Devices	160	115	-28	4.2
8	8	Philips	149	107	-28	4.0
9	9	Toshiba	75	68	-9	2.5
10	11	AT&T	60	63	5	2.3
11	12	Goldstar	44	46	5	1.7
12	13	Siemens	41	33	-20	1.2
13	14	Oki	31	33	6	1.2
14	15	Matsushita	26	29	12	1.1
15	10	Mitsubishi	63	23	-63	0.8
16	16	Applied Micro Circuits Corporation	26	20	-23	0.7
17	18	Raytheon	21	17	-19	0.6
18	17	GEC Plessey	23	16	-30	0.6
19	20	SGS-Thomson	7	12	71	0.4
20	19	Harris	9	6	-33	0.2
		All Others	24	4	-83	0.1
		North American Companies	1,591	1,424	-10	52.6
		Japanese Companies	976	1,066	9	39.4
		European Companies	224	172	-23	6.4
		Asia/Pacific Companies	44	46	5	1.7
		Total Market	2,835	2,708	-4	100.0

Source: Dataquest (March 1995)



**Table 2-8**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital ICs to**  
**the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Intel	7,957	10,079	27	13.3
2	2	NEC	4,768	6,361	33	8.4
3	3	Toshiba	3,636	5,015	38	6.6
4	5	Hitachi	3,513	4,799	37	6.3
5	4	Motorola	3,612	4,525	25	6.0
6	7	Samsung	2,731	4,409	61	5.8
7	6	Texas Instruments	2,789	4,052	45	5.3
8	8	IBM	2,510	3,035	21	4.0
9	9	Fujitsu	2,093	2,876	37	3.8
10	10	Mitsubishi	1,867	2,584	38	3.4
11	11	Advanced Micro Devices	1,307	1,804	38	2.4
12	17	Goldstar	862	1,606	86	2.1
13	12	Sharp	1,255	1,582	26	2.1
14	18	Hyundai	853	1,521	78	2.0
15	15	Micron Technology	925	1,492	61	2.0
16	13	Oki	1,085	1,365	26	1.8
17	14	Matsushita	1,037	1,328	28	1.7
18	20	Philips	737	1,027	39	1.4
19	22	Siemens	687	1,007	47	1.3
20	24	Sony	612	1,007	65	1.3
21	19	SGS-Thomson	789	998	26	1.3
22	21	LSI Logic	719	901	25	1.2
23	16	National Semiconductor	902	817	-9	1.1
24	25	Sanyo	571	797	40	1.0
25	23	AT&T	671	785	17	1.0
26	27	Cirrus Logic	371	681	84	0.9
27	26	VLSI Technology	515	588	14	0.8
28	28	United Microelectronics	309	418	35	0.6
29	31	Cypress Semiconductor	300	400	33	0.5
30	30	Integrated Device Technology	303	385	27	0.5
31	29	Yamaha	304	363	19	0.5
32	36	Atmel	223	363	63	0.5
33	33	Xilinx	231	321	39	0.4
34	34	NCR	230	298	30	0.4
35	32	Seiko Epson	241	260	8	0.3
36	37	MOSel/Vitellic	223	259	16	0.3
37	49	Winbond	126	256	103	0.3

(Continued)

**Table 2-8 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	35	Hewlett-Packard	230	255	11	0.3
39	50	Cyrix	125	241	93	0.3
40	40	Zilog	203	222	9	0.3
		All Others	3,952	4,869	23	6.4
		North American Companies	26,784	34,386	28	45.3
		Japanese Companies	21,501	29,034	35	38.4
		European Companies	2,595	3,499	35	4.6
		Asia/Pacific Companies	5,494	9,032	64	11.9
		Total Market	56,374	75,951	35	100.0

Source: Dataquest (March 1995)

**Table 2-9**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Samsung	2,512	4,194	67	12.5
2	2	Hitachi	2,369	3,232	36	9.7
3	3	NEC	2,173	3,096	42	9.2
4	4	Toshiba	2,101	3,018	44	9.0
5	5	Texas Instruments	1,275	1,931	51	5.8
6	7	Fujitsu	1,135	1,692	49	5.1
7	6	Mitsubishi	1,206	1,652	37	4.9
8	11	Goldstar	804	1,525	90	4.6
9	8	IBM	1,133	1,520	34	4.5
10	10	Hyundai	851	1,515	78	4.5
11	9	Micron Technology	925	1,492	61	4.5
12	12	Motorola	762	948	24	2.8
13	13	Sharp	697	867	24	2.6
14	14	Siemens	556	858	54	2.6
15	15	Oki	486	697	43	2.1
16	17	SGS-Thomson	467	589	26	1.8
17	16	Intel	468	458	-2	1.4
18	18	Advanced Micro Devices	427	442	4	1.3
19	19	Matsushita	305	396	30	1.2
20	20	Sony	287	387	35	1.2
21	24	Atmel	181	331	83	1.0
22	21	Cypress Semiconductor	235	285	21	0.9
23	22	MOSel/Vitelc	223	259	16	0.8
24	23	Integrated Device Technology	189	252	33	0.8
25	29	Macronix	129	200	55	0.6
26	28	United Microelectronics	146	191	31	0.6
27	26	Sanyo	155	183	18	0.5
28	27	Nittetsu Semiconductor	148	160	8	0.5
29	25	National Semiconductor	172	155	-10	0.5
30	31	Winbond	77	142	84	0.4
31	30	Xicor	105	100	-5	0.3
32	34	Alliance Semiconductor	41	90	120	0.3
33	32	Microchip Technology	64	82	28	0.2
34	NA	Integrated Silicon Solution	NA	60	NM	0.2
35	35	Rohm	39	56	44	0.2
36	33	Catalyst	54	49	-9	0.1
37	38	Hualon Microelectronics Corporation	36	46	28	0.1

(Continued)

**Table 2-9 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	42	Gould AMI	23	44	91	0.1
39	36	Seiko Epson	38	42	11	0.1
40	39	Paradigm	34	36	6	0.1
		All Others	278	209	-25	0.6
		North American Companies	6,253	8,406	34	25.1
		Japanese Companies	11,180	15,519	39	46.4
		European Companies	1,089	1,484	36	4.4
		Asia/Pacific Companies	4,784	8,072	69	24.2
		Total Market	23,306	33,481	44	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (March 1995)

**Table 2-10**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Intel	7,444	9,595	29	37.1
2	2	Motorola	2,065	2,363	14	9.1
3	3	NEC	1,341	1,678	25	6.5
4	6	Advanced Micro Devices	563	1,021	81	3.9
5	4	Texas Instruments	781	1,006	29	3.9
6	5	Hitachi	718	998	39	3.9
7	7	Toshiba	540	718	33	2.8
8	8	Mitsubishi	532	698	31	2.7
9	10	Cirrus Logic	371	681	84	2.6
10	13	Matsushita	286	460	61	1.8
11	9	National Semiconductor	477	409	-14	1.6
12	12	Philips	305	403	32	1.6
13	11	IBM	337	399	18	1.5
14	14	Fujitsu	282	390	38	1.5
15	15	AT&T	246	305	24	1.2
16	22	Yamaha	149	273	83	1.1
17	24	Cyrix	125	241	93	0.9
18	21	SGS-Thomson	162	227	40	0.9
19	26	United Microelectronics	113	227	101	0.9
20	17	Zilog	203	222	9	0.9
21	18	Oki	180	217	21	0.8
22	19	VLSI Technology	173	216	25	0.8
23	28	Sony	112	194	73	0.7
24	20	Sharp	170	192	13	0.7
25	16	Western Digital	218	184	-16	0.7
26	23	Sanyo	145	161	11	0.6
27	27	S3	113	130	15	0.5
28	31	OPTi	86	130	51	0.5
29	34	Microchip Technology	72	130	81	0.5
30	29	Siemens	107	128	20	0.5
31	25	Adaptec	122	125	2	0.5
32	52	Silicon Integrated Systems	26	101	288	0.4
33	47	Standard Microsystems	43	100	133	0.4
34	32	Chips & Technologies	86	89	3	0.3
35	39	Trident Microsystems	60	87	45	0.3
36	36	Analog Devices	69	85	23	0.3
37	30	Ricoh	89	83	-7	0.3

(Continued)

**Table 2-10 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponent ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	35	Tseng Labs	71	83	17	0.3
39	38	NCR	63	81	29	0.3
40	33	LSI Logic	77	78	1	0.3
		All Others	825	960	16	3.7
		North American Companies	14,395	18,303	27	70.8
		Japanese Companies	4,585	6,137	34	23.7
		European Companies	640	851	33	3.3
		Asia/Pacific Companies	327	577	76	2.2
		Total Market	19,947	25,868	30	100.0

Source: Dataquest (March 1995)

**Table 2-11**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	NEC	1,254	1,587	27	9.6
2	3	Toshiba	995	1,279	29	7.7
3	4	Motorola	785	1,214	55	7.3
4	2	IBM	1,040	1,116	7	6.7
5	5	Texas Instruments	733	1,115	52	6.7
6	7	LSI Logic	642	823	28	5.0
7	6	Fujitsu	676	794	17	4.8
8	12	Philips	400	610	53	3.7
9	9	Hitachi	426	569	34	3.4
10	13	Sharp	388	523	35	3.2
11	11	AT&T	415	477	15	2.9
12	8	Matsushita	446	472	6	2.8
13	16	Sanyo	271	453	67	2.7
14	10	Okidata	419	451	8	2.7
15	20	Sony	213	426	100	2.6
16	14	VLSI Technology	342	372	9	2.2
17	15	Advanced Micro Devices	317	341	8	2.1
18	18	Xilinx	231	321	39	1.9
19	19	Hewlett-Packard	230	255	11	1.5
20	17	National Semiconductor	253	253	0	1.5
21	28	Mitsubishi	129	234	81	1.4
22	23	NCR	165	217	32	1.3
23	26	Altera	140	199	42	1.2
24	21	Seiko Epson	186	197	6	1.2
25	24	SGS-Thomson	160	182	14	1.1
26	22	Samsung	173	171	-1	1.0
27	29	Lattice	127	134	6	0.8
28	27	Harris	138	124	-10	0.7
29	30	GEC Plessey	101	118	17	0.7
30	36	Rohm	50	104	108	0.6
31	60	Dallas Semiconductor	10	102	920	0.6
32	25	Yamaha	154	89	-42	0.5
33	32	Integrated Device Technology	66	82	24	0.5
34	31	ITT	96	81	-16	0.5
35	33	Actel	60	76	27	0.5
36	34	Cypress Semiconductor	57	75	32	0.5
37	48	Ricoh	25	66	164	0.4

(Continued)

**Table 2-11 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	54	Winbond	19	66	247	0.4
39	40	Gould AMI	40	61	53	0.4
40	38	Goldstar	46	52	13	0.3
		All Others	703	721	3	4.3
		North American Companies	6,136	7,677	25	46.2
		Japanese Companies	5,736	7,378	29	44.4
		European Companies	866	1,164	34	7.1
		Asia/Pacific Companies	383	383	0	2.3
		Total Market	13,121	16,602	27	100.0

Source: Dataquest (March 1995)



**Table 2-12**  
**Top 40 Companies' Factory Revenue from Shipments of Monolithic Analog ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	SGS-Thomson	858	1,197	40	7.8
2	3	Philips	752	957	27	6.2
3	4	Motorola	707	924	31	6.0
4	2	National Semiconductor	788	891	13	5.8
5	6	Texas Instruments	617	842	36	5.5
6	5	Sanyo	633	811	28	5.3
7	7	Toshiba	615	789	28	5.1
8	9	Matsushita	473	611	29	4.0
9	8	Analog Devices	526	602	14	3.9
10	11	Siemens	382	546	43	3.5
11	12	NEC	377	506	34	3.3
12	10	Sony	425	465	9	3.0
13	13	Mitsubishi	377	456	21	3.0
14	14	AT&T	334	402	20	2.6
15	18	Rohm	258	361	40	2.3
16	15	Hitachi	280	357	28	2.3
17	16	Silicon Systems	265	298	12	1.9
18	19	Harris	250	284	14	1.8
19	17	TEMIC	262	267	2	1.7
20	21	Samsung	166	233	40	1.5
21	20	Linear Technology	173	225	30	1.5
22	25	Advanced Micro Devices	154	187	21	1.2
23	22	New JRC	158	173	9	1.1
24	23	Exar	158	169	7	1.1
25	30	Maxim	111	165	49	1.1
26	24	Rockwell	155	160	3	1.0
27	27	Fujitsu	122	155	27	1.0
28	26	Mietec	123	146	19	0.9
29	29	GEC Plessey	114	135	18	0.9
30	31	Allegro MicroSystems	104	134	29	0.9
31	28	Brooktree	117	109	-7	0.7
32	33	Burr-Brown	88	105	19	0.7
33	35	Cirrus Logic	80	100	25	0.6
34	34	Sharp	87	96	10	0.6
35	32	Sierra Semiconductor	90	85	-6	0.6
36	37	Raytheon	68	78	15	0.5
37	40	Cherry Semiconductor	55	77	40	0.5

(Continued)

**Table 2-12 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Monolithic Analog ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	38	Unitrode	64	73	14	0.5
39	36	VTC	70	70	0	0.5
40	41	Mitel	55	70	27	0.5
		All Others	1,022	1,096	7	7.1
		North American Companies	5,580	6,604	18	42.9
		Japanese Companies	3,903	4,911	26	31.9
		European Companies	2,687	3,489	30	22.6
		Asia/Pacific Companies	343	403	17	2.6
		Total Market	12,513	15,407	23	100.0

Source: Dataquest (March 1995)

**Table 2-13**  
**Top 10 Companies' Factory Revenue from Shipments of Hybrid ICs to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Sarcken	202	240	19	14.4
2	2	Motorola	171	226	32	13.6
3	3	Sanyo	166	174	5	10.5
4	5	Hitachi	102	136	33	8.2
5	9	Fujitsu	62	116	87	7.0
6	4	Mitsubishi	106	109	3	6.6
7	6	NEC	98	98	0	5.9
8	8	Rohm	68	72	6	4.3
9	7	Burr-Brown	70	60	-14	3.6
10	10	Toshiba	58	59	2	3.5
		All Others	360	374	4	22.5
		North American Companies	370	424	15	25.5
		Japanese Companies	988	1,136	15	68.3
		European Companies	105	104	-1	6.3
		Asia/Pacific Companies	0	0		0
		Total Market	1,463	1,664	14	100.0

Source: Dataquest (March 1995)

**Table 2-14**  
**Top 40 Companies' Factory Revenue from Shipments of Discrete Semiconductors to**  
**the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank	Company	1993		1994		Percentage Change	1994 Market Share (%)
			Revenue	Revenue	Revenue	Revenue		
1	1	Toshiba	1,017	1,204	18	11.2		
2	2	Motorola	994	1,097	10	10.2		
3	3	Hitachi	662	798	21	7.4		
4	4	Philips	604	761	26	7.1		
5	5	NEC	579	652	13	6.1		
6	8	Rohm	380	524	38	4.9		
7	6	Matsushita	450	511	14	4.7		
8	7	SGS-Thomson	384	433	13	4.0		
9	9	Mitsubishi	360	424	12	3.9		
10	10	Sanyo	336	389	16	3.6		
11	12	Fuji Electric	293	357	22	3.3		
12	13	International Rectifier	285	353	24	3.3		
13	11	Sanken	299	334	12	3.1		
14	15	Siemens	229	284	24	2.6		
15	14	General Instrument	239	262	10	2.4		
16	16	TEMIC	175	235	34	2.2		
17	17	Shindengen Electric	162	194	20	1.8		
18	18	Fujitsu	157	192	22	1.8		
19	19	Samsung	143	187	31	1.7		
20	20	Harris	138	187	36	1.7		
21	21	Korean Electronic Co.	130	167	28	1.6		
22	22	ITT	107	114	7	1.1		
23	24	Semikron	94	112	19	1.0		
24	23	Microsemi	97	100	3	0.9		
25	29	Hewlett-Packard	49	99	102	0.9		
26	26	Eupac	82	98	20	0.9		
27	27	National Semiconductor	77	94	22	0.9		
28	28	Powerex	58	76	31	0.7		
29	30	Teccor Electronics	45	60	33	0.6		
30	32	ABB-DVYS	38	55	45	0.5		
31	31	Toko	45	51	13	0.5		
32	25	Sony	89	50	-44	0.5		
33	33	Westcode	35	41	17	0.4		
34	34	Zetex	29	36	24	0.3		
35	35	Texas Instruments	29	32	10	0.3		
36	36	GEC Plessey	21	28	33	0.3		
37	37	Fagor	19	27	42	0.3		

(Continued)

**Table 2-14 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Discrete Semiconductors to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
38	38	Semtech	17	20	18	0.2
39	NA	Ericsson	NA	15	NM	0.1
40	40	Supertex	10	11	10	0.1
		All Others	106	94	-11	0.9
		North American Companies	2,180	2,534	16	23.6
		Japanese Companies	4,861	5,692	17	52.9
		European Companies	1,767	2,178	23	20.2
		Asia/Pacific Companies	275	354	29	3.3
		Total Market	9,083	10,758	18	100.0

NA = Not available

NM = Not meaningful

Source: Dataquest (March 1995)

**Table 2-15**  
**Top 20 Companies' Factory Revenue from Shipments of Optoelectronic Semiconductors to the World (Millions of U.S. Dollars)**

1994 Rank	1993 Rank		1993 Revenue	1994 Revenue	Percentage Change	1994 Market Share (%)
1	1	Sharp	418	510	22	13.1
2	3	Toshiba	326	421	29	10.8
3	2	Matsushita	358	417	16	10.7
4	5	Hewlett-Packard	190	360	89	9.2
5	4	Sony	236	313	33	8.0
6	6	Siemens	170	220	29	5.6
7	10	Rohm	112	178	59	4.6
8	19	Mitsubishi	30	176	487	4.5
9	7	Sanyo	137	150	9	3.9
10	9	NEC	118	150	27	3.9
11	8	Fujitsu	123	135	10	3.5
12	12	TEMIC	54	94	74	2.4
13	11	Hitachi	67	89	33	2.3
14	16	AT&T	41	51	24	1.3
15	13	Texas Instruments	54	49	-9	1.3
16	15	Quality Technologies	47	49	4	1.3
17	14	Optek	54	48	-11	1.2
18	17	Motorola	41	45	10	1.2
19	18	Sanken	32	34	6	0.9
20	21	Honeywell	27	32	19	0.8
		All Others	371	373	1	9.6
		North American Companies	523	703	34	18.1
		Japanese Companies	2,162	2,798	29	71.9
		European Companies	264	379	44	9.7
		Asia/Pacific Companies	57	14	-75	0.4
		Total Market	3,006	3,894	30	100.0

Source: Dataquest (March 1995)

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**For More Information...**

Sue Kapoor, Market Research Analyst .....(408) 437-8505  
Internet address ..... skapoor@dataquest.com  
Via fax.....(408) 437-0292

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The Dun & Bradstreet Corporation

SEMI-WW-MS-9501  
Ms. Sue Kapoor  
Dataquest Incorporated  
1-8500

Qty: 1

# Dataquest

 a company of  
The Dun & Bradstreet Corporation

--INTERNAL DIST.--

Corporate Headquarters  
Dataquest Incorporated  
1290 Ridder Park Drive  
San Jose, California 95131-2398  
United States  
Phone: 1-408-437-8000  
Facsimile: 1-408-437-0292

Dataquest Incorporated  
Nine Technology Drive  
Westborough, Massachusetts 01581-5093  
United States  
Phone: 1-508-871-5555  
Facsimile: 1-508-871-6180

European Headquarters  
Dataquest Europe Limited  
Holmers Farm Way  
High Wycombe, Buckinghamshire  
HP12 4XH  
United Kingdom  
Phone: 44-1494-422722  
Facsimile: 44-1494-422742

Dataquest GmbH  
Kronstadter Strasse 9  
81677 München  
Germany  
Phone: 49-89-930-9090  
Facsimile: 49-89-930-3277

Dataquest Europe SA  
Immeuble Défense Bergères  
345, avenue Georges Clémenceau  
TSA 40002  
92882 - Nanterre CTC Cedex 9  
France  
Phone: 33-1-41-35-13-00  
Facsimile: 33-1-41-35-13-13

Japan Headquarters  
Dataquest Japan K.K.  
Shinkawa Sanko Building, 6th Floor  
1-3-17, Shinkawa, Chuo-ku  
Tokyo 104  
Japan  
Phone: 81-3-5566-0411  
Facsimile: 81-3-5566-0425

Asia/Pacific Headquarters  
7/F China Underwriters Centre  
88 Gloucester Road  
Wan Chai  
Hong Kong  
Phone: 852-2824-6168  
Facsimile: 852-2824-6138

Dataquest Korea  
2506 Trade Tower  
159 Samsung-dong  
Kangnam-gu, Seoul 135-729  
Korea  
Phone: 822-551-1331  
Facsimile: 822-551-1330

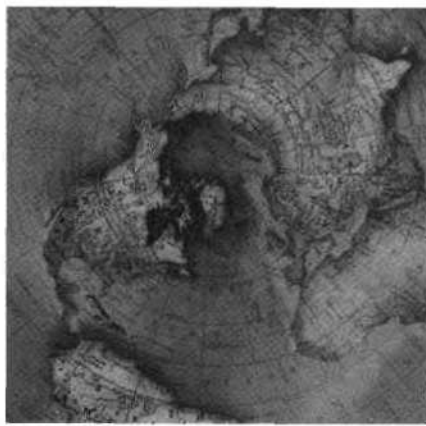
Dataquest Taiwan  
3/F, No. 87 Sung Chiang Road  
Taipei 10428  
Taiwan, R.O.C.  
Phone: 8862-509-5390  
Facsimile: 8862-509-4234

Dataquest ICC (conferences)  
3990 Westerly Place, Suite 100  
Newport Beach, California 92660  
United States  
Phone: 1-714-476-9117  
Facsimile: 1-714-476-9969

Other research offices in Beijing,  
Singapore, and Thailand

Sales agents in Australia, Belgium,  
Germany (Kronberg), Israel, Italy,  
South Africa, and Spain





# Dataquest

## Final 1995 Worldwide Semiconductor Market Share



### Market Statistics

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**Program:** Semiconductors Worldwide  
**Product Code:** SEMI-WW-MS-9603  
**Publication Date:** April 29, 1996  
**Filing:** Market Statistics

# Final 1995 Worldwide Semiconductor Market Share



Market Statistics

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**Program:** Semiconductors Worldwide  
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Note: All tables show estimated data.

# Final 1995 Worldwide Semiconductor Market Share

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## Introduction

This document contains detailed information on Dataquest's view of the semiconductor market. Included in this document are the following:

- 1993-1995 market share estimates
- 1994-1995 market share rankings

Worldwide market share estimates combine data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. market consumption or revenue are based on the average exchange rate for the given year. Refer to the section titled "Exchange Rates" for more information regarding these average rates. As a rule, Dataquest's estimates are calculated in local currencies and then converted to U.S. dollars.

More detailed data on this market may be requested through Dataquest's client inquiry service. Qualitative analysis of this data is provided in the Dataquest Perspectives.

## Segmentation

This section outlines the market segments that are specific to this document. Dataquest's objective is to provide data along lines of segmentation that is logical, appropriate to the industry in question, and immediately useful to clients.

Dataquest defines the semiconductor industry as the group of competing companies primarily engaged in manufacturing semiconductors and related solid-state devices. Important products of the semiconductor industry include integrated circuits, discrete devices, and optoelectronics devices.

For market share purposes, Dataquest defines the semiconductor market according to the following functional segmentation scheme:

- Total Semiconductor (Including Hybrids)
- Total Semiconductor (Excluding Hybrids)
  - Total Monolithic Integrated Circuit (Including Hybrids)
  - Total Monolithic Integrated Circuit (Excluding Hybrids)
    - Bipolar Digital IC
    - Bipolar Memory
    - Bipolar Logic
    - MOS Digital IC
    - MOS Memory
    - MOS Microcomponent
    - MOS Logic
    - Monolithic Analog IC
    - Hybrid IC

Discrete Semiconductor  
Optoelectronic Semiconductor

## Definitions

This section lists the definitions that are used by Dataquest to present the data in this document. For a complete listing of all semiconductor market segments tracked by Dataquest, please refer to the Dataquest Semiconductor Market Definitions Guide.

### Product Definitions

**Total Semiconductor** (Total Monolithic Integrated Circuit + Total Discrete + Total Optoelectronic). Defined as an active semiconductor product that contains semiconducting material (such as silicon, germanium, or gallium arsenide, but excluding ceramics) and reacts dynamically to an input signal, either by modifying its shape or adding energy to it. This definition excludes standalone passive components, such as capacitors, resistors, inductors, oscillators, crystals, transformers, and relays.

**Total Monolithic Integrated Circuit** (Digital Monolithic Bipolar IC + Digital Monolithic MOS IC + Analog IC). An IC is defined as a large number of passive and/or active discrete semiconductor circuits integrated into a single package. A monolithic IC is one in which discrete circuits are integrated onto a single die.

**Bipolar Digital IC** (Bipolar Digital Memory + Bipolar Digital Microcomponent + Bipolar Digital Logic). A bipolar digital IC is defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, 100 percent of the die area is manufactured using bipolar semiconductor technology. A digital function is one in which data-carrying signals vary in discrete values.

**Bipolar Digital Memory**. Defined as a bipolar digital semiconductor product in which binary data is stored and electronically retrieved. Includes ECL random-access memory (RAM), read-only memory (ROM), programmable ROM (PROM), last-in/first-out (LIFO) memory, and first-in/first-out (FIFO) memory. Not included are products made with mixed bipolar CMOS (that is, BiCMOS) with TTL or ECL outputs, which are classified as MOS.

**Bipolar Digital Logic** (Bipolar Application-Specific IC + Bipolar Digital Standard Logic + Other Bipolar Logic). Defined as a bipolar digital semiconductor product in which more than 50 percent of the die area performs logic functions. Excludes bipolar digital microcomponent ICs.

**MOS Digital IC** (MOS Digital Memory + MOS Digital Microcomponent + MOS Digital Logic). Defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and, concurrently, where any portion of the die area is manufactured using metal oxide semiconductor (MOS) technology. A digital function is one in which data-carrying signals vary in discrete values. Includes mixed technology manufacturing, such as BiMOS and BiCMOS, where there is some MOS technology employed.

MOS Digital Memory (DRAM + SRAM + EPROM + EEPROM + Flash Memory + Mask ROM + Other MOS Digital Memory). Defined as a MOS digital IC in which binary data is stored and electronically retrieved.

MOS Digital Microcomponent IC (MOS Digital Microprocessor + MOS Digital Microcontroller + MOS Digital Microperipheral + Programmable Digital Signal Processor). Defined as a MOS digital IC that contains a data processing unit or serves as an interface to such a unit.

MOS Digital Logic IC (MOS Digital Logic Application-Specific IC + MOS Digital Standard Logic IC + Other MOS Digital Logic IC). Defined as an MOS digital IC in which more than 50 percent of the die area performs logic functions. Excludes MOS digital microcomponent ICs.

Total Analog IC (Amplifier/Comparator IC + Voltage Regulator/reference IC + Data Converter/Switch/Multiplexer IC + Interface IC + Telecom IC + Disk Drive IC + Other Special-Function IC + Linear Array/ASIC + Mixed-Signal ASIC + Total Special Consumer IC + Special Automotive IC + Smart Power IC). An analog IC is a semiconductor product that deals in the realm of electrical signal processing, power control, or electrical drive capability. It is one in which some of the inputs or outputs can be defined in terms of continuously or linearly variable voltages, currents, or frequencies. Includes only monolithic analog ICs manufactured using bipolar, MOS, or BiCMOS technologies. A monolithic IC is a single die contained in a single package.

Hybrid Integrated Circuit. Defined as a semiconductor product consisting of more than one die contained in a single package. A hybrid IC may perform 100 percent linear, 100 percent digital, or mixed-signal (both linear and digital) functions. Includes hybrid implementation of all monolithic IC functions described in the following categories. Includes all hybrid ICs manufactured using bipolar, MOS, or BiCMOS technologies.

Total Discrete (Transistor + Diode + Thyristor + Other Discrete). A discrete semiconductor is defined as a unit building block performing a fundamental semiconductor function.

Total Optoelectronic (LED Lamp/Display + Optocoupler + CCD + Laser Diode + Photosensor + Other Optoelectronic). Defined as a semiconductor product in which photons induce the flow of electrons, or vice versa. Other functions may also be integrated onto the product. This category does not include LCD, incandescent displays, fluorescent displays, cathode ray tubes (CRTs), or plasma displays.



## **Regional Definitions**

### **Americas**

North America: Includes Canada, Mexico, and the United States (50 states)

South America

Central America

### **Japan**

Japan is the only single-country region.

### **Europe, Africa, and the Middle East**

Western Europe: Includes Austria, Belgium, Denmark, Eire (Ireland), Finland, France, Germany (including former East Germany), Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and Rest of Western Europe (Andorra, Cyprus, Gibraltar, Liechtenstein, Monaco, San Marino, Vatican City, Iceland, Malta, and Turkey).

Eastern Europe: Includes Albania, Bulgaria, the Czech Republic and Slovakia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the republics of the former Yugoslavia, and the republics of the former USSR (Belarus, Russian Federation, Ukraine, Georgia, Moldavia, Armenia, Azerbaijan, Kazakhstan, Uzbekistan, Tadjikistan, Kyrgyzstan, and Turkmenistan).

### **Asia/Pacific**

Includes Hong Kong, Singapore, South Korea, Taiwan, Australia, Bangladesh, Cambodia, China, India, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam.

## **Line Item Definitions**

Factory revenue is defined as the money value received by a semiconductor manufacturer for its products. Revenue from the sale of semiconductors sold either as finished goods, dies, or wafers to another semiconductor vendor for resale is attributed to the semiconductor vendor that sells the product to a distributor or equipment manufacturer.

Merchant versus captive consumption: Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. The data excludes completely captive suppliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

## **Market Share Methodology**

Dataquest uses both primary and secondary sources to produce market statistics data. In the fourth quarter of each year, Dataquest surveys all major participants within each industry. Selected companies are resurveyed during the first quarter of the following year to verify final annual

results. This primary research is supplemented with additional primary research and secondary research to verify market size, shipment totals, and pricing information. Sources of data used by Dataquest include the following:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data (such as WSTS, MITI, and U.S. DOC)
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and CD-ROM data banks
- Articles in both the general and trade press
- Reports from financial analysts
- End-user surveys

Dataquest believes that the estimates presented in this document are the most accurate and meaningful statistics available.

Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Dataquest and those provided by other sources.

## Notes on Market Share

In the process of conducting data collection and preparing market statistics information, Dataquest will sometimes consolidate or revise a particular company, model, series, or industry's numbers. In this section, we explain any such changes contained within this document for your reference.

### Notes to Market Share Tables

1. Appian Technology product lines were acquired by Cirrus Logic in 1994.
2. Dialog, Eurosil, Matra, Telefunken, and Siliconix are now known as Temic.
3. LG Semicon was formerly known as Goldstar.

4. IMP was formerly known as International Microelectronic Products.
5. Inmos revenue is included in SGS-Thomson revenue.
6. LInfinity was formerly known as Silicon General.
7. NCR was acquired by Hyundai in 1994 and is operated as Symbios Logic Inc.
8. Nippon Steel Semiconductor was formerly known as NMB Semiconductor.
9. Philips revenue includes Signetics revenue.
10. Thomson Semiconductors Specific (TCS) was formed through the merger of Thomson Composants Microndes (TCM) and Thomson Composants Militaires et Spatiaux (TMS).
11. The following companies were added to worldwide market share tables starting in 1994 and may result in higher 1994 market growth rates in certain product areas:
  - Integrated Silicon Solution Inc.
  - Ramtron
  - Quick Logic
  - International CMOS Technology
12. In 1994, three quarters of Intel's PLD Division's revenue is included in Intel's revenue and the last quarter's revenue is included in Altera's revenue to accurately reflect the sale of the PLD Division.
13. Telcom was formerly known as Teledyne Semiconductor.
14. Tektronix's revenue is now included with Maxim's revenue.
15. Part of IBM's 1994 and 1995 logic revenue has been reclassified and restated.
16. Rockwell's 1994 revenue has been restated.
17. National Semiconductor's 1994 revenue has been restated.
18. Comlinear revenue is included in National Semiconductor's revenue.
19. Silicon Storage Technology has been added to worldwide market share starting in 1995.

## Exchange Rates

Dataquest uses an average annual exchange rate in converting revenue to U.S. dollar amounts. Table 1 outlines these rates for 1993 through 1995.

**Table 1**  
**Exchange Rates**

	1993	1994	1995
Japan (Yen/U.S.\$)	111.20	101.81	93.90
France (Franc/U.S.\$)	5.67	5.54	4.97
Germany (Deutsche Mark/U.S.\$)	1.66	1.62	1.43
United Kingdom (U.S.\$/Pound Sterling)	1.50	1.53	1.59

Source: Dataquest (April 1996)

## Section 1: Final 1995 Worldwide Market Share

**Table 1-1**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	85,514	110,513	151,272	100.0	100.0	100.0
North American Companies	37,083	46,052	59,956	43.4	41.7	39.6
ACC Microelectronics	36	49	40	0	0	0
Actel	60	76	108	0.1	0.1	0.1
Adaptec	122	125	124	0.1	0.1	0.1
Advanced Micro Devices	1,660	2,134	2,330	1.9	1.9	1.5
Allegro MicroSystems	118	148	183	0.1	0.1	0.1
Alliance Semiconductor	41	90	220	0	0.1	0.1
Altera	140	199	402	0.2	0.2	0.3
Analog Devices	635	739	986	0.7	0.7	0.7
Applied Micro Circuits Corp.	48	48	48	0.1	0	0
AT&T	1,110	1,307	1,615	1.3	1.2	1.1
Atmel	225	375	590	0.3	0.3	0.4
Bipolar Integrated Technology	15	0	0	0	0	0
Brooktree	117	109	120	0.1	0.1	0.1
Burr-Brown	158	165	186	0.2	0.1	0.1
California Micro Devices	14	10	12	0	0	0
Catalyst	55	50	49	0.1	0	0
Cherry Semiconductor	55	77	87	0.1	0.1	0.1
Chips & Technologies	89	89	138	0.1	0.1	0.1
Cirrus Logic	451	781	1,002	0.5	0.7	0.7
Comlinear	16	16	-	0	0	0
Cypress Semiconductor	300	400	552	0.4	0.4	0.4
Cyrix	125	241	212	0.1	0.2	0.1
Dallas Semiconductor	112	154	228	0.1	0.1	0.2
Elantec	23	24	26	0	0	0
Electronic Designs	23	26	43	0	0	0
ETEQ Microsystems	19	6	7	0	0	0
Exar	158	169	146	0.2	0.2	0.1
General Instrument	239	262	414	0.3	0.2	0.3
Gennum	30	31	36	0	0	0
Gould AMI	101	136	72	0.1	0.1	0
Harris	605	665	681	0.7	0.6	0.5
Hewlett-Packard	469	714	648	0.5	0.6	0.4

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Honeywell	53	55	64	0.1	0	0
Hughes	40	40	36	0	0	0
IBM	2,510	2,532	3,522	2.9	2.3	2.3
IMI	21	20	35	0	0	0
IMP	37	49	55	0	0	0
Integrated Circuit Systems	41	81	96	0	0.1	0.1
Integrated Device Technology	303	385	617	0.4	0.3	0.4
Integrated Information Technology	40	35	44	0	0	0
Integrated Silicon Solutions Inc.	0	60	158	0	0.1	0.1
Intel	7,970	10,099	13,172	9.3	9.1	8.7
International CMOS Technology	0	12	17	0	0	0
International Rectifier	288	361	487	0.3	0.3	0.3
ITT	262	241	319	0.3	0.2	0.2
Kulite	24	20	24	0	0	0
Lattice	127	134	186	0.1	0.1	0.1
Level One Communications	0	-	78	0	0	0.1
Linear Technology	173	225	305	0.2	0.2	0.2
Linfinity	37	44	51	0	0	0
Logic Devices	12	14	18	0	0	0
LSI Logic	719	901	1,268	0.8	0.8	0.8
Maxim	115	169	190	0.1	0.2	0.1
Micrel	18	25	25	0	0	0
Micro Linear	45	41	54	0.1	0	0
Micro Power Systems	23	23	-	0	0	0
Microchip Technology	140	212	271	0.2	0.2	0.2
Micron Technology	925	1,492	2,601	1.1	1.4	1.7
Microsemi	97	100	118	0.1	0.1	0.1
Mitel	69	100	88	0.1	0.1	0.1
Motorola	5,957	7,238	8,732	7.0	6.5	5.8
Natel Engineering	12	0	0	0	0	0
National Semiconductor	2,060	2,127	2,408	2.4	1.9	1.6
Novasensor	16	13	15	0	0	0
Oak Technology	50	62	84	0.1	0.1	0.1
Optek	56	56	63	0.1	0.1	0
OPTi	86	130	167	0.1	0.1	0.1
Performance Semiconductor	41	20	28	0	0	0
Powerex	58	76	98	0.1	0.1	0.1

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Q Logic	21	45	60	0	0	0
Quality Semiconductor	22	22	46	0	0	0
Quality Technologies	47	49	60	0.1	0	0
QuickLogic	0	8	16	0	0	0
Ramtron	0	15	24	0	0	0
Raytheon	103	108	123	0.1	0.1	0.1
Rockwell	176	514	744	0.2	0.5	0.5
S3	113	130	315	0.1	0.1	0.2
Seeq Technology	29	22	27	0	0	0
Semtech	19	25	48	0	0	0
Sierra Semiconductor	96	120	141	0.1	0.1	0.1
Silicon Systems	265	298	368	0.3	0.3	0.2
Sipex	20	16	16	0	0	0
Silicon Storage Technology	0	-	35	0	0	0
Solitron	11	7	8	0	0	0
Standard Microsystems	47	100	150	0.1	0.1	0.1
Supertex	25	30	36	0	0	0
Symbios	275	354	395	0.3	0.3	0.3
Symphony Laboratories	66	12	15	0.1	0	0
Teccor Electronics	45	60	69	0.1	0.1	0
Tektronix	54	0	0	0.1	0	0
Telcom	0	18	17	0	0	0
Teledyne	26	0	0	0	0	0
Texas Instruments	4,079	5,548	7,831	4.8	5.0	5.2
Trident Microsystems	60	87	139	0.1	0.1	0.1
Tseng Labs	71	83	105	0.1	0.1	0.1
Unitrode	78	88	102	0.1	0.1	0.1
Universal	14	13	15	0	0	0
VLSI Technology	517	588	673	0.6	0.5	0.4
VTC	70	70	155	0.1	0.1	0.1
WaferScale Integration	25	21	36	0	0	0
Weitek	33	28	37	0	0	0
Western Digital	218	184	239	0.3	0.2	0.2
Xicor	105	100	114	0.1	0.1	0.1
Xilinx	231	321	520	0.3	0.3	0.3
Zilog	203	222	265	0.2	0.2	0.2
Other North American Companies	125	139	214	0.1	0.1	0.1

(Continued)

**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
<b>Japanese Companies</b>	<b>34,573</b>	<b>44,778</b>	<b>60,612</b>	<b>40.4</b>	<b>40.5</b>	<b>40.1</b>
Fuji Electric	366	446	566	0.4	0.4	0.4
Fujitsu	2,928	3,869	5,538	3.4	3.5	3.7
Hitachi	5,015	6,644	9,137	5.9	6.0	6.0
Matsushita	2,344	2,896	3,476	2.7	2.6	2.3
Mitsubishi	2,823	3,772	5,272	3.3	3.4	3.5
NEC	6,141	7,961	11,314	7.2	7.2	7.5
New JRC	186	218	237	0.2	0.2	0.2
Nippon Steel Semiconductor	148	160	549	0.2	0.1	0.4
Oki	1,187	1,471	2,029	1.4	1.3	1.3
Ricoh	143	182	213	0.2	0.2	0.1
Rohm	930	1,345	1,933	1.1	1.2	1.3
Sanken	533	608	733	0.6	0.6	0.5
Sanyo	1,843	2,321	2,714	2.2	2.1	1.8
Seiko Epson	252	273	314	0.3	0.2	0.2
Shindengen Electric	211	242	328	0.2	0.2	0.2
Sharp	1,760	2,188	2,592	2.1	2.0	1.7
Sony	1,398	1,876	2,338	1.6	1.7	1.5
Toko	81	91	113	0.1	0.1	0.1
Toshiba	5,727	7,556	10,077	6.7	6.8	6.7
Yamaha	317	382	444	0.4	0.3	0.3
Other Japanese Companies	240	277	694	0.3	0.3	0.5
<b>European Companies</b>	<b>7,645</b>	<b>9,834</b>	<b>12,903</b>	<b>8.9</b>	<b>8.9</b>	<b>8.5</b>
ABB-Hafo	34	40	38	0	0	0
ABB-Ixys	38	55	64	0	0	0
Austria Mikro Systeme	85	110	148	0.1	0.1	0.1
Elex	0	20	33	0	0	0
Elmos	0	15	19	0	0	0
EM Microelectronics Marin	50	65	78	0.1	0.1	0.1
Ericsson	72	113	120	0.1	0.1	0.1
Eupec	82	98	120	0.1	0.1	0.1
European Silicon Structures	36	40	59	0	0	0
Fagor	19	27	38	0	0	0
GEC Plessey	290	314	368	0.3	0.3	0.2
Micronas	14	20	43	0	0	0
Mietec	148	178	179	0.2	0.2	0.1
Philips	2,300	2,920	3,901	2.7	2.6	2.6

(Continued)



**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Semikron	94	112	126	0.1	0.1	0.1
SGS-Thomson	2,038	2,640	3,397	2.4	2.4	2.2
Siemens	1,509	2,090	3,062	1.8	1.9	2.0
TEMIC	625	719	774	0.7	0.7	0.5
TCS	65	78	100	0.1	0.1	0.1
Thesys	0	15	20	0	0	0
Westcode	35	41	54	0	0	0
Zetex	32	40	56	0	0	0
Other European Companies	79	84	106	0.1	0.1	0.1
Asia/Pacific Companies	6,213	9,849	17,802	7.3	8.9	11.8
Acer	50	70	80	0.1	0.1	0.1
Daewoo	31	38	48	0	0	0
Dongsung Semiconductor	2	0	0	0	0	0
Holttek	53	70	87	0.1	0.1	0.1
Hualon Microelectronics Corp.	83	89	107	0.1	0.1	0.1
Hyundai	853	1,521	4,132	1.0	1.4	2.7
Korean Electronics Company	177	225	288	0.2	0.2	0.2
LG Semicon	946	1,697	2,863	1.1	1.5	1.9
Macronix	144	221	271	0.2	0.2	0.2
Mosel Vitelic	223	259	502	0.3	0.2	0.3
Samsung	3,044	4,832	8,329	3.6	4.4	5.5
Silicon Integrated Systems	71	101	127	0.1	0.1	0.1
United Microelectronics Corp.	309	418	477	0.4	0.4	0.3
Winbond Electronics	184	308	491	0.2	0.3	0.3
Other Asia/Pacific Companies	43	0	0	0.1	0	0

Source: Dataquest (April 1996)

**Table 1-2**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	84,051	108,848	149,336	100.0	100.0	100.0
North American Companies	36,713	45,627	59,489	43.7	41.9	39.8
ACC Microelectronics	36	49	40	0	0	0
Actel	60	76	108	0.1	0.1	0.1
Adaptec	122	125	124	0.1	0.1	0.1
Advanced Micro Devices	1,660	2,134	2,330	2.0	2.0	1.6
Allegro MicroSystems	118	148	171	0.1	0.1	0.1
Alliance Semiconductor	41	90	220	0	0.1	0.1
Altera	140	199	402	0.2	0.2	0.3
Analog Devices	595	687	927	0.7	0.6	0.6
Applied Micro Circuits Corp.	48	48	48	0.1	0	0
AT&T	1,110	1,307	1,615	1.3	1.2	1.1
Atmel	225	375	590	0.3	0.3	0.4
Bipolar Integrated Technology	15	0	0	0	0	0
Brooktree	117	109	120	0.1	0.1	0.1
Burr-Brown	88	105	126	0.1	0.1	0.1
California Micro Devices	14	10	12	0	0	0
Catalyst	55	50	49	0.1	0	0
Cherry Semiconductor	55	77	87	0.1	0.1	0.1
Chips & Technologies	89	89	138	0.1	0.1	0.1
Cirrus Logic	451	781	1,002	0.5	0.7	0.7
Comlinear	8	9	-	0	0	0
Cypress Semiconductor	300	400	552	0.4	0.4	0.4
Cyrix	125	241	212	0.1	0.2	0.1
Dallas Semiconductor	112	154	228	0.1	0.1	0.2
Elantec	21	21	23	0	0	0
Electronic Designs	23	26	43	0	0	0
ETEQ Microsystems	19	6	7	0	0	0
Exar	158	169	146	0.2	0.2	0.1
General Instrument	239	262	414	0.3	0.2	0.3
Gennum	30	29	34	0	0	0
Gould AMI	101	136	72	0.1	0.1	0
Harris	605	665	681	0.7	0.6	0.5
Hewlett-Packard	469	714	648	0.6	0.7	0.4
Honeywell	53	55	64	0.1	0.1	0
Hughes	40	40	36	0	0	0
IBM	2,510	2,532	3,522	3.0	2.3	2.4

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
IMI	21	20	35	0	0	0
IMP	37	49	55	0	0	0
Integrated Circuit Systems	41	81	96	0	0.1	0.1
Integrated Device Technology	303	385	617	0.4	0.4	0.4
Integrated Information Technology	40	35	44	0	0	0
Integrated Silicon Solutions Inc.	0	60	158	0	0.1	0.1
Intel	7,970	10,099	13,172	9.5	9.3	8.8
International CMOS Technology	0	12	17	0	0	0
International Rectifier	288	361	487	0.3	0.3	0.3
ITT	262	241	319	0.3	0.2	0.2
Kulite	24	20	24	0	0	0
Lattice	127	134	186	0.2	0.1	0.1
Level One Communications	0	-	78	0	0	0.1
Linear Technology	173	225	305	0.2	0.2	0.2
Linfinity	34	41	48	0	0	0
Logic Devices	12	14	18	0	0	0
LSI Logic	719	901	1,268	0.9	0.8	0.8
Maxim	111	165	186	0.1	0.2	0.1
Micrel	18	25	25	0	0	0
Micro Linear	45	41	54	0.1	0	0
Micro Power Systems	23	23	-	0	0	0
Microchip Technology	140	212	271	0.2	0.2	0.2
Micron Technology	925	1,492	2,601	1.1	1.4	1.7
Microsemi	97	100	118	0.1	0.1	0.1
Mitel	55	70	68	0.1	0.1	0
Motorola	5,786	7,012	8,452	6.9	6.4	5.7
Natel Engineering	7	0	0	0	0	0
National Semiconductor	2,046	2,120	2,400	2.4	1.9	1.6
Novasensor	16	13	15	0	0	0
Oak Technology	50	62	84	0.1	0.1	0.1
Optek	56	56	63	0.1	0.1	0
OPTi	86	130	167	0.1	0.1	0.1
Performance Semiconductor	41	20	28	0	0	0
Powerex	58	76	98	0.1	0.1	0.1
Q Logic	21	45	60	0	0	0
Quality Semiconductor	22	22	46	0	0	0
Quality Technologies	47	49	60	0.1	0	0

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
QuickLogic	0	8	16	0	0	0
Ramtron	0	15	24	0	0	0
Raytheon	103	108	123	0.1	0.1	0.1
Rockwell	176	514	744	0.2	0.5	0.5
S3	113	130	315	0.1	0.1	0.2
Seeq Technology	29	22	27	0	0	0
Semtech	19	25	48	0	0	0
Sierra Semiconductor	96	120	141	0.1	0.1	0.1
Silicon Systems	265	298	368	0.3	0.3	0.2
Sipex	3	2	2	0	0	0
Silicon Storage Technology	0	-	35	0	0	0
Solitron	11	5	6	0	0	0
Standard Microsystems	47	100	150	0.1	0.1	0.1
Supertex	25	30	36	0	0	0
Symbios	275	354	395	0.3	0.3	0.3
Symphony Laboratories	66	12	15	0.1	0	0
Teccor Electronics	45	60	69	0.1	0.1	0
Tektronix	46	0	0	0.1	0	0
Telcom	0	18	17	0	0	0
Teledyne	26	0	0	0	0	0
Texas Instruments	4,079	5,548	7,831	4.9	5.1	5.2
Trident Microsystems	60	87	139	0.1	0.1	0.1
Tseng Labs	71	83	105	0.1	0.1	0.1
Unitrode	64	73	102	0.1	0.1	0.1
Universal	14	13	15	0	0	0
VLSI Technology	517	588	673	0.6	0.5	0.5
VTC	70	70	155	0.1	0.1	0.1
WaferScale Integration	25	21	36	0	0	0
Weitek	33	28	37	0	0	0
Western Digital	218	184	239	0.3	0.2	0.2
Xicor	105	100	114	0.1	0.1	0.1
Xilinx	231	321	520	0.3	0.3	0.3
Zilog	203	222	265	0.2	0.2	0.2
Other North American Companies	125	139	214	0.1	0.1	0.1

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Japanese Companies	33,585	43,642	59,242	40.0	40.1	39.7
Fuji Electric	345	424	543	0.4	0.4	0.4
Fujitsu	2,866	3,753	5,389	3.4	3.4	3.6
Hitachi	4,913	6,508	9,000	5.8	6.0	6.0
Matsushita	2,344	2,896	3,476	2.8	2.7	2.3
Mitsubishi	2,717	3,663	5,074	3.2	3.4	3.4
NEC	6,043	7,863	11,184	7.2	7.2	7.5
New JRC	186	218	237	0.2	0.2	0.2
Nippon Steel Semiconductor	148	160	549	0.2	0.1	0.4
Oki	1,175	1,458	2,017	1.4	1.3	1.4
Ricoh	143	182	213	0.2	0.2	0.1
Rohm	862	1,273	1,855	1.0	1.2	1.2
Sanken	331	368	450	0.4	0.3	0.3
Sanyo	1,677	2,147	2,520	2.0	2.0	1.7
Seiko Epson	252	273	314	0.3	0.3	0.2
Shindengen Electric	162	194	300	0.2	0.2	0.2
Sharp	1,760	2,188	2,592	2.1	2.0	1.7
Sony	1,362	1,835	2,297	1.6	1.7	1.5
Toko	73	83	105	0.1	0.1	0.1
Toshiba	5,669	7,497	10,003	6.7	6.9	6.7
Yamaha	317	382	444	0.4	0.4	0.3
Other Japanese Companies	240	277	680	0.3	0.3	0.5
European Companies	7,540	9,730	12,803	9.0	8.9	8.6
ABB-Hafo	34	32	33	0	0	0
ABB-Ixys	38	55	64	0	0.1	0
Austria Mikro Systeme	85	110	148	0.1	0.1	0.1
Elex	0	20	33	0	0	0
Elmos	0	15	19	0	0	0
EM Microelectronics Marin	50	65	78	0.1	0.1	0.1
Ericsson	60	94	105	0.1	0.1	0.1
Eupec	82	98	120	0.1	0.1	0.1
European Silicon Structures	36	40	59	0	0	0
Fagor	19	27	38	0	0	0
GEC Plessey	269	308	365	0.3	0.3	0.2
Micronas	14	20	33	0	0	0
Mietec	148	178	179	0.2	0.2	0.1
Philips	2,245	2,866	3,855	2.7	2.6	2.6

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Semikron	94	112	126	0.1	0.1	0.1
SGS-Thomson	2,038	2,640	3,397	2.4	2.4	2.3
Siemens	1,509	2,090	3,062	1.8	1.9	2.1
TEMIC	623	719	774	0.7	0.7	0.5
TCS	65	78	100	0.1	0.1	0.1
Thesys	0	15	20	0	0	0
Westcode	35	41	54	0	0	0
Zetex	32	40	56	0	0	0
Other European Companies	64	67	85	0.1	0.1	0.1
Asia/Pacific Companies	6,213	9,849	17,802	7.4	9.0	11.9
Acer	50	70	80	0.1	0.1	0.1
Daewoo	31	38	48	0	0	0
Dongsung Semiconductor	2	0	0	0	0	0
Holtek	53	70	87	0.1	0.1	0.1
Hualon Microelectronics Corp.	83	89	107	0.1	0.1	0.1
Hyundai	853	1,521	4,132	1.0	1.4	2.8
Korean Electronics Company	177	225	288	0.2	0.2	0.2
LG Semicon	946	1,697	2,863	1.1	1.6	1.9
Macronix	144	221	271	0.2	0.2	0.2
Mosel Vitelic	223	259	502	0.3	0.2	0.3
Samsung	3,044	4,832	8,329	3.6	4.4	5.6
Silicon Integrated Systems	71	101	127	0.1	0.1	0.1
United Microelectronics Corp.	309	418	477	0.4	0.4	0.3
Winbond Electronics	184	308	491	0.2	0.3	0.3
Other Asia/Pacific Companies	43	0	0	0.1	0	0

Source: Dataquest (April 1996)

**Table 1-3**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	73,429	95,861	132,437	100.0	100.0	100.0
North American Companies	34,384	42,814	56,045	46.8	44.7	42.3
ACC Microelectronics	36	49	40	0	0.1	0
Actel	60	76	108	0.1	0.1	0.1
Adaptec	122	125	124	0.2	0.1	0.1
Advanced Micro Devices	1,660	2,134	2,330	2.3	2.2	1.8
Allegro MicroSystems	108	139	158	0.1	0.1	0.1
Alliance Semiconductor	41	90	220	0.1	0.1	0.2
Altera	140	199	402	0.2	0.2	0.3
Analog Devices	635	739	986	0.9	0.8	0.7
Applied Micro Circuits Corp.	48	48	48	0.1	0.1	0
AT&T	1,065	1,250	1,534	1.5	1.3	1.2
Atmel	225	375	590	0.3	0.4	0.4
Bipolar Integrated Technology	15	0	0	0	0	0
Brooktree	117	109	120	0.2	0.1	0.1
Burr-Brown	158	165	186	0.2	0.2	0.1
California Micro Devices	14	10	12	0	0	0
Catalyst	55	50	49	0.1	0.1	0
Cherry Semiconductor	55	77	87	0.1	0.1	0.1
Chips & Technologies	89	89	138	0.1	0.1	0.1
Cirrus Logic	451	781	1,002	0.6	0.8	0.8
Comlinear	16	16	-	0	0	0
Cypress Semiconductor	300	400	552	0.4	0.4	0.4
Cyrix	125	241	212	0.2	0.3	0.2
Dallas Semiconductor	112	154	228	0.2	0.2	0.2
Elantec	23	24	26	0	0	0
Electronic Designs	23	26	43	0	0	0
ETEQ Microsystems	19	6	7	0	0	0
Exar	158	169	146	0.2	0.2	0.1
Gennum	30	31	36	0	0	0
Gould AMI	101	136	72	0.1	0.1	0.1
Harris	467	478	454	0.6	0.5	0.3
Hewlett-Packard	230	255	343	0.3	0.3	0.3
Honeywell	26	23	27	0	0	0
Hughes	40	40	36	0.1	0	0
IBM	2,510	2,532	3,522	3.4	2.6	2.7
IMI	21	20	35	0	0	0

(Continued)

**Table 1-3 (Continued)**

**Each Company's Factory Revenue from Shipments of Total Integrated Circuits (Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
IMP'	37	49	55	0.1	0.1	0
Integrated Circuit Systems	41	81	96	0.1	0.1	0.1
Integrated Device Technology	303	385	617	0.4	0.4	0.5
Integrated Information Technology	40	35	44	0.1	0	0
Integrated Silicon Solutions Inc.	0	60	158	0	0.1	0.1
Intel	7,970	10,099	13,172	10.9	10.5	9.9
International CMOS Technology	0	12	17	0	0	0
International Rectifier	3	8	17	0	0	0
ITT	155	127	126	0.2	0.1	0.1
Kulite	24	20	24	0	0	0
Lattice	127	134	186	0.2	0.1	0.1
Level One Communications	0	-	78	0	0	0.1
Linear Technology	173	225	305	0.2	0.2	0.2
Linfinity	37	44	51	0.1	0	0
Logic Devices	12	14	18	0	0	0
LSI Logic	719	901	1,268	1.0	0.9	1.0
Maxim	115	169	190	0.2	0.2	0.1
Micrel	18	25	25	0	0	0
Micro Linear	45	41	54	0.1	0	0
Micro Power Systems	23	23	-	0	0	0
Microchip Technology	140	212	271	0.2	0.2	0.2
Micron Technology	925	1,492	2,601	1.3	1.6	2.0
Mitel	69	100	88	0.1	0.1	0.1
Motorola	4,922	6,096	7,323	6.7	6.4	5.5
Natel Engineering	12	0	0	0	0	0
National Semiconductor	1,983	2,028	2,243	2.7	2.1	1.7
Novasensor	16	13	15	0	0	0
Oak Technology	50	62	84	0.1	0.1	0.1
Optek	0	7	8	0	0	0
OPTi	86	130	167	0.1	0.1	0.1
Performance Semiconductor	41	20	28	0.1	0	0
Q Logic	21	45	60	0	0	0
Quality Semiconductor	22	22	46	0	0	0
QuickLogic	0	8	16	0	0	0
Ramtron	0	15	24	0	0	0
Raytheon	95	100	110	0.1	0.1	0.1
Rockwell	176	514	744	0.2	0.5	0.6

(Continued)



**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
S3	113	130	315	0.2	0.1	0.2
Seeq Technology	29	22	27	0	0	0
Semtech	2	5	19	0	0	0
Sierra Semiconductor	96	120	141	0.1	0.1	0.1
Silicon Systems	265	298	368	0.4	0.3	0.3
Sipex	20	16	16	0	0	0
Silicon Storage Technology	0	-	35	0	0	0
Solitron	0	2	2	0	0	0
Standard Microsystems	47	100	150	0.1	0.1	0.1
Supertex	15	19	20	0	0	0
Symbios	275	354	395	0.4	0.4	0.3
Symphony Laboratories	66	12	15	0.1	0	0
Tektronix	49	0	0	0.1	0	0
Telcom	0	18	17	0	0	0
Teledyne	26	0	0	0	0	0
Texas Instruments	4,000	5,471	7,772	5.4	5.7	5.9
Trident Microsystems	60	87	139	0.1	0.1	0.1
Tseng Labs	71	83	105	0.1	0.1	0.1
Unitrode	78	88	102	0.1	0.1	0.1
Universal	14	13	15	0	0	0
VLSI Technology	517	588	673	0.7	0.6	0.5
VTC	70	70	155	0.1	0.1	0.1
WaferScale Integration	25	21	36	0	0	0
Weitek	33	28	37	0	0	0
Western Digital	218	184	239	0.3	0.2	0.2
Xicor	105	100	114	0.1	0.1	0.1
Xilinx	231	321	520	0.3	0.3	0.4
Zilog	203	222	265	0.3	0.2	0.2
Other North American Companies	61	70	150	0.1	0.1	0.1
Japanese Companies	27,550	36,288	49,737	37.5	37.9	37.6
Fuji Electric	73	89	99	0.1	0.1	0.1
Fujitsu	2,648	3,542	5,087	3.6	3.7	3.8
Hitachi	4,286	5,757	8,163	5.8	6.0	6.2
Matsushita	1,536	1,968	2,350	2.1	2.1	1.8
Mitsubishi	2,413	3,172	4,644	3.3	3.3	3.5
NEC	5,444	7,159	10,281	7.4	7.5	7.8

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
New JRC	170	205	223	0.2	0.2	0.2
Nippon Steel Semiconductor	148	160	549	0.2	0.2	0.4
Oki	1,150	1,437	1,989	1.6	1.5	1.5
Ricoh	143	182	213	0.2	0.2	0.2
Rohm	438	643	876	0.6	0.7	0.7
Sanken	202	240	283	0.3	0.3	0.2
Sanyo	1,370	1,782	2,058	1.9	1.9	1.6
Seiko Epson	252	273	314	0.3	0.3	0.2
Shindengen Electric	49	48	28	0.1	0.1	0
Sharp	1,342	1,678	1,956	1.8	1.8	1.5
Sony	1,073	1,513	1,901	1.5	1.6	1.4
Toko	36	40	45	0	0	0
Toshiba	4,384	5,931	8,028	6.0	6.2	6.1
Yamaha	317	382	444	0.4	0.4	0.3
Other Japanese Companies	76	87	206	0.1	0.1	0.2
European Companies	5,614	7,278	9,417	7.6	7.6	7.1
ABB-Hafo	20	28	24	0	0	0
Austria Mikro Systeme	85	110	148	0.1	0.1	0.1
Elex	0	20	31	0	0	0
Elmos	0	15	19	0	0	0
EM Microelectronics Marin	50	65	78	0.1	0.1	0.1
Ericsson	72	83	84	0.1	0.1	0.1
European Silicon Structures	36	40	59	0	0	0
GEC Plessey	269	286	333	0.4	0.3	0.3
Micronas	14	20	43	0	0	0
Mietec	148	178	179	0.2	0.2	0.1
Philips	1,696	2,159	2,843	2.3	2.3	2.1
SGS-Thomson	1,654	2,207	2,806	2.3	2.3	2.1
Siemens	1,110	1,586	2,313	1.5	1.7	1.7
TEMIC	396	391	343	0.5	0.4	0.3
TCS	43	51	65	0.1	0.1	0
Thesys	0	15	20	0	0	0
Zetex	2	3	4	0	0	0
Other European Companies	19	21	25	0	0	0

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Asia/Pacific Companies	5,881	9,481	17,238	8.0	9.9	13.0
Acer	50	70	80	0.1	0.1	0.1
Daewoo	31	38	48	0	0	0
Holttek	53	70	87	0.1	0.1	0.1
Hualon Microelectronics Corp.	83	89	107	0.1	0.1	0.1
Hyundai	853	1,521	4,132	1.2	1.6	3.1
Korean Electronics Company	37	47	45	0.1	0	0
LG Semicon	946	1,697	2,863	1.3	1.8	2.2
Macronix	144	221	271	0.2	0.2	0.2
Mosel Vitelic	223	259	502	0.3	0.3	0.4
Samsung	2,897	4,642	8,008	3.9	4.8	6.0
Silicon Integrated Systems	71	101	127	0.1	0.1	0.1
United Microelectronics Corp.	309	418	477	0.4	0.4	0.4
Winbond Electronics	184	308	491	0.3	0.3	0.4

Source: Dataquest (April 1996)

**Table 1-4**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	71,966	94,196	130,502	100.0	100.0	100.0
North American Companies	34,014	42,389	55,578	47.3	45.0	42.6
ACC Microelectronics	36	49	40	0.1	0.1	0
Actel	60	76	108	0.1	0.1	0.1
Adaptec	122	125	124	0.2	0.1	0.1
Advanced Micro Devices	1,660	2,134	2,330	2.3	2.3	1.8
Allegro MicroSystems	108	139	146	0.2	0.1	0.1
Alliance Semiconductor	41	90	220	0.1	0.1	0.2
Altera	140	199	402	0.2	0.2	0.3
Analog Devices	595	687	927	0.8	0.7	0.7
Applied Micro Circuits Corp.	48	48	48	0.1	0.1	0
AT&T	1,065	1,250	1,534	1.5	1.3	1.2
Atmel	225	375	590	0.3	0.4	0.5
Bipolar Integrated Technology	15	0	0	0	0	0
Brooktree	117	109	120	0.2	0.1	0.1
Burr-Brown	88	105	126	0.1	0.1	0.1
California Micro Devices	14	10	12	0	0	0
Catalyst	55	50	49	0.1	0.1	0
Cherry Semiconductor	55	77	87	0.1	0.1	0.1
Chips & Technologies	89	89	138	0.1	0.1	0.1
Cirrus Logic	451	781	1,002	0.6	0.8	0.8
Comlinear	8	9	-	0	0	0
Cypress Semiconductor	300	400	552	0.4	0.4	0.4
Cyrix	125	241	212	0.2	0.3	0.2
Dallas Semiconductor	112	154	228	0.2	0.2	0.2
Elantec	21	21	23	0	0	0
Electronic Designs	23	26	43	0	0	0
ETEQ Microsystems	19	6	7	0	0	0
Exar	158	169	146	0.2	0.2	0.1
Gennum	30	29	34	0	0	0
Gould AMI	101	136	72	0.1	0.1	0.1
Harris	467	478	454	0.6	0.5	0.3
Hewlett-Packard	230	255	343	0.3	0.3	0.3
Honeywell	26	23	27	0	0	0
Hughes	40	40	36	0.1	0	0
IBM	2,510	2,532	3,522	3.5	2.7	2.7
IMI	21	20	35	0	0	0

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
IMP	37	49	55	0.1	0.1	0
Integrated Circuit Systems	41	81	96	0.1	0.1	0.1
Integrated Device Technology	303	385	617	0.4	0.4	0.5
Integrated Information Technology	40	35	44	0.1	0	0
Integrated Silicon Solutions Inc.	0	60	158	0	0.1	0.1
Intel	7,970	10,099	13,172	11.1	10.7	10.1
International CMOS Technology	0	12	17	0	0	0
International Rectifier	3	8	17	0	0	0
ITT	155	127	126	0.2	0.1	0.1
Kulite	24	20	24	0	0	0
Lattice	127	134	186	0.2	0.1	0.1
Level One Communications	0	-	78	0	0	0.1
Linear Technology	173	225	305	0.2	0.2	0.2
Linfinity	34	41	48	0	0	0
Logic Devices	12	14	18	0	0	0
LSI Logic	719	901	1,268	1.0	1.0	1.0
Maxim	111	165	186	0.2	0.2	0.1
Micrel	18	25	25	0	0	0
Micro Linear	45	41	54	0.1	0	0
Micro Power Systems	23	23	-	0	0	0
Microchip Technology	140	212	271	0.2	0.2	0.2
Micron Technology	925	1,492	2,601	1.3	1.6	2.0
Mitel	55	70	68	0.1	0.1	0.1
Motorola	4,751	5,870	7,043	6.6	6.2	5.4
Natel Engineering	7	0	0	0	0	0
National Semiconductor	1,969	2,021	2,235	2.7	2.1	1.7
Novasensor	16	13	15	0	0	0
Oak Technology	50	62	84	0.1	0.1	0.1
Optek	0	7	8	0	0	0
OPTi	86	130	167	0.1	0.1	0.1
Performance Semiconductor	41	20	28	0.1	0	0
Q Logic	21	45	60	0	0	0
Quality Semiconductor	22	22	46	0	0	0
QuickLogic	0	8	16	0	0	0
Ramtron	0	15	24	0	0	0
Raytheon	95	100	110	0.1	0.1	0.1
Rockwell	176	514	744	0.2	0.5	0.6

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
S3	113	130	315	0.2	0.1	0.2
Seeq Technology	29	22	27	0	0	0
Semtech	2	5	19	0	0	0
Sierra Semiconductor	96	120	141	0.1	0.1	0.1
Silicon Systems	265	298	368	0.4	0.3	0.3
Sipex	3	2	2	0	0	0
Silicon Storage Technology	0	-	35	0	0	0
Standard Microsystems	47	100	150	0.1	0.1	0.1
Supertex	15	19	20	0	0	0
Symbios	275	354	395	0.4	0.4	0.3
Symphony Laboratories	66	12	15	0.1	0	0
Tektronix	41	0	0	0.1	0	0
Telcom	0	18	17	0	0	0
Teledyne	26	0	0	0	0	0
Texas Instruments	4,000	5,471	7,772	5.6	5.8	6.0
Trident Microsystems	60	87	139	0.1	0.1	0.1
Tseng Labs	71	83	105	0.1	0.1	0.1
Unitrode	64	73	102	0.1	0.1	0.1
Universal	14	13	15	0	0	0
VLSI Technology	517	588	673	0.7	0.6	0.5
VTC	70	70	155	0.1	0.1	0.1
WaferScale Integration	25	21	36	0	0	0
Weitek	33	28	37	0	0	0
Western Digital	218	184	239	0.3	0.2	0.2
Xicor	105	100	114	0.1	0.1	0.1
Xilinx	231	321	520	0.3	0.3	0.4
Zilog	203	222	265	0.3	0.2	0.2
Other North American Companies	61	70	150	0.1	0.1	0.1
Japanese Companies	26,562	35,152	48,368	36.9	37.3	37.1
Fuji Electric	52	67	76	0.1	0.1	0.1
Fujitsu	2,586	3,426	4,938	3.6	3.6	3.8
Hitachi	4,184	5,621	8,026	5.8	6.0	6.1
Matsushita	1,536	1,968	2,350	2.1	2.1	1.8
Mitsubishi	2,307	3,063	4,446	3.2	3.3	3.4
NEC	5,346	7,061	10,151	7.4	7.5	7.8
New JRC	170	205	223	0.2	0.2	0.2
Nippon Steel Semiconductor	148	160	549	0.2	0.2	0.4

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Oki	1,138	1,424	1,977	1.6	1.5	1.5
Ricoh	143	182	213	0.2	0.2	0.2
Rohm	370	571	798	0.5	0.6	0.6
Sanyo	1,204	1,608	1,864	1.7	1.7	1.4
Seiko Epson	252	273	314	0.4	0.3	0.2
Sharp	1,342	1,678	1,956	1.9	1.8	1.5
Sony	1,037	1,472	1,861	1.4	1.6	1.4
Toko	28	32	36	0	0	0
Toshiba	4,326	5,872	7,954	6.0	6.2	6.1
Yamaha	317	382	444	0.4	0.4	0.3
Other Japanese Companies	76	87	192	0.1	0.1	0.1
European Companies	5,509	7,174	9,317	7.7	7.6	7.1
ABB-Hafo	20	20	19	0	0	0
Austria Mikro Systeme	85	110	148	0.1	0.1	0.1
Elex	0	20	31	0	0	0
Elmos	0	15	19	0	0	0
EM Microelectronics Marin	50	65	78	0.1	0.1	0.1
Ericsson	60	64	69	0.1	0.1	0.1
European Silicon Structures	36	40	59	0.1	0	0
GEC Plessey	248	280	330	0.3	0.3	0.3
Micronas	14	20	33	0	0	0
Mietec	148	178	179	0.2	0.2	0.1
Philips	1,641	2,105	2,797	2.3	2.2	2.1
SGS-Thomson	1,654	2,207	2,806	2.3	2.3	2.2
Siemens	1,110	1,586	2,313	1.5	1.7	1.8
TEMIC	394	391	343	0.5	0.4	0.3
TCS	43	51	65	0.1	0.1	0.1
Thesys	0	15	20	0	0	0
Zetex	2	3	4	0	0	0
Other European Companies	4	4	4	0	0	0

(Continued)

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Asia/Pacific Companies	5,881	9,481	17,238	8.2	10.1	13.2
Acer	50	70	80	0.1	0.1	0.1
Daewoo	31	38	48	0	0	0
Holtek	53	70	87	0.1	0.1	0.1
Hualon Microelectronics Corp.	83	89	107	0.1	0.1	0.1
Hyundai	853	1,521	4,132	1.2	1.6	3.2
Korean Electronics Company	37	47	45	0.1	0	0
LG Semicon	946	1,697	2,863	1.3	1.8	2.2
Macronix	144	221	271	0.2	0.2	0.2
Mosel Vitelic	223	259	502	0.3	0.3	0.4
Samsung	2,897	4,642	8,008	4.0	4.9	6.1
Silicon Integrated Systems	71	101	127	0.1	0.1	0.1
United Microelectronics Corp.	309	418	477	0.4	0.4	0.4
Winbond Electronics	184	308	491	0.3	0.3	0.4

Source: Dataquest (April 1996)



**Table 1-5**  
**Each Company's Factory Revenue from Shipments of Bipolar Digital Memory/Logic to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	3,079	2,912	2,496	100.0	100.0	100.0
North American Companies	1,650	1,473	1,337	53.6	50.6	53.6
Advanced Micro Devices	199	143	99	6.5	4.9	4.0
Applied Micro Circuits Corp.	26	20	18	0.8	0.7	0.7
AT&T	60	63	50	1.9	2.2	2.0
Atmel	1	-	-	0	0	0
Bipolar Integrated Technology	15	0	0	0.5	0	0
Chips & Technologies	3	-	-	0.1	0	0
Harris	13	6	4	0.4	0.2	0.2
Intel	1	-	-	0	0	0
Motorola	432	421	425	14.0	14.5	17.0
National Semiconductor	279	221	210	9.1	7.6	8.4
Raytheon	27	22	19	0.9	0.8	0.7
Texas Instruments	594	577	512	19.3	19.8	20.5
Japanese Companies	1,158	1,207	970	37.6	41.4	38.9
Fujitsu	371	395	204	12.0	13.6	8.2
Hitachi	391	465	442	12.7	16.0	17.7
Matsushita	26	29	28	0.8	1.0	1.1
Mitsubishi	63	23	36	2.0	0.8	1.4
NEC	201	194	109	6.5	6.7	4.4
Oki	31	33	35	1.0	1.1	1.4
Toshiba	75	68	116	2.4	2.3	4.6
European Companies	227	186	174	7.4	6.4	7.0
GEC Plessey	23	16	10	0.7	0.5	0.4
Philips	152	121	123	4.9	4.2	4.9
SGS-Thomson	7	12	6	0.2	0.4	0.3
Siemens	41	33	31	1.3	1.1	1.2
Other European Companies	4	4	4	0.1	0.1	0.2
Asia/Pacific Companies	44	46	14	1.4	1.6	0.6
LG Semicon	44	46	14	1.4	1.6	0.6

Source: Dataquest (April 1996)

**Table 1-6**  
**Each Company's Factory Revenue from Shipments of Bipolar Digital Memory to**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	244	199	160	100.0	100.0	100.0
North American Companies	59	44	36	24.2	22.1	22.3
Advanced Micro Devices	39	28	27	16.0	14.1	16.8
Harris	4	-	-	1.6	0	0
Motorola	2	1	1	0.8	0.5	0.6
National Semiconductor	5	5	2	2.0	2.5	1.3
Raytheon	6	5	4	2.5	2.5	2.3
Texas Instruments	3	5	2	1.2	2.5	1.2
Japanese Companies	182	141	111	74.6	70.9	69.0
Fujitsu	81	32	21	33.2	16.1	12.9
Hitachi	85	93	81	34.8	46.7	50.4
NEC	16	16	9	6.6	8.0	5.7
European Companies	3	14	14	1.2	7.0	8.7
Philips	3	14	14	1.2	7.0	8.7

Source: Dataquest (April 1996)

**Table 1-7**  
**Each Company's Factory Revenue from Shipments of Bipolar Digital Logic to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	2,835	2,713	2,335	100.0	100.0	100.0
North American Companies	1,591	1,429	1,301	56.1	52.7	55.7
Advanced Micro Devices	160	115	72	5.6	4.2	3.1
Applied Micro Circuits Corp.	26	20	18	0.9	0.7	0.8
AT&T	60	63	50	2.1	2.3	2.1
Atmel	1	-	-	0	0	0
Bipolar Integrated Technology	15	0	0	0.5	0	0
Chips & Technologies	3	-	-	0.1	0	0
Harris	9	6	4	0.3	0.2	0.2
Intel	1	-	-	0	0	0
Motorola	430	420	424	15.2	15.5	18.2
National Semiconductor	274	216	208	9.7	8.0	8.9
Raytheon	21	17	15	0.7	0.6	0.6
Texas Instruments	591	572	510	20.8	21.1	21.9
Japanese Companies	976	1,066	860	34.4	39.3	36.8
Fujitsu	290	363	183	10.2	13.4	7.8
Hitachi	306	372	361	10.8	13.7	15.5
Matsushita	26	29	28	0.9	1.1	1.2
Mitsubishi	63	23	36	2.2	0.8	1.5
NEC	185	178	100	6.5	6.6	4.3
Oki	31	33	35	1.1	1.2	1.5
Toshiba	75	68	116	2.6	2.5	5.0
European Companies	224	172	160	7.9	6.3	6.9
GEC Plessey	23	16	10	0.8	0.6	0.4
Philips	149	107	109	5.3	3.9	4.7
SGS-Thomson	7	12	6	0.2	0.4	0.3
Siemens	41	33	31	1.4	1.2	1.3
Other European Companies	4	4	4	0.1	0.1	0.2
Asia/Pacific Companies	44	46	14	1.6	1.7	0.6
LG Semicon	44	46	14	1.6	1.7	0.6

Source: Dataquest (April 1996)

**Table 1-8**  
**Each Company's Factory Revenue from Shipments of MOS Digital Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	56,374	76,021	110,399	100.0	100.0	100.0
North American Companies	26,784	34,456	46,954	47.5	45.3	42.5
ACC Microelectronics	36	49	40	0.1	0.1	0
Actel	60	76	108	0.1	0.1	0.1
Adaptec	122	125	124	0.2	0.2	0.1
Advanced Micro Devices	1,307	1,804	2,059	2.3	2.4	1.9
Allegro MicroSystems	4	5	-	0	0	0
Alliance Semiconductor	41	90	220	0.1	0.1	0.2
Altera	140	199	402	0.2	0.3	0.4
Analog Devices	69	85	117	0.1	0.1	0.1
Applied Micro Circuits Corp.	22	21	26	0	0	0
AT&T	671	785	1,200	1.2	1.0	1.1
Atmel	223	363	574	0.4	0.5	0.5
California Micro Devices	6	5	6	0	0	0
Catalyst	54	49	49	0.1	0.1	0
Chips & Technologies	86	89	138	0.2	0.1	0.1
Cirrus Logic	371	681	886	0.7	0.9	0.8
Cypress Semiconductor	300	400	552	0.5	0.5	0.5
Cyrix	125	241	212	0.2	0.3	0.2
Dallas Semiconductor	104	154	228	0.2	0.2	0.2
Electronic Designs	23	26	43	0	0	0
ETEQ Microsystems	19	6	7	0	0	0
Exar	0	0	15	0	0	0
Gould AMI	63	105	72	0.1	0.1	0.1
Harris	204	188	191	0.4	0.2	0.2
Hewlett-Packard	230	255	343	0.4	0.3	0.3
Hughes	24	21	20	0	0	0
IBM	2,510	2,532	3,522	4.5	3.3	3.2
IMI	18	18	30	0	0	0
IMP	8	9	12	0	0	0
Integrated Circuit Systems	29	42	51	0.1	0.1	0
Integrated Device Technology	303	385	617	0.5	0.5	0.6
Integrated Information Technology	40	35	44	0.1	0	0
Integrated Silicon Solutions Inc.	0	60	158	0	0.1	0.1
Intel	7,957	10,079	13,162	14.1	13.3	11.9
International CMOS Technology	0	12	17	0	0	0

(Continued)

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
ITT	132	103	112	0.2	0.1	0.1
Lattice	127	134	186	0.2	0.2	0.2
Logic Devices	12	14	18	0	0	0
LSI Logic	719	901	1,268	1.3	1.2	1.1
Micrel	5	7	7	0	0	0
Micro Linear	0	6	-	0	0	0
Microchip Technology	140	212	271	0.2	0.3	0.2
Micron Technology	925	1,492	2,601	1.6	2.0	2.4
Motorola	3,612	4,525	5,595	6.4	6.0	5.1
National Semiconductor	902	893	992	1.6	1.2	0.9
Oak Technology	50	62	84	0.1	0.1	0.1
OPTI	86	130	167	0.2	0.2	0.2
Performance Semiconductor	41	20	28	0.1	0	0
Q Logic	21	45	60	0	0.1	0.1
Quality Semiconductor	22	22	46	0	0	0
QuickLogic	0	8	16	0	0	0
Ramtron	0	15	24	0	0	0
Rockwell	21	514	744	0	0.7	0.7
S3	113	130	315	0.2	0.2	0.3
Seeq Technology	20	22	27	0	0	0
Sierra Semiconductor	6	35	44	0	0	0
Silicon Storage Technology	0	-	35	0	0	0
Standard Microsystems	47	100	150	0.1	0.1	0.1
Supertex	5	6	7	0	0	0
Symbios	230	298	293	0.4	0.4	0.3
Symphony Laboratories	66	12	15	0.1	0	0
Texas Instruments	2,789	4,052	6,326	4.9	5.3	5.7
Trident Microsystems	60	87	139	0.1	0.1	0.1
Tseng Labs	71	83	105	0.1	0.1	0.1
Universal	9	7	8	0	0	0
VLSI Technology	515	588	673	0.9	0.8	0.6
WaferScale Integration	25	21	36	0	0	0
Weitek	33	28	37	0.1	0	0
Western Digital	218	184	239	0.4	0.2	0.2
Xicor	105	100	114	0.2	0.1	0.1
Xilinx	231	321	520	0.4	0.4	0.5
Zilog	203	222	265	0.4	0.3	0.2
Other North American Companies	54	63	142	0.1	0.1	0.1

(Continued)

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Japanese Companies	21,501	29,034	41,692	38.1	38.2	37.8
Fuji Electric	36	40	46	0.1	0.1	0
Fujitsu	2,093	2,876	4,418	3.7	3.8	4.0
Hitachi	3,513	4,799	7,229	6.2	6.3	6.5
Matsushita	1,037	1,328	1,681	1.8	1.7	1.5
Mitsubishi	1,867	2,584	3,956	3.3	3.4	3.6
NEC	4,768	6,361	9,402	8.5	8.4	8.5
New JRC	12	32	40	0	0	0
Nippon Steel Semiconductor	148	160	549	0.3	0.2	0.5
Oki	1,085	1,365	1,914	1.9	1.8	1.7
Ricoh	135	168	175	0.2	0.2	0.2
Rohm	112	210	376	0.2	0.3	0.3
Sanyo	571	797	971	1.0	1.0	0.9
Seiko Epson	241	260	298	0.4	0.3	0.3
Sharp	1,255	1,582	1,851	2.2	2.1	1.7
Sony	612	1,007	1,306	1.1	1.3	1.2
Toshiba	3,636	5,015	6,921	6.4	6.6	6.3
Yamaha	304	363	416	0.5	0.5	0.4
Other Japanese Companies	76	87	142	0.1	0.1	0.1
European Companies	2,595	3,499	4,930	4.6	4.6	4.5
Austria Mikro Systeme	36	46	68	0.1	0.1	0.1
Elex	0	20	23	0	0	0
Elmos	0	15	19	0	0	0
EM Microelectronics Marin	0	0	2	0	0	0
Ericsson	15	15	19	0	0	0
European Silicon Structures	36	40	48	0.1	0.1	0
GEC Plessey	111	129	164	0.2	0.2	0.1
Mietec	25	32	35	0	0	0
Philips	737	1,027	1,418	1.3	1.4	1.3
SGS-Thomson	789	998	1,318	1.4	1.3	1.2
Siemens	687	1,007	1,590	1.2	1.3	1.4
TEMIC	132	124	165	0.2	0.2	0.1
TCS	27	31	41	0	0	0
Thesys	0	15	20	0	0	0

(Continued)

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Asia/Pacific Companies	5,494	9,032	16,822	9.7	11.9	15.2
Acer	50	70	80	0.1	0.1	0.1
Daewoo	11	21	27	0	0	0
Holttek	38	70	87	0.1	0.1	0.1
Hualon Microelectronics Corp.	76	80	98	0.1	0.1	0.1
Hyundai	853	1,521	4,130	1.5	2.0	3.7
LG Semicon	862	1,606	2,807	1.5	2.1	2.5
Macronix	144	221	271	0.3	0.3	0.2
Mosel Vitelic	223	259	502	0.4	0.3	0.5
Samsung	2,731	4,409	7,775	4.8	5.8	7.0
Silicon Integrated Systems	71	101	127	0.1	0.1	0.1
United Microelectronics Corp.	309	418	477	0.5	0.5	0.4
Winbond Electronics	126	256	442	0.2	0.3	0.4

Source: Dataquest (April 1996)

**Table 1-9**  
**Each Company's Factory Revenue from Shipments of MOS Memory to Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	23,306	33,505	55,262	100.0	100.0	100.0
North American Companies	6,253	8,430	13,615	26.8	25.2	24.6
Advanced Micro Devices	427	442	717	1.8	1.3	1.3
Alliance Semiconductor	41	90	210	0.2	0.3	0.4
AT&T	10	3	3	0	0	0
Atmel	181	331	477	0.8	1.0	0.9
Catalyst	54	49	49	0.2	0.1	0.1
Cypress Semiconductor	235	285	424	1.0	0.9	0.8
Dallas Semiconductor	38	30	56	0.2	0.1	0.1
Electronic Designs	23	26	43	0.1	0.1	0.1
Gould AMI	23	44	-	0.1	0.1	0
Harris	19	12	18	0.1	0	0
IBM	1,133	1,520	2,100	4.9	4.5	3.8
IMP	2	1	-	0	0	0
Integrated Device Technology	189	252	444	0.8	0.8	0.8
Integrated Silicon Solutions Inc.	0	60	158	0	0.2	0.3
Intel	468	458	766	2.0	1.4	1.4
ITT	11	10	-	0	0	0
Logic Devices	4	2	5	0	0	0
Microchip Technology	64	82	102	0.3	0.2	0.2
Micron Technology	925	1,492	2,601	4.0	4.5	4.7
Motorola	762	948	1,213	3.3	2.8	2.2
National Semiconductor	172	179	188	0.7	0.5	0.3
Performance Semiconductor	8	5	7	0	0	0
Quality Semiconductor	12	7	14	0.1	0	0
Ramtron	0	15	24	0	0	0
Seeq Technology	16	5	6	0.1	0	0
Silicon Storage Technology	0	-	35	0	0	0.1
Symbios	2	-	-	0	0	0
Texas Instruments	1,275	1,931	3,756	5.5	5.8	6.8
WaferScale Integration	20	15	17	0.1	0	0
Xicor	105	100	114	0.5	0.3	0.2
Other North American Companies	34	36	69	0.1	0.1	0.1

(Continued)



**Table 1-9 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Memory to Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Japanese Companies	11,180	15,519	24,063	48.0	46.3	43.5
Fujitsu	1,135	1,692	2,589	4.9	5.0	4.7
Hitachi	2,369	3,232	5,132	10.2	9.6	9.3
Matsushita	305	396	492	1.3	1.2	0.9
Mitsubishi	1,206	1,652	2,547	5.2	4.9	4.6
NEC	2,173	3,096	5,352	9.3	9.2	9.7
Nippon Steel Semiconductor	148	160	549	0.6	0.5	1.0
Oki	486	697	1,228	2.1	2.1	2.2
Ricoh	21	19	6	0.1	0.1	0
Rohm	39	56	61	0.2	0.2	0.1
Sanyo	155	183	257	0.7	0.5	0.5
Seiko Epson	38	42	41	0.2	0.1	0.1
Sharp	697	867	1,030	3.0	2.6	1.9
Sony	287	387	490	1.2	1.2	0.9
Toshiba	2,101	3,018	4,264	9.0	9.0	7.7
Yamaha	1	1	1	0	0	0
Other Japanese Companies	19	21	23	0.1	0.1	0
European Companies	1,089	1,484	2,023	4.7	4.4	3.7
GEC Plessey	3	0	-	0	0	0
Philips	32	14	-	0.1	0	0
SGS-Thomson	467	589	646	2.0	1.8	1.2
Siemens	556	858	1,353	2.4	2.6	2.4
TEMIC	31	23	24	0.1	0.1	0
Asia/Pacific Companies	4,784	8,072	15,561	20.5	24.1	28.2
Daewoo	1	-	-	0	0	0
Hualon Microelectronics Corp.	36	46	54	0.2	0.1	0.1
Hyundai	851	1,515	4,116	3.7	4.5	7.4
LG Semicon	804	1,525	2,635	3.4	4.6	4.8
Macronix	129	200	236	0.6	0.6	0.4
Mosel Vitelic	223	259	502	1.0	0.8	0.9
Samsung	2,512	4,194	7,498	10.8	12.5	13.6
Silicon Integrated Systems	5	0	-	0	0	0
United Microelectronics Corp.	146	191	203	0.6	0.6	0.4
Winbond Electronics	77	142	317	0.3	0.4	0.6

Source: Dataquest (April 1996)

**Table 1-10**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponents to**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	19,947	26,408	34,513	100.0	100.0	100.0
North American Companies	14,395	18,843	24,205	72.2	71.4	70.1
ACC Microelectronics	36	49	40	0.2	0.2	0.1
Adaptec	122	125	124	0.6	0.5	0.4
Advanced Micro Devices	563	1,021	922	2.8	3.9	2.7
Alliance Semiconductor	0	-	10	0	0	0
Analog Devices	69	85	117	0.3	0.3	0.3
AT&T	246	305	510	1.2	1.2	1.5
Atmel	5	5	28	0	0	0.1
California Micro Devices	6	5	6	0	0	0
Chips & Technologies	86	89	138	0.4	0.3	0.4
Cirrus Logic	371	681	886	1.9	2.6	2.6
Cypress Semiconductor	8	40	48	0	0.2	0.1
Cyrix	125	241	212	0.6	0.9	0.6
Dallas Semiconductor	56	22	35	0.3	0.1	0.1
ETEQ Microsystems	19	0	-	0.1	0	0
Harris	47	52	66	0.2	0.2	0.2
Hughes	3	3	3	0	0	0
IBM	337	399	703	1.7	1.5	2.0
IMP	6	8	1	0	0	0
Integrated Device Technology	48	51	63	0.2	0.2	0.2
Integrated Information Technology	40	35	44	0.2	0.1	0.1
Intel	7,444	9,595	12,396	37.3	36.3	35.9
ITT	25	12	15	0.1	0	0
LSI Logic	77	78	107	0.4	0.3	0.3
Micro Linear	0	6	-	0	0	0
Microchip Technology	72	130	169	0.4	0.5	0.5
Motorola	2,065	2,363	2,996	10.4	8.9	8.7
National Semiconductor	477	452	541	2.4	1.7	1.6
Oak Technology	50	62	84	0.3	0.2	0.2
OPTi	86	130	167	0.4	0.5	0.5
Performance Semiconductor	18	15	21	0.1	0.1	0.1
Q Logic	21	45	60	0.1	0.2	0.2
Rockwell	17	509	738	0.1	1.9	2.1
S3	113	130	315	0.6	0.5	0.9
Seeq Technology	4	17	21	0	0.1	0.1

(Continued)

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponents to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Sierra Semiconductor	0	35	44	0	0.1	0.1
Standard Microsystems	43	100	150	0.2	0.4	0.4
Supertex	2	1	1	0	0	0
Symbios	63	81	85	0.3	0.3	0.2
Symphony Laboratories	66	12	15	0.3	0	0
Texas Instruments	781	1,006	1,254	3.9	3.8	3.6
Trident Microsystems	60	87	139	0.3	0.3	0.4
Tseng Labs	71	83	105	0.4	0.3	0.3
VLSI Technology	173	216	194	0.9	0.8	0.6
WaferScale Integration	5	3	18	0	0	0.1
Weitek	33	28	37	0.2	0.1	0.1
Western Digital	218	184	239	1.1	0.7	0.7
Zilog	203	222	265	1.0	0.8	0.8
Other North American Companies	15	25	69	0.1	0.1	0.2
Japanese Companies	4,585	6,137	8,102	23.0	23.2	23.5
Fuji Electric	1	2	3	0	0	0
Fujitsu	282	390	651	1.4	1.5	1.9
Hitachi	718	998	1,441	3.6	3.8	4.2
Matsushita	286	460	557	1.4	1.7	1.6
Mitsubishi	532	698	982	2.7	2.6	2.8
NEC	1,341	1,678	2,063	6.7	6.4	6.0
New JRC	0	2	4	0	0	0
Oki	180	217	235	0.9	0.8	0.7
Ricoh	89	83	75	0.4	0.3	0.2
Rohm	23	50	71	0.1	0.2	0.2
Sanyo	145	161	186	0.7	0.6	0.5
Seiko Epson	17	21	28	0.1	0.1	0.1
Sharp	170	192	221	0.9	0.7	0.6
Sony	112	194	235	0.6	0.7	0.7
Toshiba	540	718	1,095	2.7	2.7	3.2
Yamaha	149	273	245	0.7	1.0	0.7
Other Japanese Companies	0	0	10	0	0	0
European Companies	640	851	1,432	3.2	3.2	4.1
Elex	0	15	23	0	0.1	0.1
EM Microelectronics Marin	0	0	2	0	0	0
GEC Plessey	7	11	10	0	0	0
Philips	305	403	662	1.5	1.5	1.9

(Continued)

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponents to**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
SGS-Thomson	162	227	437	0.8	0.9	1.3
Siemens	107	128	208	0.5	0.5	0.6
TEMIC	44	51	68	0.2	0.2	0.2
TCS	15	16	22	0.1	0.1	0.1
Asia/Pacific Companies	327	577	774	1.6	2.2	2.2
Acer	50	68	77	0.3	0.3	0.2
Daewoo	7	17	23	0	0.1	0.1
Holttek	18	20	34	0.1	0.1	0.1
Hualon Microelectronics Corp.	10	0	-	0.1	0	0
Hyundai	0	2	1	0	0	0
LG Semicon	12	29	56	0.1	0.1	0.2
Macronix	15	21	35	0.1	0.1	0.1
Samsung	46	44	87	0.2	0.2	0.3
Silicon Integrated Systems	26	101	127	0.1	0.4	0.4
United Microelectronics Corp.	113	227	274	0.6	0.9	0.8
Winbond Electronics	30	48	60	0.2	0.2	0.2

Source: Dataquest (April 1996)

**Table 1-11**  
**Each Company's Factory Revenue from Shipments of MOS Logic to Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	13,121	16,108	20,623	100.0	100.0	100.0
North American Companies	6,136	7,183	9,134	46.8	44.6	44.3
Actel	60	76	108	0.5	0.5	0.5
Advanced Micro Devices	317	341	420	2.4	2.1	2.0
Allegro MicroSystems	4	5	-	0	0	0
Altera	140	199	402	1.1	1.2	1.9
Applied Micro Circuits Corp.	22	21	26	0.2	0.1	0.1
AT&T	415	477	687	3.2	3.0	3.3
Atmel	37	27	69	0.3	0.2	0.3
Cypress Semiconductor	57	75	79	0.4	0.5	0.4
Dallas Semiconductor	10	102	137	0.1	0.6	0.7
ETEQ Microsystems	0	6	7	0	0	0
Exar	0	0	15	0	0	0.1
Gould AMI	40	61	72	0.3	0.4	0.3
Harris	138	124	108	1.1	0.8	0.5
Hewlett-Packard	230	255	343	1.8	1.6	1.7
Hughes	21	18	17	0.2	0.1	0.1
IBM	1,040	613	719	7.9	3.8	3.5
IMI	18	18	30	0.1	0.1	0.1
IMP	0	0	11	0	0	0.1
Integrated Circuit Systems	29	42	51	0.2	0.3	0.2
Integrated Device Technology	66	82	110	0.5	0.5	0.5
Intel	45	26	-	0.3	0.2	0
International CMOS Technology	0	12	17	0	0.1	0.1
ITT	96	81	96	0.7	0.5	0.5
Lattice	127	134	186	1.0	0.8	0.9
Logic Devices	8	12	13	0.1	0.1	0.1
LSI Logic	642	823	1,161	4.9	5.1	5.6
Micrel	5	7	7	0	0	0
Microchip Technology	4	-	-	0	0	0
Motorola	785	1,214	1,386	6.0	7.5	6.7
National Semiconductor	253	262	263	1.9	1.6	1.3
Performance Semiconductor	15	0	-	0.1	0	0
Quality Semiconductor	10	15	32	0.1	0.1	0.2
QuickLogic	0	8	16	0	0	0.1
Rockwell	4	5	6	0	0	0

(Continued)

**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Logic to Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Sierra Semiconductor	6	0	-	0	0	0
Standard Microsystems	4	-	-	0	0	0
Supertex	3	5	6	0	0	0
Symbios	165	217	208	1.3	1.3	1.0
Texas Instruments	733	1,115	1,317	5.6	6.9	6.4
Universal	9	7	8	0.1	0	0
VLSI Technology	342	372	479	2.6	2.3	2.3
WaferScale Integration	0	3	1	0	0	0
Xilinx	231	321	520	1.8	2.0	2.5
Other North American Companies	5	2	4	0	0	0
Japanese Companies	5,736	7,378	9,527	43.7	45.8	46.2
Fuji Electric	35	38	43	0.3	0.2	0.2
Fujitsu	676	794	1,179	5.2	4.9	5.7
Hitachi	426	569	655	3.2	3.5	3.2
Matsushita	446	472	632	3.4	2.9	3.1
Mitsubishi	129	234	427	1.0	1.5	2.1
NEC	1,254	1,587	1,987	9.6	9.9	9.6
New JRC	12	30	36	0.1	0.2	0.2
Oki	419	451	451	3.2	2.8	2.2
Ricoh	25	66	94	0.2	0.4	0.5
Rohm	50	104	244	0.4	0.6	1.2
Sanyo	271	453	528	2.1	2.8	2.6
Seiko Epson	186	197	229	1.4	1.2	1.1
Sharp	388	523	600	3.0	3.2	2.9
Sony	213	426	581	1.6	2.6	2.8
Toshiba	995	1,279	1,562	7.6	7.9	7.6
Yamaha	154	89	170	1.2	0.6	0.8
Other Japanese Companies	57	66	109	0.4	0.4	0.5
European Companies	866	1,164	1,475	6.6	7.2	7.2
Austria Mikro Systeme	36	46	68	0.3	0.3	0.3
Elex	0	5	-	0	0	0
Elmos	0	15	19	0	0.1	0.1
Ericsson	15	15	19	0.1	0.1	0.1
European Silicon Structures	36	40	48	0.3	0.2	0.2
GEC Plessey	101	118	154	0.8	0.7	0.7
Mietec	25	32	35	0.2	0.2	0.2
Philips	400	610	756	3.0	3.8	3.7

(Continued)

**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Logic to Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
SGS-Thomson	160	182	235	1.2	1.1	1.1
Siemens	24	21	29	0.2	0.1	0.1
TEMIC	57	50	73	0.4	0.3	0.4
TCS	12	15	19	0.1	0.1	0.1
Thesys	0	15	20	0	0.1	0.1
Asia/Pacific Companies	383	383	487	2.9	2.4	2.4
Acer	0	2	3	0	0	0
Daewoo	3	4	4	0	0	0
Holttek	20	50	53	0.2	0.3	0.3
Hualon Microelectronics Corp.	30	34	44	0.2	0.2	0.2
Hyundai	2	4	13	0	0	0.1
LG Semicon	46	52	116	0.4	0.3	0.6
Samsung	173	171	190	1.3	1.1	0.9
Silicon Integrated Systems	40	0	-	0.3	0	0
United Microelectronics Corp.	50	0	-	0.4	0	0
Winbond Electronics	19	66	65	0.1	0.4	0.3

Source: Dataquest (April 1996)

**Table 1-12**  
**Each Company's Factory Revenue from Shipments of Total Discrete Semiconductors to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	9,083	10,763	14,023	100.0	100.0	100.0
North American Companies	2,180	2,539	3,364	24.0	23.6	24.0
Allegro MicroSystems	10	9	25	0.1	0.1	0.2
AT&T	4	6	-	0	0.1	0
General Instrument	239	262	414	2.6	2.4	3.0
Harris	138	187	227	1.5	1.7	1.6
Hewlett-Packard	49	99	146	0.5	0.9	1.0
International Rectifier	285	353	470	3.1	3.3	3.4
ITT	107	114	192	1.2	1.1	1.4
Microsemi	97	100	118	1.1	0.9	0.8
Motorola	994	1,097	1,359	10.9	10.2	9.7
National Semiconductor	77	99	164	0.8	0.9	1.2
Optek	2	1	1	0	0	0
Powerex	58	76	98	0.6	0.7	0.7
Raytheon	8	8	13	0.1	0.1	0.1
Semtech	17	20	29	0.2	0.2	0.2
Solitron	11	5	6	0.1	0	0
Supertex	10	11	16	0.1	0.1	0.1
Teccor Electronics	45	60	69	0.5	0.6	0.5
Texas Instruments	29	32	16	0.3	0.3	0.1
Japanese Companies	4,861	5,692	7,140	53.5	52.9	50.9
Fuji Electric	293	357	467	3.2	3.3	3.3
Fujitsu	157	192	283	1.7	1.8	2.0
Hitachi	662	798	890	7.3	7.4	6.3
Matsushita	450	511	631	5.0	4.7	4.5
Mitsubishi	380	424	478	4.2	3.9	3.4
NEC	579	652	832	6.4	6.1	5.9
New JRC	3	2	2	0	0	0
Oki	9	10	12	0.1	0.1	0.1
Rohm	380	524	771	4.2	4.9	5.5
Sanken	299	334	398	3.3	3.1	2.8
Sanyo	336	389	487	3.7	3.6	3.5
Shindengen Electric	162	194	300	1.8	1.8	2.1
Sony	89	50	53	1.0	0.5	0.4
Toko	45	51	68	0.5	0.5	0.5
Toshiba	1,017	1,204	1,428	11.2	11.2	10.2
Other Japanese Companies	0	0	40	0	0	0.3

(Continued)



**Table 1-12 (Continued)**

**Each Company's Factory Revenue from Shipments of Total Discrete Semiconductors to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
European Companies	1,767	2,178	2,981	19.5	20.2	21.3
ABB-Hafo	6	0	-	0.1	0	0
ABB-Ixys	38	55	64	0.4	0.5	0.5
Elex	0	0	1	0	0	0
Ericsson	0	15	20	0	0.1	0.1
Eupec	82	98	120	0.9	0.9	0.9
Fagor	19	27	38	0.2	0.3	0.3
GEC Plessey	21	28	35	0.2	0.3	0.2
Philips	604	761	1,058	6.6	7.1	7.5
Semikron	94	112	126	1.0	1.0	0.9
SGS-Thomson	384	433	591	4.2	4.0	4.2
Siemens	229	284	435	2.5	2.6	3.1
TEMIC	175	235	321	1.9	2.2	2.3
TCS	1	1	1	0	0	0
Westcode	35	41	54	0.4	0.4	0.4
Zetex	29	36	51	0.3	0.3	0.4
Other European Companies	50	52	66	0.6	0.5	0.5
Asia/Pacific Companies	275	354	538	3.0	3.3	3.8
Dongsung Semiconductor	2	0	0	0	0	0
Korean Electronics Company	130	167	221	1.4	1.6	1.6
Samsung	143	187	317	1.6	1.7	2.3

Source: Dataquest (April 1996)

**Table 1-13**  
**Each Company's Factory Revenue from Shipments of Total Optical Semiconductors to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	3,002	3,889	4,811	100.0	100.0	100.0
North American Companies	519	699	547	17.3	18.0	11.4
AT&T	41	51	81	1.4	1.3	1.7
Hewlett-Packard	190	360	159	6.3	9.3	3.3
Honeywell	27	32	37	0.9	0.8	0.8
Motorola	41	45	50	1.4	1.2	1.0
Optek	54	48	53	1.8	1.2	1.1
Quality Technologies	47	49	60	1.6	1.3	1.2
Tektronix	5	0	0	0.2	0	0
Texas Instruments	50	45	43	1.7	1.2	0.9
Other North American Companies	64	69	64	2.1	1.8	1.3
Japanese Companies	2,162	2,798	3,734	72.0	71.9	77.6
Fujitsu	123	135	168	4.1	3.5	3.5
Hitachi	67	89	85	2.2	2.3	1.8
Matsushita	358	417	495	11.9	10.7	10.3
Mitsubishi	30	176	151	1.0	4.5	3.1
NEC	118	150	200	3.9	3.9	4.2
New JRC	13	11	12	0.4	0.3	0.2
Oki	28	24	28	0.9	0.6	0.6
Rohm	112	178	286	3.7	4.6	5.9
Sanken	32	34	52	1.1	0.9	1.1
Sanyo	137	150	169	4.6	3.9	3.5
Sharp	418	510	636	13.9	13.1	13.2
Sony	236	313	383	7.9	8.0	8.0
Toshiba	326	421	622	10.9	10.8	12.9
Other Japanese Companies	164	190	448	5.5	4.9	9.3
European Companies	264	378	504	8.8	9.7	10.5
ABB-Hafo	8	12	14	0.3	0.3	0.3
Ericsson	0	15	16	0	0.4	0.3
Siemens	170	220	314	5.7	5.7	6.5
TEMIC	54	93	110	1.8	2.4	2.3
TCS	21	26	34	0.7	0.7	0.7
Zetex	1	1	1	0	0	0
Other European Companies	10	11	15	0.3	0.3	0.3
Asia/Pacific Companies	57	14	26	1.9	0.4	0.5
Korean Electronics Company	10	11	22	0.3	0.3	0.5
Samsung	4	3	4	0.1	0.1	0.1
Other Asia/Pacific Companies	43	0	0	1.4	0	0

Source: Dataquest (April 1996)

**Table 1-14**  
**Each Company's Factory Revenue from Shipments of Analog-Monolithic Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	12,513	15,263	17,607	100.0	100.0	100.0
North American Companies	5,580	6,460	7,287	44.6	42.3	41.4
Advanced Micro Devices	154	187	172	1.2	1.2	1.0
Allegro MicroSystems	104	134	146	0.8	0.9	0.8
Analog Devices	526	602	810	4.2	3.9	4.6
Applied Micro Circuits Corp.	0	7	5	0	0	0
AT&T	334	402	284	2.7	2.6	1.6
Atmel	1	12	16	0	0.1	0.1
Brooktree	117	109	120	0.9	0.7	0.7
Burr-Brown	88	105	126	0.7	0.7	0.7
California Micro Devices	8	5	6	0.1	0	0
Catalyst	1	1	-	0	0	0
Cherry Semiconductor	55	77	87	0.4	0.5	0.5
Cirrus Logic	80	100	117	0.6	0.7	0.7
Comlinear	8	9	-	0.1	0.1	0
Dallas Semiconductor	8	-	-	0.1	0	0
Elantec	21	21	23	0.2	0.1	0.1
Exar	158	169	131	1.3	1.1	0.7
Gennum	30	29	34	0.2	0.2	0.2
Gould AMI	38	31	-	0.3	0.2	0
Harris	250	284	259	2.0	1.9	1.5
Honeywell	26	23	27	0.2	0.2	0.2
Hughes	16	19	16	0.1	0.1	0.1
IMI	3	2	5	0	0	0
IMP	29	40	42	0.2	0.3	0.2
Integrated Circuit Systems	12	39	45	0.1	0.3	0.3
Intel	12	20	9	0.1	0.1	0.1
International Rectifier	3	8	17	0	0.1	0.1
ITT	23	24	15	0.2	0.2	0.1
Kulite	24	20	24	0.2	0.1	0.1
Level One Communications	0	-	78	0	0	0.4
Linear Technology	173	225	305	1.4	1.5	1.7
Linfinity	34	41	48	0.3	0.3	0.3
Maxim	111	165	186	0.9	1.1	1.1
Micrel	13	18	19	0.1	0.1	0.1
Micro Linear	45	35	54	0.4	0.2	0.3
Micro Power Systems	23	23	-	0.2	0.2	0

(Continued)

**Table 1-14 (Continued)**  
**Each Company's Factory Revenue from Shipments of Analog-Monolithic Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Mitel	55	70	68	0.4	0.5	0.4
Motorola	707	924	1,024	5.7	6.1	5.8
Natel Engineering	7	0	0	0.1	0	0
National Semiconductor	788	907	1,033	6.3	5.9	5.9
Novasensor	16	13	15	0.1	0.1	0.1
Optek	0	7	8	0	0	0
Raytheon	68	78	92	0.5	0.5	0.5
Rockwell	155	-	-	1.2	0	0
Seeq Technology	9	0	0	0.1	0	0
Semtech	2	5	19	0	0	0.1
Sierra Semiconductor	90	85	97	0.7	0.6	0.6
Silicon Systems	265	298	368	2.1	2.0	2.1
Sipex	3	2	2	0	0	0
Supertex	10	13	13	0.1	0.1	0.1
Symbios	45	56	102	0.4	0.4	0.6
Tektronix	41	0	0	0.3	0	0
Telcom	0	18	17	0	0.1	0.1
Teledyne	26	0	0	0.2	0	0
Texas Instruments	617	842	933	4.9	5.5	5.3
Unitrode	64	73	102	0.5	0.5	0.6
Universal	5	6	7	0	0	0
VLSI Technology	2	-	-	0	0	0
VTC	70	70	155	0.6	0.5	0.9
Other North American Companies	7	7	8	0.1	0	0
Japanese Companies	3,903	4,911	5,706	31.2	32.2	32.4
Fuji Electric	16	27	30	0.1	0.2	0.2
Fujitsu	122	155	316	1.0	1.0	1.8
Hitachi	280	357	355	2.2	2.3	2.0
Matsushita	473	611	640	3.8	4.0	3.6
Mitsubishi	377	456	454	3.0	3.0	2.6
NEC	377	506	641	3.0	3.3	3.6
New JRC	158	173	183	1.3	1.1	1.0
Oki	22	26	28	0.2	0.2	0.2
Ricoh	8	14	38	0.1	0.1	0.2
Rohm	258	361	422	2.1	2.4	2.4
Sanyo	633	811	893	5.1	5.3	5.1
Seiko Epson	11	13	16	0.1	0.1	0.1

(Continued)

Table 1-14 (Continued)

Each Company's Factory Revenue from Shipments of Analog-Monolithic Integrated Circuits to Worldwide (Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Sharp	87	96	105	0.7	0.6	0.6
Sony	425	465	555	3.4	3.0	3.2
Toko	28	32	36	0.2	0.2	0.2
Toshiba	615	789	917	4.9	5.2	5.2
Yamaha	13	19	27	0.1	0.1	0.2
Other Japanese Companies	0	0	50	0	0	0.3
European Companies	2,687	3,489	4,213	21.5	22.9	23.9
ABB-Hafo	20	20	19	0.2	0.1	0.1
Austria Mikro Systeme	49	64	80	0.4	0.4	0.5
Elex	0	0	8	0	0	0
EM Microelectronics Marin	50	65	76	0.4	0.4	0.4
Ericsson	45	49	50	0.4	0.3	0.3
European Silicon Structures	0	0	11	0	0	0.1
GEC Plessey	114	135	156	0.9	0.9	0.9
Micronas	14	20	33	0.1	0.1	0.2
Mietec	123	146	144	1.0	1.0	0.8
Philips	752	957	1,256	6.0	6.3	7.1
SGS-Thomson	858	1,197	1,482	6.9	7.8	8.4
Siemens	382	546	692	3.1	3.6	3.9
TEMIC	262	267	178	2.1	1.7	1.0
TCS	16	20	24	0.1	0.1	0.1
Zetex	2	3	4	0	0	0
Asia/Pacific Companies	343	403	401	2.7	2.6	2.3
Daewoo	20	17	21	0.2	0.1	0.1
Holttek	15	-	-	0.1	0	0
Hualon Microelectronics Corp.	7	9	9	0.1	0.1	0.1
Hyundai	0	0	2	0	0	0
Korean Electronics Company	37	47	45	0.3	0.3	0.3
LG Semicon	40	45	42	0.3	0.3	0.2
Samsung	166	233	233	1.3	1.5	1.3
Winbond Electronics	58	52	49	0.5	0.3	0.3

Source: Dataquest (April 1996)

**Table 1-15**  
**Each Company's Factory Revenue from Shipments of Hybrid Analog Integrated**  
**Circuits to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	1,463	1,665	1,935	100.0	100.0	100.0
North American Companies	370	425	466	25.3	25.5	24.1
Allegro MicroSystems	0	-	12	0	0	0.6
Analog Devices	40	52	58	2.7	3.1	3.0
Burr-Brown	70	60	60	4.8	3.6	3.1
Comlinear	8	7	-	0.5	0.4	0
Elantec	2	3	3	0.1	0.2	0.2
Gennum	0	2	2	0	0.1	0.1
Linfinity	3	3	3	0.2	0.2	0.2
Maxim	4	4	4	0.3	0.2	0.2
Mitel	14	30	20	1.0	1.8	1.0
Motorola	171	226	280	11.7	13.6	14.5
Natel Engineering	5	0	0	0.3	0	0
National Semiconductor	14	7	8	1.0	0.4	0.4
Sipex	17	14	14	1.2	0.8	0.7
Solitron	0	2	2	0	0.1	0.1
Tektronix	8	0	0	0.5	0	0
Unitrode	14	15	-	1.0	0.9	0
Japanese Companies	988	1,136	1,369	67.5	68.2	70.7
Fuji Electric	21	22	23	1.4	1.3	1.2
Fujitsu	62	116	149	4.2	7.0	7.7
Hitachi	102	136	137	7.0	8.2	7.1
Mitsubishi	106	109	198	7.2	6.5	10.2
NEC	98	98	130	6.7	5.9	6.7
Oki	12	13	13	0.8	0.8	0.7
Rohm	68	72	78	4.6	4.3	4.0
Sanken	202	240	283	13.8	14.4	14.6
Sanyo	166	174	193	11.3	10.5	10.0
Shindengen Electric	49	48	28	3.3	2.9	1.4
Sony	36	41	41	2.5	2.5	2.1
Toko	8	8	9	0.5	0.5	0.4
Toshiba	58	59	74	4.0	3.5	3.8
Other Japanese Companies	0	0	14	0	0	0.7

(Continued)

**Table 1-15 (Continued)**

**Each Company's Factory Revenue from Shipments of Hybrid Analog Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
European Companies	105	104	100	7.2	6.2	5.2
ABB-Hafo	0	8	5	0	0.5	0.3
Ericsson	12	19	15	0.8	1.1	0.8
GEC Plessey	21	6	3	1.4	0.4	0.2
Micronas	0	0	10	0	0	0.5
Philips	55	54	46	3.8	3.2	2.4
TEMIC	2	-	-	0.1	0	0
Other European Companies	15	17	21	1.0	1.0	1.1

Source: Dataquest (April 1996)

## Section 2: Final 1995 Worldwide Market Share Rankings

**Table 2-1**  
**Top 40 Companies' Factory Revenue from Shipments of Total Semiconductors**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Intel	10,099	13,172	30	8.7
2	2	NEC	7,961	11,314	42	7.5
3	3	Toshiba	7,556	10,077	33	6.7
4	5	Hitachi	6,644	9,137	38	6.0
5	4	Motorola	7,238	8,732	21	5.8
6	7	Samsung	4,832	8,329	72	5.5
7	6	Texas Instruments	5,548	7,831	41	5.2
8	8	Fujitsu	3,869	5,538	43	3.7
9	9	Mitsubishi	3,772	5,272	40	3.5
10	21	Hyundai	1,521	4,132	172	2.7
11	10	Philips	2,920	3,901	34	2.6
12	13	IBM	2,532	3,522	39	2.3
13	11	Matsushita	2,896	3,476	20	2.3
14	12	SGS-Thomson	2,640	3,397	29	2.2
15	18	Siemens	2,090	3,062	47	2.0
16	20	LG Semicon	1,697	2,863	69	1.9
17	14	Sanyo	2,321	2,714	17	1.8
18	22	Micron Technology	1,492	2,601	74	1.7
19	15	Sharp	2,188	2,592	18	1.7
20	17	National Semiconductor	2,127	2,408	13	1.6
21	19	Sony	1,876	2,338	25	1.5
22	16	Advanced Micro Devices	2,134	2,330	9	1.5
23	23	Oki	1,471	2,029	38	1.3
24	24	Rohm	1,345	1,933	44	1.3
25	25	AT&T	1,307	1,615	24	1.1
26	26	LSI Logic	901	1,268	41	0.8
27	27	Cirrus Logic	781	1,002	28	0.7
28	28	Analog Devices	739	986	33	0.7
29	29	TEMIC	719	774	8	0.5
30	34	Rockwell	514	744	45	0.5
31	32	Sanken	608	733	20	0.5
32	31	Harris	665	681	2	0.5
33	33	VLSI Technology	588	673	15	0.4
34	30	Hewlett-Packard	714	648	-9	0.4

(Continued)



**Table 2-1 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Total Semiconductors**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
35	38	Integrated Device Technology	385	617	60	0.4
36	40	Atmel	375	590	57	0.4
37	35	Fuji Electric	446	566	27	0.4
38	37	Cypress Semiconductor	400	552	38	0.4
39	66	Nippon Steel Semiconductor	160	549	243	0.4
40	43	Xilinx	321	520	62	0.3
		All Others	12,121	16,053	32	10.6
		North American Companies	46,052	59,956	30	39.6
		Japanese Companies	44,778	60,612	35	40.1
		European Companies	9,834	12,903	31	8.5
		Asia/Pacific Companies	9,849	17,802	81	11.8
		Total Market	110,513	151,272	37	100.0

Source: Dataquest (April 1996)

**Table 2-2**  
**Top 40 Companies' Factory Revenue from Shipments of Total Semiconductors**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank	Company	1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Intel	10,099	13,172	30	8.8
2	2	NEC	7,863	11,184	42	7.5
3	3	Toshiba	7,497	10,003	33	6.7
4	5	Hitachi	6,508	9,000	38	6.0
5	4	Motorola	7,012	8,452	21	5.7
6	7	Samsung	4,832	8,329	72	5.6
7	6	Texas Instruments	5,548	7,831	41	5.2
8	8	Fujitsu	3,753	5,389	44	3.6
9	9	Mitsubishi	3,663	5,074	39	3.4
10	21	Hyundai	1,521	4,132	172	2.8
11	11	Philips	2,866	3,855	35	2.6
12	13	IBM	2,532	3,522	39	2.4
13	10	Matsushita	2,896	3,476	20	2.3
14	12	SGS-Thomson	2,640	3,397	29	2.3
15	18	Siemens	2,090	3,062	47	2.1
16	20	LG Semicon	1,697	2,863	69	1.9
17	22	Micron Technology	1,492	2,601	74	1.7
18	14	Sharp	2,188	2,592	18	1.7
19	15	Sanyo	2,147	2,520	17	1.7
20	17	National Semiconductor	2,120	2,400	13	1.6
21	16	Advanced Micro Devices	2,134	2,330	9	1.6
22	19	Sony	1,835	2,297	25	1.5
23	23	OKi	1,458	2,017	38	1.4
24	25	Rohm	1,273	1,855	46	1.2
25	24	AT&T	1,307	1,615	24	1.1
26	26	LSI Logic	901	1,268	41	0.8
27	27	Cirrus Logic	781	1,002	28	0.7
28	30	Analog Devices	687	927	35	0.6
29	28	TEMIC	719	774	8	0.5
30	33	Rockwell	514	744	45	0.5
31	31	Harris	665	681	2	0.5
32	32	VLSI Technology	588	673	15	0.5
33	29	Hewlett-Packard	714	648	-9	0.4
34	37	Integrated Device Technology	385	617	60	0.4
35	39	Atmel	375	590	57	0.4
36	36	Cypress Semiconductor	400	552	38	0.4
37	65	Nippon Steel Semiconductor	160	549	243	0.4

(Continued)

**Table 2-2 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Total Semiconductors**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	34	Fuji Electric	424	543	28	0.4
39	43	Xilinx	321	520	62	0.3
40	49	Mosel Vitelic	259	502	94	0.3
		All Others	11,984	15,777	32	10.6
		North American Companies	45,627	59,489	30	39.8
		Japanese Companies	43,642	59,242	36	39.7
		European Companies	9,730	12,803	32	8.6
		Asia/Pacific Companies	9,849	17,802	81	11.9
		Total Market	108,848	149,336	37	100.0

Source: Dataquest (April 1996)

**Table 2-3**  
**Top 40 Companies' Factory Revenue from Shipments of Total Integrated Circuits**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Intel	10,099	13,172	30	9.9
2	2	NEC	7,159	10,281	44	7.8
3	5	Hitachi	5,757	8,163	42	6.2
4	4	Toshiba	5,931	8,028	35	6.1
5	7	Samsung	4,642	8,008	73	6.0
6	6	Texas Instruments	5,471	7,772	42	5.9
7	3	Motorola	6,096	7,323	20	5.5
8	8	Fujitsu	3,542	5,087	44	3.8
9	9	Mitsubishi	3,172	4,644	46	3.5
10	20	Hyundai	1,521	4,132	172	3.1
11	10	IBM	2,532	3,522	39	2.7
12	17	LG Semicon	1,697	2,863	69	2.2
13	12	Philips	2,159	2,843	32	2.1
14	11	SGS-Thomson	2,207	2,806	27	2.1
15	22	Micron Technology	1,492	2,601	74	2.0
16	15	Matsushita	1,968	2,350	19	1.8
17	13	Advanced Micro Devices	2,134	2,330	9	1.8
18	19	Siemens	1,586	2,313	46	1.7
19	14	National Semiconductor	2,028	2,243	11	1.7
20	16	Sanyo	1,782	2,058	15	1.6
21	23	Oki	1,437	1,989	38	1.5
22	18	Sharp	1,678	1,956	17	1.5
23	21	Sony	1,513	1,901	26	1.4
24	24	AT&T	1,250	1,534	23	1.2
25	25	LSI Logic	901	1,268	41	1.0
26	26	Cirrus Logic	781	1,002	28	0.8
27	27	Analog Devices	739	986	33	0.7
28	28	Rohm	643	876	36	0.7
29	30	Rockwell	514	744	45	0.6
30	29	VLSI Technology	588	673	15	0.5
31	35	Integrated Device Technology	385	617	60	0.5
32	37	Atmel	375	590	57	0.4
33	33	Cypress Semiconductor	400	552	38	0.4
34	60	Nippon Steel Semiconductor	160	549	243	0.4
35	39	Xilinx	321	520	62	0.4
36	44	Mosel Vitelic	259	502	94	0.4
37	40	Winbond Electronics	308	491	60	0.4

(Continued)

**Table 2-3 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Total Integrated Circuits**  
**(Including Hybrid) to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	32	United Microelectronics Corp.	418	477	14	0.4
39	31	Harris	478	454	-5	0.3
40	36	Yamaha	382	444	16	0.3
		All Others	9,356	11,772	26	8.9
		North American Companies	42,814	56,045	31	42.3
		Japanese Companies	36,288	49,737	37	37.6
		European Companies	7,278	9,417	29	7.1
		Asia/Pacific Companies	9,481	17,238	82	13.0
		Total Market	95,861	132,437	38	100.0

Source: Dataquest (April 1996)

**Table 2-4**  
**Top 40 Companies' Factory Revenue from Shipments of Total Integrated Circuits**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Intel	10,099	13,172	30	10.1
2	2	NEC	7,061	10,151	44	7.8
3	5	Hitachi	5,621	8,026	43	6.1
4	7	Samsung	4,642	8,008	73	6.1
5	3	Toshiba	5,872	7,954	35	6.1
6	6	Texas Instruments	5,471	7,772	42	6.0
7	4	Motorola	5,870	7,043	20	5.4
8	8	Fujitsu	3,426	4,938	44	3.8
9	9	Mitsubishi	3,063	4,446	45	3.4
10	20	Hyundai	1,521	4,132	172	3.2
11	10	IBM	2,532	3,522	39	2.7
12	16	LG Semicon	1,697	2,863	69	2.2
13	11	SGS-Thomson	2,207	2,806	27	2.2
14	13	Philips	2,105	2,797	33	2.1
15	21	Micron Technology	1,492	2,601	74	2.0
16	15	Matsushita	1,968	2,350	19	1.8
17	12	Advanced Micro Devices	2,134	2,330	9	1.8
18	19	Siemens	1,586	2,313	46	1.8
19	14	National Semiconductor	2,021	2,235	11	1.7
20	23	Oki	1,424	1,977	39	1.5
21	17	Sharp	1,678	1,956	17	1.5
22	18	Sanyo	1,608	1,864	16	1.4
23	22	Sony	1,472	1,861	26	1.4
24	24	AT&T	1,250	1,534	23	1.2
25	25	LSI Logic	901	1,268	41	1.0
26	26	Cirrus Logic	781	1,002	28	0.8
27	27	Analog Devices	687	927	35	0.7
28	29	Rohm	571	798	40	0.6
29	30	Rockwell	514	744	45	0.6
30	28	VLSI Technology	588	673	15	0.5
31	35	Integrated Device Technology	385	617	60	0.5
32	37	Atmel	375	590	57	0.5
33	33	Cypress Semiconductor	400	552	38	0.4
34	58	Nippon Steel Semiconductor	160	549	243	0.4
35	39	Xilinx	321	520	62	0.4
36	44	Mosel Vitelic	259	502	94	0.4
37	40	Winbond Electronics	308	491	60	0.4

(Continued)

**Table 2-4 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Total Integrated Circuits**  
**(Excluding Hybrid) to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	32	United Microelectronics Corp.	418	477	14	0.4
39	31	Harris	478	454	-5	0.3
40	36	Yamaha	382	444	16	0.3
		All Others	8,848	11,242	27	8.6
		North American Companies	42,389	55,578	31	42.6
		Japanese Companies	35,152	48,368	38	37.1
		European Companies	7,174	9,317	30	7.1
		Asia/Pacific Companies	9,481	17,238	82	13.2
		Total Market	94,196	130,502	39	100.0

Source: Dataquest (April 1996)

**Table 2-5**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Digital Memory/Logic to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Texas Instruments	577	512	-11	20.5
2	2	Hitachi	465	442	-5	17.7
3	3	Motorola	421	425	1	17.0
4	5	National Semiconductor	221	210	-5	8.4
5	4	Fujitsu	395	204	-48	8.2
6	8	Philips	121	123	2	4.9
7	9	Toshiba	68	116	71	4.6
8	6	NEC	194	109	-44	4.4
9	7	Advanced Micro Devices	143	99	-31	4.0
10	10	AT&T	63	50	-21	2.0
11	15	Mitsubishi	23	36	57	1.4
12	13	Okidata	33	35	7	1.4
13	12	Siemens	33	31	-6	1.2
14	14	Matsushita	29	28	-2	1.1
15	16	Raytheon	22	19	-15	0.7
16	17	Applied Micro Circuits Corp.	20	18	-10	0.7
17	11	LG Semicon	46	14	-70	0.6
18	18	GEC Plessey	16	10	-38	0.4
19	19	SGS-Thomson	12	6	-47	0.3
20	20	Harris	6	4	-33	0.2
		All Others	4	4	0	0.2
		North American Companies	1,473	1,337	-9	53.6
		Japanese Companies	1,207	970	-20	38.9
		European Companies	186	174	-6	7.0
		Asia/Pacific Companies	46	14	-70	0.6
		Total Market	2,912	2,496	-14	100.0

Source: Dataquest (April 1996)



**Table 2-6**  
**Top Nine Companies' Factory Revenue from Shipments of Bipolar Digital Memory to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Hitachi	93	81	-13	50.4
2	3	Advanced Micro Devices	28	27	-4	16.8
3	2	Fujitsu	32	21	-35	12.9
4	5	Philips	14	14	0	8.7
5	4	NEC	16	9	-43	5.7
6	8	Raytheon	5	4	-28	2.3
7	7	National Semiconductor	5	2	-58	1.3
8	6	Texas Instruments	5	2	-60	1.2
9	9	Motorola	1	1	0	0.6
		All Others	0	0	NA	0
		North American Companies	44	36	-19	22.3
		Japanese Companies	141	111	-22	69.0
		European Companies	14	14	0	8.7
		Asia/Pacific Companies	0	0	NA	0
		Total Market	199	160	-19	100.0

NA = Not available

Source: Dataquest (April 1996)

**Table 2-7**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Digital Logic to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Texas Instruments	572	510	-11	21.9
2	2	Motorola	420	424	1	18.2
3	3	Hitachi	372	361	-3	15.5
4	5	National Semiconductor	216	208	-4	8.9
5	4	Fujitsu	363	183	-50	7.8
6	9	Toshiba	68	116	71	5.0
7	8	Philips	107	109	2	4.7
8	6	NEC	178	100	-44	4.3
9	7	Advanced Micro Devices	115	72	-38	3.1
10	10	AT&T	63	50	-21	2.1
11	15	Mitsubishi	23	36	57	1.5
12	12	Oki	33	35	7	1.5
13	13	Siemens	33	31	-6	1.3
14	14	Matsushita	29	28	-2	1.2
15	16	Applied Micro Circuits Corp.	20	18	-10	0.8
16	17	Raytheon	17	15	-11	0.6
17	11	LG Semicon	46	14	-70	0.6
18	18	GEC Plessey	16	10	-38	0.4
19	19	SGS-Thomson	12	6	-47	0.3
20	20	Harris	6	4	-33	0.2
		All Others	4	4	0	0.2
		North American Companies	1,429	1,301	-9	55.7
		Japanese Companies	1,066	860	-19	36.8
		European Companies	172	160	-7	6.9
		Asia/Pacific Companies	46	14	-70	0.6
		Total Market	2,713	2,335	-14	100.0

Source: Dataquest (April 1996)

**Table 2-8**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Intel	10,079	13,162	31	11.9
2	2	NEC	6,361	9,402	48	8.5
3	6	Samsung	4,409	7,775	76	7.0
4	4	Hitachi	4,799	7,229	51	6.5
5	3	Toshiba	5,015	6,921	38	6.3
6	7	Texas Instruments	4,052	6,326	56	5.7
7	5	Motorola	4,525	5,595	24	5.1
8	8	Fujitsu	2,876	4,418	54	4.0
9	14	Hyundai	1,521	4,130	172	3.7
10	9	Mitsubishi	2,584	3,956	53	3.6
11	10	IBM	2,532	3,522	39	3.2
12	12	LG Semicon	1,606	2,807	75	2.5
13	15	Micron Technology	1,492	2,601	74	2.4
14	11	Advanced Micro Devices	1,804	2,059	14	1.9
15	16	Oki	1,365	1,914	40	1.7
16	13	Sharp	1,582	1,851	17	1.7
17	17	Matsushita	1,328	1,681	27	1.5
18	19	Siemens	1,007	1,590	58	1.4
19	18	Philips	1,027	1,418	38	1.3
20	21	SGS-Thomson	998	1,318	32	1.2
21	20	Sony	1,007	1,306	30	1.2
22	22	LSI Logic	901	1,268	41	1.1
23	25	AT&T	785	1,200	53	1.1
24	23	National Semiconductor	893	992	11	0.9
25	24	Sanyo	797	971	22	0.9
26	26	Cirrus Logic	681	886	30	0.8
27	28	Rockwell	514	744	45	0.7
28	27	VLSI Technology	588	673	15	0.6
29	31	Integrated Device Technology	385	617	60	0.6
30	32	Atmel	363	574	58	0.5
31	30	Cypress Semiconductor	400	552	38	0.5
32	49	Nippon Steel Semiconductor	160	549	243	0.5
33	34	Xilinx	321	520	62	0.5
34	37	Mosel Vitelic	259	502	94	0.5
35	29	United Microelectronics Corp.	418	477	14	0.4
36	38	Winbond Electronics	256	442	73	0.4
37	33	Yamaha	363	416	15	0.4

(Continued)

**Table 2-8 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Digital Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	45	Altera	199	402	102	0.4
39	44	Rohm	210	376	79	0.3
40	39	Hewlett-Packard	255	343	34	0.3
		All Others	5,304	6,913	30	6.3
		North American Companies	34,456	46,954	36	42.5
		Japanese Companies	29,034	41,692	44	37.8
		European Companies	3,499	4,930	41	4.5
		Asia/Pacific Companies	9,032	16,822	86	15.2
		Total Market	76,021	110,399	45	100.0

Source: Dataquest (April 1996)

**Table 2-9**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory to Worldwide**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Samsung	4,194	7,498	79	13.6
2	3	NEC	3,096	5,352	73	9.7
3	2	Hitachi	3,232	5,132	59	9.3
4	4	Toshiba	3,018	4,264	41	7.7
5	10	Hyundai	1,515	4,116	172	7.4
6	5	Texas Instruments	1,931	3,756	95	6.8
7	8	LG Semicon	1,525	2,635	73	4.8
8	11	Micron Technology	1,492	2,601	74	4.7
9	6	Fujitsu	1,692	2,589	53	4.7
10	7	Mitsubishi	1,652	2,547	54	4.6
11	9	IBM	1,520	2,100	38	3.8
12	14	Siemens	858	1,353	58	2.4
13	15	Oki	697	1,228	76	2.2
14	12	Motorola	948	1,213	28	2.2
15	13	Sharp	867	1,030	19	1.9
16	17	Intel	458	766	67	1.4
17	18	Advanced Micro Devices	442	717	62	1.3
18	16	SGS-Thomson	589	646	10	1.2
19	29	Nippon Steel Semiconductor	160	549	243	1.0
20	23	Mosel Vitelic	259	502	94	0.9
21	19	Matsushita	396	492	24	0.9
22	20	Sony	387	490	27	0.9
23	21	Atmel	331	477	44	0.9
24	24	Integrated Device Technology	252	444	76	0.8
25	22	Cypress Semiconductor	285	424	49	0.8
26	30	Winbond Electronics	142	317	123	0.6
27	27	Sanyo	183	257	41	0.5
28	25	Macronix	200	236	18	0.4
29	32	Alliance Semiconductor	90	210	133	0.4
30	26	United Microelectronics Corp.	191	203	6	0.4
31	28	National Semiconductor	179	188	5	0.3
32	34	Integrated Silicon Solutions Inc.	60	158	164	0.3
33	31	Xicor	100	114	14	0.2
34	33	Microchip Technology	82	102	24	0.2
35	35	Rohm	56	61	8	0.1
36	41	Dallas Semiconductor	30	56	87	0.1
37	40	Paradigm	36	55	53	0.1

(Continued)

**Table 2-9 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Memory to Worldwide**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	37	Hualon Microelectronics Corp.	46	54	18	0.1
39	36	Catalyst	49	49	0	0.1
40	42	Electronic Designs	26	43	65	0.1
		All Others	239	237	-1	0.4
		North American Companies	8,430	13,615	62	24.6
		Japanese Companies	15,519	24,063	55	43.5
		European Companies	1,484	2,023	36	3.7
		Asia/Pacific Companies	8,072	15,561	93	28.2
		Total Market	33,505	55,262	65	100.0

Source: Dataquest (April 1996)

**Table 2-10**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponents to**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank	Company	1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Intel	9,595	12,396	29	35.9
2	2	Motorola	2,363	2,996	27	8.7
3	3	NEC	1,678	2,063	23	6.0
4	6	Hitachi	998	1,441	44	4.2
5	5	Texas Instruments	1,006	1,254	25	3.6
6	7	Toshiba	718	1,095	52	3.2
7	8	Mitsubishi	698	982	41	2.8
8	4	Advanced Micro Devices	1,021	922	-10	2.7
9	9	Cirrus Logic	681	886	30	2.6
10	10	Rockwell	509	738	45	2.1
11	14	IBM	399	703	76	2.0
12	13	Philips	403	662	64	1.9
13	15	Fujitsu	390	651	67	1.9
14	11	Matsushita	460	557	21	1.6
15	12	National Semiconductor	452	541	20	1.6
16	16	AT&T	305	510	67	1.5
17	19	SGS-Thomson	227	437	92	1.3
18	29	S3	130	315	142	0.9
19	20	United Microelectronics Corp.	227	274	21	0.8
20	21	Zilog	222	265	19	0.8
21	17	Yamaha	273	245	-10	0.7
22	26	Western Digital	184	239	30	0.7
23	22	Oki	217	235	8	0.7
24	24	Sony	194	235	21	0.7
25	25	Sharp	192	221	15	0.6
26	18	Cyrix	241	212	-12	0.6
27	31	Siemens	128	208	63	0.6
28	23	VLSI Technology	216	194	-10	0.6
29	27	Sanyo	161	186	16	0.5
30	28	Microchip Technology	130	169	30	0.5
31	30	OPTi	130	167	28	0.5
32	34	Standard Microsystems	100	150	50	0.4
33	36	Trident Microsystems	87	139	60	0.4
34	35	Chips & Technologies	89	138	55	0.4
35	33	Silicon Integrated Systems	101	127	26	0.4
36	32	Adaptec	125	124	-1	0.4
37	37	Analog Devices	85	117	37	0.3

(Continued)

**Table 2-10 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Microcomponents to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	41	LSI Logic	78	107	37	0.3
39	39	Tseng Labs	83	105	26	0.3
40	51	Samsung	44	87	98	0.3
		All Others	1,068	1,421	33	4.1
		North American Companies	18,843	24,205	28	70.1
		Japanese Companies	6,137	8,102	32	23.5
		European Companies	851	1,432	68	4.1
		Asia/Pacific Companies	577	774	34	2.2
		Total Market	26,408	34,513	31	100.0

Source: Dataquest (April 1996)



**Table 2-11**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic to Worldwide**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	NEC	1,587	1,987	25	9.6
2	2	Toshiba	1,279	1,562	22	7.6
3	3	Motorola	1,214	1,386	14	6.7
4	4	Texas Instruments	1,115	1,317	18	6.4
5	6	Fujitsu	794	1,179	48	5.7
6	5	LSI Logic	823	1,161	41	5.6
7	8	Philips	610	756	24	3.7
8	7	IBM	613	719	17	3.5
9	11	AT&T	477	687	44	3.3
10	9	Hitachi	569	655	15	3.2
11	12	Matsushita	472	632	34	3.1
12	10	Sharp	523	600	15	2.9
13	15	Sony	426	581	36	2.8
14	13	Sanyo	453	528	17	2.6
15	18	Xilinx	321	520	62	2.5
16	16	VLSI Technology	372	479	29	2.3
17	14	Oki	451	451	0	2.2
18	21	Mitsubishi	234	427	82	2.1
19	17	Advanced Micro Devices	341	420	23	2.0
20	23	Altera	199	402	102	1.9
21	20	Hewlett-Packard	255	343	34	1.7
22	19	National Semiconductor	262	263	0	1.3
23	30	Rohm	104	244	135	1.2
24	25	SGS-Thomson	182	235	29	1.1
25	24	Seiko Epson	197	229	16	1.1
26	22	Symbios	217	208	-4	1.0
27	26	Samsung	171	190	11	0.9
28	27	Lattice	134	186	39	0.9
29	32	Yamaha	89	170	91	0.8
30	29	GEC Plessey	118	154	31	0.7
31	31	Dallas Semiconductor	102	137	34	0.7
32	40	LG Semicon	52	116	123	0.6
33	33	Integrated Device Technology	82	110	34	0.5
34	35	Actel	76	108	42	0.5
35	28	Harris	124	108	-13	0.5
36	34	ITT	81	96	19	0.5
37	37	Ricoh	66	94	43	0.5

(Continued)

**Table 2-11 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS Logic to Worldwide**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	36	Cypress Semiconductor	75	79	6	0.4
39	41	TEMIC	50	73	46	0.4
40	39	Gould AMI	61	72	18	0.3
		All Others	737	960	30	4.7
		North American Companies	7,183	9,134	27	44.3
		Japanese Companies	7,378	9,527	29	46.2
		European Companies	1,164	1,475	27	7.2
		Asia/Pacific Companies	383	487	27	2.4
		Total Market	16,108	20,623	28	100.0

Source: Dataquest (April 1996)

**Table 2-12**  
**Top 40 Companies' Factory Revenue from Shipments of Total Discrete Semiconductors to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Toshiba	1,204	1,428	19	10.2
2	2	Motorola	1,097	1,359	24	9.7
3	4	Philips	761	1,058	39	7.5
4	3	Hitachi	798	890	11	6.3
5	5	NEC	652	832	28	5.9
6	6	Rohm	524	771	47	5.5
7	7	Matsushita	511	631	24	4.5
8	8	SGS-Thomson	433	591	36	4.2
9	10	Sanyo	389	487	25	3.5
10	9	Mitsubishi	424	478	13	3.4
11	12	International Rectifier	353	470	33	3.4
12	11	Fuji Electric	357	467	31	3.3
13	14	Siemens	284	435	53	3.1
14	15	General Instrument	262	414	58	3.0
15	13	Sanken	334	398	19	2.8
16	16	TEMIC	235	321	37	2.3
17	20	Samsung	187	317	70	2.3
18	17	Shindengen Electric	194	300	55	2.1
19	18	Fujitsu	192	283	47	2.0
20	19	Harris	187	227	21	1.6
21	21	Korean Electronics Company	167	221	32	1.6
22	22	ITT	114	192	69	1.4
23	25	National Semiconductor	99	164	66	1.2
24	26	Hewlett-Packard	99	146	47	1.0
25	23	Semikron	112	126	13	0.9
26	27	Eupec	98	120	22	0.9
27	24	Microsemi	100	118	18	0.8
28	28	Powerex	76	98	28	0.7
29	29	Teccor Electronics	60	69	16	0.5
30	31	Toko	51	68	34	0.5
31	30	ABB-Ixys	55	64	16	0.5
32	33	Westcode	41	54	32	0.4
33	32	Sony	50	53	6	0.4
34	34	Zetex	36	51	42	0.4
35	37	Fagor	27	38	41	0.3
36	36	GEC Plessey	28	35	25	0.2
37	38	Semtech	20	29	45	0.2

(Continued)

**Table 2-12 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Total Discrete Semiconductors to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	42	Allegro MicroSystems	9	25	178	0.2
39	39	Ericsson	15	20	33	0.1
40	35	Texas Instruments	32	16	-49	0.1
		All Others	96	158	64	1.1
		North American Companies	2,539	3,364	32	24.0
		Japanese Companies	5,692	7,140	25	50.9
		European Companies	2,178	2,981	37	21.3
		Asia/Pacific Companies	354	538	52	3.8
		Total Market	10,763	14,023	30	100.0

Source: Dataquest (April 1996)

**Table 2-13**  
**Top 20 Companies' Factory Revenue from Shipments of Total Optical Semiconductors to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Sharp	510	636	25	13.2
2	2	Toshiba	421	622	48	12.9
3	3	Matsushita	417	495	19	10.3
4	5	Sony	313	383	22	8.0
5	6	Siemens	220	314	43	6.5
6	7	Rohm	178	286	61	5.9
7	9	NEC	150	200	34	4.2
8	10	Sanyo	150	169	12	3.5
9	11	Fujitsu	135	168	25	3.5
10	4	Hewlett-Packard	360	159	-56	3.3
11	8	Mitsubishi	176	151	-14	3.1
12	12	TEMIC	93	110	18	2.3
13	13	Hitachi	89	85	-5	1.8
14	14	AT&T	51	81	59	1.7
15	15	Quality Technologies	49	60	22	1.2
16	16	Optek	48	53	11	1.1
17	19	Sanken	34	52	53	1.1
18	18	Motorola	45	50	11	1.0
19	17	Texas Instruments	45	43	-4	0.9
20	20	Honeywell	32	37	15	0.8
		All Others	373	658	76	13.7
		North American Companies	699	547	-22	11.4
		Japanese Companies	2,798	3,734	33	77.6
		European Companies	378	504	33	10.5
		Asia/Pacific Companies	14	26	86	0.5
		Total Market	3,889	4,811	24	100.0

Source: Dataquest (April 1996)

**Table 2-14**  
**Top 40 Companies' Factory Revenue from Shipments of Analog-Monolithic Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	SGS-Thomson	1,197	1,482	24	8.4
2	2	Philips	957	1,256	31	7.1
3	4	National Semiconductor	907	1,033	14	5.9
4	3	Motorola	924	1,024	11	5.8
5	5	Texas Instruments	842	933	11	5.3
6	7	Toshiba	789	917	16	5.2
7	6	Sanyo	811	893	10	5.1
8	9	Analog Devices	602	810	35	4.6
9	10	Siemens	546	692	27	3.9
10	11	NEC	506	641	27	3.6
11	8	Matsushita	611	640	5	3.6
12	12	Sony	465	555	19	3.2
13	13	Mitsubishi	456	454	0	2.6
14	15	Rohm	361	422	17	2.4
15	17	Silicon Systems	298	368	23	2.1
16	16	Hitachi	357	355	-1	2.0
17	26	Fujitsu	155	316	104	1.8
18	21	Linear Technology	225	305	35	1.7
19	14	AT&T	402	284	-29	1.6
20	18	Harris	284	259	-9	1.5
21	20	Samsung	233	233	0	1.3
22	25	Maxim	165	186	13	1.1
23	23	New JRC	173	183	6	1.0
24	19	TEMIC	267	178	-33	1.0
25	22	Advanced Micro Devices	187	172	-8	1.0
26	28	GEC Plessey	135	156	15	0.9
27	38	VTC	70	155	122	0.9
28	29	Allegro MicroSystems	134	146	9	0.8
29	27	Mietec	146	144	-1	0.8
30	24	Exar	169	131	-22	0.7
31	31	Burr-Brown	105	126	20	0.7
32	30	Brooktree	109	120	10	0.7
33	32	Cirrus Logic	100	117	17	0.7
34	33	Sharp	96	105	9	0.6
35	42	Symbios	56	102	83	0.6
36	37	Unitrode	73	102	40	0.6
37	34	Sierra Semiconductor	85	97	14	0.6

(Continued)

**Table 2-14 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Analog-Monolithic Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
38	35	Raytheon	78	92	18	0.5
39	36	Cherry Semiconductor	77	87	14	0.5
40	41	Austria Mikro Systeme	64	80	25	0.5
		All Others	1,046	1,257	20	7.1
		North American Companies	6,460	7,287	13	41.4
		Japanese Companies	4,911	5,706	16	32.4
		European Companies	3,489	4,213	21	23.9
		Asia/Pacific Companies	403	401	0	2.3
		Total Market	15,263	17,607	15	100.0

Source: Dataquest (April 1996)

**Table 2-15**  
**Top 10 Companies' Factory Revenue from Shipments of Hybrid Analog Integrated Circuits to Worldwide (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percent Change	1995 Market Share (%)
1	1	Sanken	240	283	18	14.6
2	2	Motorola	226	280	24	14.5
3	6	Mitsubishi	109	198	82	10.2
4	3	Sanyo	174	193	11	10.0
5	5	Fujitsu	116	149	28	7.7
6	4	Hitachi	136	137	1	7.1
7	7	NEC	98	130	33	6.7
8	8	Rohm	72	78	8	4.0
9	10	Toshiba	59	74	25	3.8
10	9	Burr-Brown	60	60	0	3.1
		All Others	375	353	-6	18.2
		North American Companies	425	466	10	24.1
		Japanese Companies	1,136	1,369	21	70.7
		European Companies	104	100	-4	5.2
		Asia/Pacific Companies	0	0	NA	0
		Total Market	1,665	1,935	16	100.0

NA = Not available

Source: Dataquest (April 1996)



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**For More Information...**

Kevin McClure, Market Research Analyst .....(408) 468-8505  
Internet address ..... kmclure@dataquest.com  
Via fax .....(408) 954-1780

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**Dataquest**  
A Gartner Group Company

## DATAQUEST WORLDWIDE OFFICES

### NORTH AMERICA

#### Worldwide Headquarters

251 River Oaks Parkway  
San Jose, California 95134-1913  
United States  
Phone: 1-408-468-8000  
Facsimile: 1-408-954-1780

#### East Coast Headquarters

Nine Technology Drive  
P.O. Box 5093  
Westborough, Massachusetts 01581-5093  
United States  
Phone: 1-508-871-5555  
Facsimile: 1-508-871-6262

#### Dataquest Global Events

3990 Westerly Place, Suite 100  
Newport Beach, California 92660  
United States  
Phone: 1-714-476-9117  
Facsimile: 1-714-476-9969

#### Sales Offices:

Washington, DC (Federal)  
New York, NY (Financial)  
Dallas, TX

### LATIN AMERICA

#### Research Affiliates and Sales Offices:

Buenos Aires, Argentina  
Sao Paulo, Brazil  
Santiago, Chile  
Mexico City, Mexico

### EUROPE

#### European Headquarters

Dataquest Europe Limited  
Holmers Farm Way  
High Wycombe, Bucks HP12 4XH  
United Kingdom  
Phone: +44 1494 422 722  
Facsimile: +44 1494 422 742

#### Dataquest France

Immeuble Défense Bergères  
345, avenue Georges Clémenceau  
TSA 40002  
92882 - Nanterre CTC Cedex 9  
France  
Phone: +33 1 41 35 13 00  
Facsimile: +33 1 41 35 13 13

#### Dataquest Germany

Kronstadter Strasse 9  
81677 München  
Germany  
Phone: +49 89 93 09 09 0  
Facsimile: +49 89 93 03 27 7

#### Sales Offices:

Brussels, Belgium  
Kfar Saba, Israel  
Milan, Italy  
Randburg, South Africa  
Madrid, Spain

### JAPAN

#### Japan Headquarters

Shinkawa Sanko Building  
6th Floor  
1-3-17, Shinkawa  
Chuo-ku, Tokyo 104  
Japan  
Phone: 81-3-5566-0411  
Facsimile: 81-3-5566-0425

### ASIA/PACIFIC

#### Asia/Pacific Headquarters

7/F China Underwriters Centre  
88 Gloucester Road  
Wan Chai  
Hong Kong  
Phone: 852-2824-6168  
Facsimile: 852-2824-6138

#### Dataquest Korea

Suite 2407, Trade Tower  
159 Samsung-dong, Kangnam-gu  
Seoul 135-729  
Korea  
Phone: 822-551-1331  
Facsimile: 822-551-1330

#### Dataquest Taiwan

11F-2, No. 188, Section 5  
Nan King East Road  
Taipei  
Taiwan, R.O.C.  
Phone: 8862-756-0389  
Facsimile: 8862-756-2663

#### Dataquest Singapore

105 Cecil Street  
#06-01/02 The Octagon  
Singapore 069534  
Phone: 65-227-1213  
Facsimile: 65-227-4607

#### Dataquest Thailand

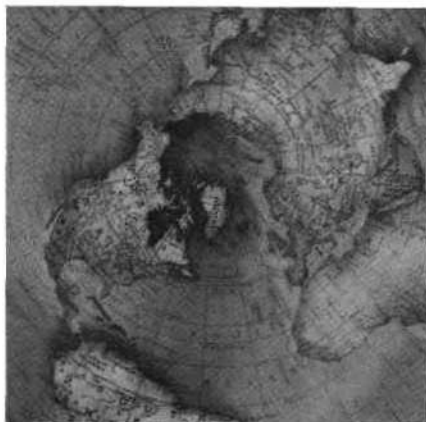
12/F, Vanissa Building  
29 Soi Chidlom  
Ploenchit Road  
Patumwan, Bangkok 10330  
Thailand  
Phone: 662-655-0577  
Facsimile: 662-655-0576

#### Research Affiliates and Sales Offices:

Melbourne, Australia  
Beijing, China

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MARIA VALENZUELA**

**Dataquest**

## **Final 1995 Worldwide ASIC Market Share**



**Market Statistics**

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**Program:** ASICs Worldwide  
**Product Code:** ASIC-WW-MS-9601  
**Publication Date:** April 29, 1996  
**Filing:** Market Statistics

# Final 1995 Worldwide ASIC Market Share



Market Statistics

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**Program:** ASICs Worldwide  
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Note: All tables show estimated data.



# Final 1995 Worldwide ASIC Market Share

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## Introduction

This document contains detailed information on Dataquest's view of the application-specific integrated circuit (ASIC) market. Included in this document are the following:

- 1993-1995 ASIC market share estimates
- 1993-1995 gate array market share estimates
- 1993-1995 cell-based IC (CBIC) market share estimates
- 1993-1995 programmable logic device (PLD) market share estimates

Analyses of market share by company provide insight into high-technology markets and reinforce estimates of consumption, production, and company revenue.

ASIC market share estimates combine data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. market consumption or revenue are based on the average exchange rate for the given year. Refer to the section titled "Exchange Rates" for more information regarding these average rates. As a rule, Dataquest's estimates are calculated in local currencies and then converted to U.S. dollars.

More detailed data on this market may be requested through Dataquest's client inquiry service. Qualitative analysis of this data is provided in Market Analysis documents and in a future ASIC Market Trends report.

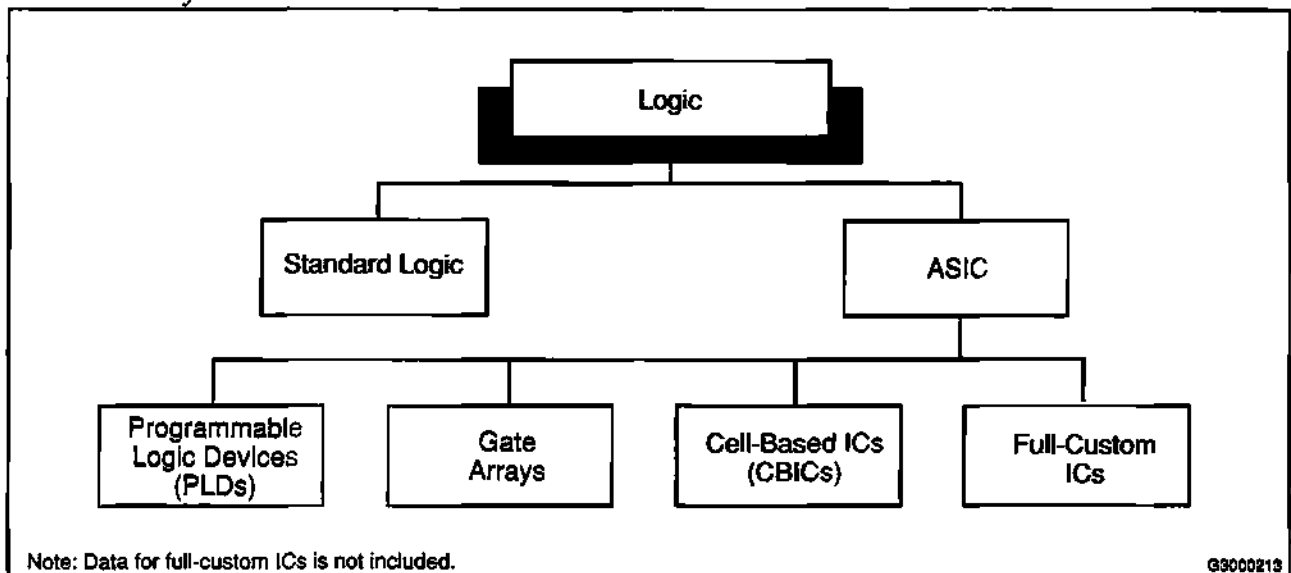
## Segmentation

This section outlines the market segments that are specific to this document. Dataquest's objective is to provide data along lines of segmentation that are logical, appropriate to the industry in question, and immediately useful to clients.

Dataquest defines the ASIC market according to the segmentation scheme in Figure 1.

Figure 1 shows Dataquest's segmentation into the two main categories of standard logic and ASIC. The ASIC family tree breaks out ASICs as follows: PLDs, gate arrays, CBICs, and full-custom ICs. CBICs and full-custom ICs are personalized by altering the full set of masks, whereas PLDs and gate arrays are personalized by electrically programming the devices or by altering only the final layers of interconnect.

**Figure 1**  
**ASIC Family Tree**



## Definitions

This section lists the definitions that are used by Dataquest to present the data in this document. Complete definitions for all terms associated with Dataquest's segmentation of the high-technology marketplace can be found in the *Dataquest Semiconductor Market Definitions Guide*.

### Product Definitions

**Application-Specific Integrated Circuits (ASICs):** This term is used to describe all IC products customized for a single user. ASIC products are a combination of digital, mixed-signal, and analog products. Customized ICs purchased by more than one user become standard products and are no longer counted as ASICs.

**Programmable Logic Devices (PLDs):** PLDs are defined as ICs programmed after assembly. Memory devices such as PROMs and ROMs are not included in this market segment. PLDs are subdivided into three main categories as follows:

- **Simple Programmable Logic Devices (SPLDs):** These devices have fixed or preconnected architectures capable of providing up to two levels of logic without using additional I/O cells or pins.
- **Complex Programmable Logic Devices (CPLDs):** These devices are product-term or segmented PAL-based devices that may or may not implement multiple levels of logic without using additional I/O cells or pins.
- **Field-Programmable Gate Arrays (FPGAs):** Field-programmable gate arrays are based on segmented programmable interconnect and typically consist of an x-y matrix of logic modules typically fed by a limited number of preconnected signals.

**Gate Arrays:** Gate arrays are ASICs that contain a configuration of uncommitted elements in a prefabricated base wafer. They are customized by interconnecting these elements with one or more routing layers. Included in this category are traditional gate arrays (channeled and sea-of-gates architecture) and embedded gate arrays (channeled or sea-of-gates architecture that also includes megacells such as SRAM diffused into the gate array base wafer).

**Cell-Based ICs (CBICs):** CBICs are ASICs that are customized using a full set of masks and use automatic place and route tools. Included in this category are traditional standard cells (fixed-height/fixed-width cells), as well as megacells (variable-height/variable-width cells) and compiled cells.

**Full-Custom ICs:** Full-custom ICs are defined as ASICs customized using a full set of masks and using manual place and route.

### **Revenue Classification**

Because ASICs may be fabricated, assembled, and sold in several different locations, Dataquest regional device consumption is defined according to the shipping destination.

Consumption estimates include the following five sources of revenue:

- Intracompany revenue (sales to internal divisions)
- Nonrecurring engineering (NRE) revenue
- ASIC software revenue
- PLD development kit revenue
- Device production revenue

### **Merchant versus Captive Consumption**

Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. Dataquest's revenue estimates do not include captive-only manufacturing companies represented by companies such as Digital Equipment, Northern Telecom, or Unisys that do not sell semiconductor products in the merchant market.

### **Regional Definitions**

#### **Americas**

North America: Includes Canada, Mexico, and the United States (50 states).

South America

Central America

#### **Japan**

Japan is the only single-country region.

**Europe, Africa, and the Middle East**

Western Europe: Includes Austria, Belgium, Denmark, Eire (Ireland), Finland, France, Germany (including former East Germany), Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and rest of western Europe (Andorra, Cyprus, Gibraltar, Liechtenstein, Monaco, San Marino, Vatican City, Iceland, Malta, and Turkey).

Eastern Europe: Includes Albania, Bulgaria, the Czech Republic and Slovakia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the republics of the former Yugoslavia, and the republics of the former USSR (Belarus, Russian Federation, Ukraine, Georgia, Moldavia, Armenia, Azerbaijan, Kazakhstan, Uzbekistan, Tadjikistan, Kyrgyzstan, and Turkmenistan).

**Asia/Pacific**

Includes Hong Kong, Singapore, South Korea, Taiwan, Australia, Bangladesh, Cambodia, China, India, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam.

**Line Item Definitions**

Factory revenue is defined as the money value received by a semiconductor manufacturer for its products. Revenue from the sale of semiconductors sold either as finished goods, die, or wafers to another semiconductor vendor for resale is attributed to the semiconductor vendor that sells the product to a distributor or equipment manufacturer.

**Market Share Methodology**

Dataquest uses both primary and secondary sources to produce market statistics data. In the fourth quarter of each year, Dataquest surveys all major participants within each industry. Selected companies are resurveyed during the first quarter of the following year to verify final annual results. This primary research is supplemented with additional primary research and secondary research to verify market size, shipment totals, and pricing information. Sources of data used by Dataquest include the following:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data (such as WSTS, MITI, and U.S. DOC)
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and CD-ROM data banks

- Articles in both the general and trade press
- Reports from financial analysts
- End-user surveys

Dataquest believes that the estimates presented in this document are the most accurate and meaningful statistics available. Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Dataquest and those provided by other suppliers.

## Notes on Market Share

In the process of conducting data collection and preparing market statistics information, Dataquest will sometimes consolidate or revise a particular company, model, series, or industry's numbers. In this section, we explain any such changes contained within this document for your reference.

### Notes to Market Share Tables

1. Full-custom IC revenue is not included in the data presented here.
2. ASIC product revenue is based on the combined revenue from digital, mixed analog and digital, and analog products.
3. MOS rankings include the sales of CMOS, NMOS, and BiCMOS.
4. Total rankings include the sales of CMOS, NMOS, BiCMOS, and bipolar.
5. Appian Technology was formerly known as ZyMOS.
6. Dialog, Eurosil, Matra, Telefunken, and Siliconix are now known as TEMIC.
7. Exel's revenue is included in Rohm.
8. GEC Plessey's revenue includes MEDL and Plessey's revenue from 1990 forward.
9. IBM entered the merchant ASIC market in May 1993. Dataquest estimates for IBM start in 1993 and include both merchant and intracompany revenue.
10. Philips' revenue includes Signetics' revenue.
11. Raytheon's revenue includes that of TRW's LSI Division from 1992 forward.

12. Seiko Epson's revenue includes revenue of SMOS Systems.
13. Thomson Semiconductors Specific was formed through the merger of Thomson Composants Microndes (TCM) and Thomson Composants Militaires et Spatiaux (TMS).
14. Vertex's (formerly known as Integrated CMOS Systems) revenue is included in Toshiba's revenue from 1991 forward.
15. Xilinx acquired Plus Logic in 1992.
16. National Semiconductor, Siemens, SGS-Thomson, and the Other Company category have been re-evaluated and restated for 1993.
17. In 1994, the first three quarters of Intel's PLD Division's revenue is included in Intel's revenue, and the last quarter's revenue is included in Altera's revenue to accurately reflect the sale of the PLD Division.
18. Fujitsu's and Texas Instruments' 1994 MOS gate array revenue has been re-evaluated and restated.
19. Compass Software revenue is excluded from VLSI Technology's ASIC revenue starting in 1995.

## Exchange Rates

Dataquest uses an average annual exchange rate in converting revenue to U.S. dollar amounts. Table 1 outlines these rates for 1993 through 1995.

**Table 1**  
**Exchange Rates**

	1993	1994	1995
Japan (Yen/U.S.\$)	111.20	101.81	93.90
France (Franc/U.S.\$)	5.67	5.54	4.97
Germany (Deutsche Mark/U.S.\$)	1.66	1.62	1.43
United Kingdom (U.S.\$/Pound Sterling)	1.50	1.53	1.59

Source: Dataquest (April 1996)

## Section 1: Estimated Worldwide ASIC Revenue, 1993-1995

Table 1-1

Each Company's 1995 Factory Revenue from Shipments of ASICs by Product to the World (Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	Gate Arrays	CBICs	PLDs	Gate Arrays	CBICs	PLDs
Total Market	6,625	5,819	1812	100.0	100.0	100.0
North American Companies	2,077	3,517	1789	31.4	60.4	98.7
Actel	0	0	108	0	0	6.0
Advanced Micro Devices	0	0	335	0	0	18.5
Altera	0	0	402	0	0	22.2
Analog Devices	0	17	0	0	0.3	0
Applied Micro Circuits Corp.	38	0	0	0.6	0	0
AT&T	64	658	72	1.0	11.3	4.0
Atmel	21	10	18	0.3	0.2	1.0
Cherry Semiconductor	4	0	0	0.1	0	0
Cypress Semiconductor	0	0	56	0	0	3.1
ETEQ Microsystems	7	0	0	0.1	0	0
Exar	7	0	0	0.1	0	0
Gennum	5	0	0	0.1	0	0
Gould AMI	50	55	4	0.7	0.9	0.2
Harris	0	50	0	0	0.9	0
Hewlett-Packard	0	343	0	0	5.9	0
Hughes	9	4	0	0.1	0.1	0
IBM	302	417	0	4.6	7.2	0
IMI	30	0	0	0.5	0	0
IMP Microelectronic Products	0	9	0	0	0.2	0
Integrated Circuit Systems	0	44	0	0	0.8	0
Intel	0	0	0	0	0	0
International CMOS Technology	0	0	17	0	0	0.9
Lattice	0	0	186	0	0	10.3
LSI Logic	677	484	0	10.2	8.3	0
Micro Linear	9	0	0	0.1	0	0
Motorola	262	95	0	4.0	1.6	0
National Semiconductor	41	103	2	0.6	1.8	0.1
QuickLogic	0	0	16	0	0	0.9
Raytheon	23	6	0	0.3	0.1	0
Rockwell	0	4	0	0	0.1	0
Sierra Semiconductor	0	12	0	0	0.2	0

(Continued)

**Table 1-1 (Continued)**  
**Each Company's 1995 Factory Revenue from Shipments of ASICs by Product to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	Gate Arrays	CBICs	PLDs	Gate Arrays	CBICs	PLDs
Silicon Systems	0	4	0	0	0.1	0
Sipex	1	0	0	0	0	0
Standard Microsystems	0	0	0	0	0	0
Symbios	27	290	0	0.4	5.0	0
Texas Instruments	362	410	50	5.5	7.0	2.8
Universal	8	0	0	0.1	0	0
VLSI Technology	94	385	0	1.4	6.6	0
Xilinx	0	0	520	0	0	28.7
Other North American Companies	36	118	3	0.5	2.0	0.2
Japanese Companies	4,080	1,457	3	61.6	25.0	0.2
Fujitsu	1,001	328	0	15.1	5.6	0
Hitachi	507	99	0	7.7	1.7	0
Matsushita	113	162	0	1.7	2.8	0
Mitsubishi	263	35	0	4.0	0.6	0
NEC	1,097	345	0	16.6	5.9	0
Oki	93	76	0	1.4	1.3	0
Ricoh	31	47	1	0.5	0.8	0.1
Rohm	35	21	0	0.5	0.4	0
Sanyo	30	27	0	0.5	0.5	0
Seiko Epson	113	16	0	1.7	0.3	0
Sharp	76	42	0	1.1	0.7	0
Sony	43	0	0	0.7	0	0
Toshiba	675	246	2	10.2	4.2	0.1
Yamaha	3	12	0	0	0.2	0
European Companies	286	808	17	4.3	13.9	0.9
ABB-Hafo	0	21	0	0	0.4	0
Austria Mikro Systeme	3	129	0	0	2.2	0
Elex	0	0	0	0	0	0
Elmos	0	7	0	0	0.1	0
Ericsson	0	19	0	0	0.3	0
European Silicon Structures	0	59	0	0	1.0	0
GEC Plessey	139	78	0	2.1	1.3	0
Micronas	0	37	0	0	0.6	0
Mietec	0	182	0	0	3.1	0
Philips	0	0	16	0	0	0.9
SGS-Thomson	96	189	0	1.4	3.2	0

(Continued)



**Table 1-1 (Continued)**  
**Each Company's 1995 Factory Revenue from Shipments of ASICs by Product to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	Gate Arrays	CBICs	PLDs	Gate Arrays	CBICs	PLDs
Siemens	16	29	0	0.2	0.5	0
TEMIC	29	26	0	0.4	0.4	0
TCS	1	12	0	0	0.2	0
Thesys	0	20	0	0	0.3	0
Other European Companies	2	0	1	0	0	0.1
Asia/Pacific Companies	181	37	3	2.7	0.6	0.1
Acer	0	0	3	0	0	0.1
Daewoo	3	1	0	0	0	0
Holtek	6	0	0	0.1	0	0
Hualon Microelectronics Corp.	0	0	0	0	0	0
Hyundai	13	0	0	0.2	0	0
LG Semicon	72	18	0	1.1	0.3	0
Samsung	87	18	0	1.3	0.3	0

Source: Dataquest (April 1996)

**Table 1-2**  
**Each Company's Factory Revenue from Shipments of ASICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	9,114	11,040	14,256	100.0	100.0	100.0
North American Companies	4,945	5,757	7,384	54.3	52.1	51.8
Actel	60	76	108	0.7	0.7	0.8
Advanced Micro Devices	288	281	335	3.2	2.5	2.4
Altera	140	199	402	1.5	1.8	2.8
Analog Devices	15	17	17	0.2	0.2	0.1
Applied Micro Circuits Corp.	43	36	38	0.5	0.3	0.3
AT&T	499	564	794	5.5	5.1	5.6
Atmel	23	24	49	0.3	0.2	0.3
Cherry Semiconductor	1	4	4	0	0	0
Cypress Semiconductor	47	55	56	0.5	0.5	0.4
ETEQ Microsystems	0	6	7	0	0.1	0
Exar	14	7	7	0.2	0.1	0
Gennum	4	5	5	0	0	0
Gould AMI	65	92	109	0.7	0.8	0.8
Harris	62	47	50	0.7	0.4	0.4
Hewlett-Packard	230	255	343	2.5	2.3	2.4
Hughes	17	14	13	0.2	0.1	0.1
IBM	540	613	719	5.9	5.6	5.0
IMI	18	18	30	0.2	0.2	0.2
IMP	13	12	9	0.1	0.1	0.1
Integrated Circuit Systems	33	35	44	0.4	0.3	0.3
Intel	45	26	0	0.5	0.2	0
International CMOS Technology	0	12	17	0	0.1	0.1
Lattice	127	134	186	1.4	1.2	1.3
LSI Logic	642	823	1,161	7.0	7.5	8.1
Micro Linear	11	10	9	0.1	0.1	0.1
Motorola	269	316	357	3.0	2.9	2.5
National Semiconductor	174	159	146	1.9	1.4	1.0
QuickLogic	0	8	16	0	0.1	0.1
Raytheon	37	30	29	0.4	0.3	0.2
Rockwell	2	3	4	0	0	0
Sierra Semiconductor	18	14	12	0.2	0.1	0.1
Silicon Systems	8	6	4	0.1	0.1	0
Sipex	2	1	1	0	0	0
Standard Microsystems	4	0	0	0	0	0
Symbios	202	273	317	2.2	2.5	2.2

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of ASICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Texas Instruments	556	696	822	6.1	6.3	5.8
Universal	9	7	8	0.1	0.1	0.1
VLSI Technology	344	372	479	3.8	3.4	3.4
Xilinx	231	321	520	2.5	2.9	3.6
Other North American Companies	152	186	157	1.7	1.7	1.1
Japanese Companies	3,257	4,273	5,540	35.7	38.7	38.9
Fujitsu	832	1,056	1,329	9.1	9.6	9.3
Hitachi	428	561	606	4.7	5.1	4.3
Matsushita	154	212	275	1.7	1.9	1.9
Mitsubishi	73	170	298	0.8	1.5	2.1
NEC	851	1,082	1,442	9.3	9.8	10.1
Oki	105	149	169	1.2	1.3	1.2
Ricoh	15	20	79	0.2	0.2	0.6
Rohm	23	41	56	0.3	0.4	0.4
Sanyo	26	42	57	0.3	0.4	0.4
Seiko Epson	103	106	129	1.1	1.0	0.9
Sharp	76	94	118	0.8	0.9	0.8
Sony	25	36	43	0.3	0.3	0.3
Toshiba	542	700	923	5.9	6.3	6.5
Yamaha	4	4	15	0	0	0.1
European Companies	809	881	1,111	8.9	8.0	7.8
ABB-Hafo	20	20	21	0.2	0.2	0.1
Austria Mikro Systeme	70	89	132	0.8	0.8	0.9
Elex	0	5	0	0	0	0
Elmos	0	5	7	0	0	0
Ericsson	15	15	19	0.2	0.1	0.1
European Silicon Structures	36	40	59	0.4	0.4	0.4
GEC Plessey	170	173	217	1.9	1.6	1.5
Micronas	14	20	37	0.2	0.2	0.3
Mietec	139	165	182	1.5	1.5	1.3
Philips	49	20	16	0.5	0.2	0.1
SGS-Thomson	168	212	285	1.8	1.9	2.0
Siemens	48	38	45	0.5	0.3	0.3
TEMIC	56	51	55	0.6	0.5	0.4
TCS	21	10	13	0.2	0.1	0.1
Thesys	0	15	20	0	0.1	0.1
Other European Companies	3	3	3	0	0	0

(Continued)

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of ASICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Asia/Pacific Companies	103	129	221	1.1	1.2	1.5
Acer	0	2	3	0	0	0
Daewoo	2	3	4	0	0	0
Holtek	2	2	6	0	0	0
Hualon Microelectronics Corp.	1	0	0	0	0	0
Hyundai	2	4	13	0	0	0.1
LG Semicon	25	35	90	0.3	0.3	0.6
Samsung	71	83	105	0.8	0.8	0.7

Source: Dataquest (April 1996)

**Table 1-3**  
**Each Company's Factory Revenue from Shipments of MOS/BiCMOS ASICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	7,911	9,970	13,427	100.0	100.0	100.0
North American Companies	4,435	5,341	7,086	56.1	53.6	52.8
Actel	60	76	108	0.8	0.8	0.8
Advanced Micro Devices	160	188	271	2.0	1.9	2.0
Altera	140	199	402	1.8	2.0	3.0
Analog Devices	15	17	17	0.2	0.2	0.1
Applied Micro Circuits Corp.	17	16	20	0.2	0.2	0.1
AT&T	454	520	772	5.7	5.2	5.7
Atmel	22	24	49	0.3	0.2	0.4
Cypress Semiconductor	47	55	56	0.6	0.6	0.4
ETEQ Microsystems	0	6	7	0	0.1	0.1
Gould AMI	65	92	109	0.8	0.9	0.8
Harris	62	47	50	0.8	0.5	0.4
Hewlett-Packard	230	255	343	2.9	2.6	2.6
Hughes	17	14	13	0.2	0.1	0.1
IBM	540	613	719	6.8	6.1	5.4
IMI	18	18	30	0.2	0.2	0.2
IMP	13	12	9	0.2	0.1	0.1
Integrated Circuit Systems	33	35	44	0.4	0.4	0.3
Intel	45	26	0	0.6	0.3	0
International CMOS Technology	0	12	17	0	0.1	0.1
Lattice	127	134	186	1.6	1.3	1.4
LSI Logic	642	823	1,161	8.1	8.3	8.6
Micro Linear	6	5	4	0.1	0.1	0
Motorola	169	225	302	2.1	2.3	2.2
National Semiconductor	117	108	93	1.5	1.1	0.7
QuickLogic	0	8	16	0	0.1	0.1
Raytheon	3	5	6	0	0.1	0
Rockwell	2	3	4	0	0	0
Sierra Semiconductor	18	14	12	0.2	0.1	0.1
Silicon Systems	8	6	4	0.1	0.1	0
Standard Microsystems	4	0	0	0.1	0	0
Symbios	202	273	317	2.6	2.7	2.4
Texas Instruments	472	630	787	6.0	6.3	5.9
Universal	9	7	8	0.1	0.1	0.1
VLSI Technology	344	372	479	4.3	3.7	3.6
Xilinx	231	321	520	2.9	3.2	3.9

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS/BiCMOS ASICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Other North American Companies	143	182	153	1.8	1.8	1.1
Japanese Companies	2,678	3,687	5,063	33.9	37.0	37.7
Fujitsu	600	805	1,157	7.6	8.1	8.6
Hitachi	274	393	445	3.5	3.9	3.3
Matsushita	154	212	275	1.9	2.1	2.0
Mitsubishi	73	170	298	0.9	1.7	2.2
NEC	667	924	1,308	8.4	9.3	9.7
Oki	96	140	159	1.2	1.4	1.2
Ricoh	15	20	79	0.2	0.2	0.6
Rohm	23	41	56	0.3	0.4	0.4
Sanyo	26	42	57	0.3	0.4	0.4
Seiko Epson	103	106	129	1.3	1.1	1.0
Sharp	76	94	118	1.0	0.9	0.9
Sony	25	36	43	0.3	0.4	0.3
Toshiba	542	700	923	6.9	7.0	6.9
Yamaha	4	4	15	0.1	0	0.1
European Companies	695	813	1,056	8.8	8.2	7.9
ABB-Hafo	20	20	21	0.3	0.2	0.2
Austria Mikro Systeme	70	89	132	0.9	0.9	1.0
Elex	0	5	0	0	0.1	0
Elmos	0	5	7	0	0.1	0.1
Ericsson	15	15	19	0.2	0.2	0.1
European Silicon Structures	36	40	59	0.5	0.4	0.4
GEC Plessey	146	155	199	1.8	1.6	1.5
Micronas	14	20	37	0.2	0.2	0.3
Mietec	139	165	182	1.8	1.7	1.4
Philips	5	3	5	0.1	0	0
SGS-Thomson	158	199	278	2.0	2.0	2.1
Siemens	26	21	29	0.3	0.2	0.2
TEMIC	56	51	55	0.7	0.5	0.4
TCS	10	10	13	0.1	0.1	0.1
Thesys	0	15	20	0	0.2	0.1

(Continued)

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS/BiCMOS ASICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Asia/Pacific Companies	103	129	221	1.3	1.3	1.6
Acer	0	2	3	0	0	0
Daewoo	2	3	4	0	0	0
Holtek	2	2	6	0	0	0
Hualon Microelectronics Corp.	1	0	0	0	0	0
Hyundai	2	4	13	0	0	0.1
LG Semicon	25	35	90	0.3	0.4	0.7
Samsung	71	83	105	0.9	0.8	0.8

Source: Dataquest (April 1996)

**Table 1-4**  
**Each Company's Factory Revenue from Shipments of Bipolar ASICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	1,203	1,070	829	100.0	100.0	100.0
North American Companies	510	416	297	42.4	38.9	35.9
Advanced Micro Devices	128	93	64	10.6	8.7	7.8
Applied Micro Circuits Corp.	26	20	18	2.2	1.9	2.2
AT&T	45	44	22	3.7	4.1	2.7
Atmel	1	0	0	0.1	0	0
Cherry Semiconductor	1	4	4	0.1	0.4	0.5
Exar	14	7	7	1.2	0.7	0.8
Gennum	4	5	5	0.3	0.5	0.6
Micro Linear	5	5	5	0.4	0.5	0.6
Motorola	100	91	55	8.3	8.5	6.6
National Semiconductor	57	51	53	4.7	4.8	6.4
Raytheon	34	25	23	2.8	2.3	2.8
Sipex	2	1	1	0.2	0.1	0.1
Texas Instruments	84	66	35	7.0	6.2	4.3
Other North American Companies	9	4	4	0.7	0.4	0.5
Japanese Companies	579	586	477	48.1	54.8	57.5
Fujitsu	232	251	172	19.3	23.5	20.7
Hitachi	154	168	161	12.8	15.7	19.4
NEC	184	158	134	15.3	14.8	16.2
Oki	9	9	10	0.7	0.8	1.2
European Companies	114	68	55	9.5	6.4	6.6
GEC Plessey	24	18	18	2.0	1.7	2.2
Philips	44	17	11	3.7	1.6	1.3
SGS-Thomson	10	13	7	0.8	1.2	0.8
Siemens	22	17	16	1.8	1.6	1.9
TCS	11	0	0	0.9	0	0
Other European Companies	3	3	3	0.2	0.3	0.4

Source: Dataquest (April 1996)



**Table 1-5**  
**Top 60 Companies' Factory Revenue from Shipments of ASICs to the World**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	NEC	1,082	1,442	33	10.1
2	2	Fujitsu	1,056	1,329	26	9.3
3	3	LSI Logic	823	1,161	41	8.1
4	4	Toshiba	700	923	32	6.5
5	5	Texas Instruments	696	822	18	5.8
6	7	AT&T	564	794	41	5.6
7	6	IBM	613	719	17	5.0
8	8	Hitachi	561	606	8	4.3
9	10	Xilinx	321	520	62	3.6
10	9	VLSI Technology	372	479	29	3.4
11	17	Altera	199	402	102	2.8
12	11	Motorola	316	357	13	2.5
13	14	Hewlett-Packard	255	343	34	2.4
14	12	Advanced Micro Devices	281	335	19	2.4
15	13	Symbios	273	317	16	2.2
16	19	Mitsubishi	170	298	75	2.1
17	15	SGS-Thomson	212	285	34	2.0
18	16	Matsushita	212	275	30	1.9
19	18	GEC Plessey	173	217	25	1.5
20	23	Lattice	134	186	39	1.3
21	20	Mietec	165	182	10	1.3
22	22	Oki	149	169	14	1.2
23	21	National Semiconductor	159	146	-8	1.0
24	27	Austria Mikro Systeme	89	132	48	0.9
25	24	Seiko Epson	106	129	22	0.9
26	25	Sharp	94	118	26	0.8
27	26	Gould AMI	92	109	18	0.8
28	29	Actel	76	108	42	0.8
29	28	Samsung	83	105	27	0.7
30	39	LG Semicon	35	90	157	0.6
31	45	Ricoh	20	79	297	0.6
32	35	European Silicon Structures	40	59	48	0.4
33	33	Sanyo	42	57	36	0.4
34	34	Rohm	41	56	38	0.4
35	30	Cypress Semiconductor	55	56	2	0.4
36	31	TEMIC	51	55	8	0.4
37	32	Harris	47	50	6	0.4

(Continued)

**Table 1-5 (Continued)**  
**Top 60 Companies' Factory Revenue from Shipments of ASICs to the World**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
38	43	Atmel	24	49	103	0.3
39	36	Siemens	38	45	18	0.3
40	40	Integrated Circuit Systems	35	44	26	0.3
41	37	Sony	36	43	20	0.3
42	38	Applied Micro Circuits Corp.	36	38	5	0.3
43	46	Micronas	20	37	85	0.3
44	48	IMI	18	30	67	0.2
45	41	Raytheon	30	29	-3	0.2
46	47	ABB-Hafo	20	21	5	0.1
47	51	Thesys	15	20	33	0.1
48	50	Ericsson	15	19	27	0.1
49	49	Analog Devices	17	17	0	0.1
50	55	International CMOS Technology	12	17	41	0.1
51	44	Philips	20	16	-20	0.1
52	58	QuickLogic	8	16	100	0.1
53	68	Yamaha	4	15	271	0.1
54	53	Hughes	14	13	-7	0.1
55	57	TCS	10	13	30	0.1
56	66	Hyundai	4	13	225	0.1
57	52	Sierra Semiconductor	14	12	-14	0.1
58	54	IMP	12	9	-25	0.1
59	56	Micro Linear	10	9	-10	0.1
60	60	Universal	7	8	15	0.1
		All Others	264	211	-20	1.5
		North American Companies	5,757	7,384	28	51.8
		Japanese Companies	4,273	5,540	30	38.9
		European Companies	881	1,111	26	7.8
		Asia/Pacific Companies	129	221	71	1.5
		Total Market	11,040	14,256	29	100.0

Source: Dataquest (April 1996)

**Table 1-6**  
**Top 50 Companies' Factory Revenue from Shipments of MOS/BiCMOS ASICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	NEC	924	1,308	42	9.7
2	2	LSI Logic	823	1,161	41	8.6
3	3	Fujitsu	805	1,157	44	8.6
4	4	Toshiba	700	923	32	6.9
5	5	Texas Instruments	630	787	25	5.9
6	7	AT&T	520	772	48	5.7
7	6	IBM	613	719	17	5.4
8	10	Xilinx	321	520	62	3.9
9	9	VLSI Technology	372	479	29	3.6
10	8	Hitachi	393	445	13	3.3
11	16	Altera	199	402	102	3.0
12	12	Hewlett-Packard	255	343	34	2.6
13	11	Symbios	273	317	16	2.4
14	13	Motorola	225	302	34	2.2
15	18	Mitsubishi	170	298	75	2.2
16	15	SGS-Thomson	199	278	40	2.1
17	14	Matsushita	212	275	30	2.0
18	17	Advanced Micro Devices	188	271	44	2.0
19	20	GEC Plessey	155	199	28	1.5
20	22	Lattice	134	186	39	1.4
21	19	Mitetec	165	182	10	1.4
22	21	Oki	140	159	14	1.2
23	27	Austria Mikro Systeme	89	132	48	1.0
24	24	Seiko Epson	106	129	22	1.0
25	25	Sharp	94	118	26	0.9
26	26	Gould AMI	92	109	18	0.8
27	29	Actel	76	108	42	0.8
28	28	Samsung	83	105	27	0.8
29	23	National Semiconductor	108	93	-14	0.7
30	38	LG Semicon	35	90	157	0.7
31	42	Ricoh	20	79	297	0.6
32	35	European Silicon Structures	40	59	48	0.4
33	33	Sanyo	42	57	36	0.4
34	34	Rohm	41	56	38	0.4
35	30	Cypress Semiconductor	55	56	2	0.4
36	31	TEMIC	51	55	8	0.4
37	32	Harris	47	50	6	0.4

(Continued)

**Table 1-6 (Continued)**  
**Top 50 Companies' Factory Revenue from Shipments of MOS/BiCMOS ASICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
38	40	Atmel	24	49	103	0.4
39	37	Integrated Circuit Systems	35	44	26	0.3
40	36	Sony	36	43	20	0.3
41	43	Micronas	20	37	85	0.3
42	45	IMI	18	30	67	0.2
43	41	Siemens	21	29	38	0.2
44	44	ABB-Hafo	20	21	5	0.2
45	48	Thesys	15	20	33	0.1
46	47	Applied Micro Circuits Corp.	16	20	24	0.1
47	49	Ericsson	15	19	27	0.1
48	46	Analog Devices	17	17	0	0.1
49	53	International CMOS Technology	12	17	41	0.1
50	55	QuickLogic	8	16	100	0.1
		All Others	318	285	-10	2.1
		North American Companies	5,341	7,086	33	52.8
		Japanese Companies	3,687	5,063	37	37.7
		European Companies	813	1,056	30	7.9
		Asia/Pacific Companies	129	221	71	1.6
		Total Market	9,970	13,427	35	100.0

Source: Dataquest (April 1996)

**Table 1-7**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar ASICs to the World**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	Fujitsu	251	172	-32	20.7
2	2	Hitachi	168	161	-4	19.4
3	3	NEC	158	134	-15	16.2
4	4	Advanced Micro Devices	93	64	-31	7.8
5	5	Motorola	91	55	-40	6.6
6	7	National Semiconductor	51	53	5	6.4
7	6	Texas Instruments	66	35	-46	4.3
8	9	Raytheon	25	23	-8	2.8
9	8	AT&T	44	22	-50	2.7
10	11	GEC Plessey	18	18	0	2.2
11	10	Applied Micro Circuits Corp.	20	18	-10	2.2
12	12	Siemens	17	16	-6	1.9
13	13	Philips	17	11	-35	1.3
14	15	Oki	9	10	9	1.2
15	14	SGS-Thomson	13	7	-46	0.8
16	16	Exar	7	7	0	0.8
17	17	Micro Linear	5	5	0	0.6
18	18	Gennum	5	5	0	0.6
19	19	Cherry Semiconductor	4	4	0	0.5
20	20	Sipex	1	1	0	0.1
		All Others	7	7	0	0.8
		North American Companies	416	297	-29	35.9
		Japanese Companies	586	477	-19	57.5
		European Companies	68	55	-19	6.6
		Asia/Pacific Companies	0	0	NA	0
		<b>Total Market</b>	<b>1,070</b>	<b>829</b>	<b>-23</b>	<b>100.0</b>

NA = Not available

Source: Dataquest (April 1996)

## Section 2: Estimated Worldwide Gate Array Revenue, 1993-1995

Table 2-1

Each Company's Factory Revenue from Shipments of Gate Array ICs to the World  
(Millions of U.S. Dollars)

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	4,658	5,538	6,625	100.0	100.0	100.0
North American Companies	1,694	1,874	2,077	36.4	33.8	31.4
Advanced Micro Devices	8	1	0	0.2	0	0
Applied Micro Circuits Corp.	43	36	38	0.9	0.7	0.6
AT&T	38	39	64	0.8	0.7	1.0
Atmel	7	7	21	0.2	0.1	0.3
Cherry Semiconductor	1	4	4	0	0.1	0.1
ETEQ Microsystems	0	6	7	0	0.1	0.1
Exar	14	7	7	0.3	0.1	0.1
Gennum	4	5	5	0.1	0.1	0.1
Gould AMI	21	43	50	0.5	0.8	0.7
Hughes	8	10	9	0.2	0.2	0.1
IBM	243	280	302	5.2	5.1	4.6
IMI	18	18	30	0.4	0.3	0.5
LSI Logic	552	575	677	11.9	10.4	10.2
Micro Linear	11	10	9	0.2	0.2	0.1
Motorola	246	277	262	5.3	5.0	4.0
National Semiconductor	51	40	41	1.1	0.7	0.6
Raytheon	34	25	23	0.7	0.5	0.3
Sipex	2	1	1	0	0	0
Symbios	65	35	27	1.4	0.6	0.4
Texas Instruments	101	264	362	2.2	4.8	5.5
Universal	9	7	8	0.2	0.1	0.1
VLSI Technology	145	109	94	3.1	2.0	1.4
Other North American Companies	73	75	36	1.6	1.4	0.5
Japanese Companies	2,623	3,306	4,080	56.3	59.7	61.6
Fujitsu	680	877	1,001	14.6	15.8	15.1
Hitachi	389	475	507	8.4	8.6	7.7
Matsushita	73	95	113	1.6	1.7	1.7
Mitsubishi	58	139	263	1.2	2.5	4.0
NEC	734	863	1,097	15.8	15.6	16.6
Oki	70	87	93	1.5	1.6	1.4
Ricoh	3	7	31	0.1	0.1	0.5
Rohm	19	25	35	0.4	0.5	0.5
Sanyo	16	23	30	0.3	0.4	0.5

(Continued)

**Table 2-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Gate Array ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Seiko Epson	80	91	113	1.7	1.6	1.7
Sharp	48	62	76	1.0	1.1	1.1
Sony	25	36	43	0.5	0.7	0.7
Toshiba	427	525	675	9.2	9.5	10.2
Yamaha	1	1	3	0	0	0
European Companies	253	246	286	5.4	4.4	4.3
Austria Mikro Systeme	3	3	3	0.1	0.1	0
GEC Plessey	102	106	139	2.2	1.9	2.1
SGS-Thomson	83	93	96	1.8	1.7	1.4
Siemens	29	23	16	0.6	0.4	0.2
TEMIC	22	18	29	0.5	0.3	0.4
TCS	12	1	1	0.3	0	0
Other European Companies	2	2	2	0	0	0
Asia/Pacific Companies	88	112	181	1.9	2.0	2.7
Daewoo	2	3	3	0	0.1	0
Holtek	2	2	6	0	0	0.1
Hyundai	2	4	13	0	0.1	0.2
LG Semicon	25	35	72	0.5	0.6	1.1
Samsung	57	68	87	1.2	1.2	1.3

Source: Dataquest (April 1996)

**Table 2-2**  
**Each Company's Factory Revenue from Shipments of MOS/BiCMOS Gate Arrays to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	3,785	4,720	5,977	100.0	100.0	100.0
North American Companies	1,446	1,676	1,939	38.2	35.5	32.4
Applied Micro Circuits Corp.	17	16	20	0.4	0.3	0.3
AT&T	3	5	50	0.1	0.1	0.8
Atmel	7	7	21	0.2	0.1	0.3
ETEQ Microsystems	0	6	7	0	0.1	0.1
Gould AMI	21	43	50	0.6	0.9	0.8
Hughes	8	10	9	0.2	0.2	0.2
IBM	243	280	302	6.4	5.9	5.1
IMI	18	18	30	0.5	0.4	0.5
LSI Logic	552	575	677	14.6	12.2	11.3
Micro Linear	6	5	4	0.2	0.1	0.1
Motorola	147	187	207	3.9	4.0	3.5
National Semiconductor	42	40	41	1.1	0.8	0.7
Symbios	65	35	27	1.7	0.7	0.5
Texas Instruments	99	262	361	2.6	5.6	6.0
Universal	9	7	8	0.2	0.1	0.1
VLSI Technology	145	109	94	3.8	2.3	1.6
Other North American Companies	64	71	32	1.7	1.5	0.5
Japanese Companies	2,062	2,736	3,614	54.5	58.0	60.5
Fujitsu	466	642	839	12.3	13.6	14.0
Hitachi	235	307	346	6.2	6.5	5.8
Matsushita	73	95	113	1.9	2.0	1.9
Mitsubishi	58	139	263	1.5	2.9	4.4
NEC	550	705	963	14.5	14.9	16.1
Oki	61	78	83	1.6	1.7	1.4
Ricoh	3	7	31	0.1	0.1	0.5
Rohm	19	25	35	0.5	0.5	0.6
Sanyo	16	23	30	0.4	0.5	0.5
Seiko Epson	80	91	113	2.1	1.9	1.9
Sharp	48	62	76	1.3	1.3	1.3
Sony	25	36	43	0.7	0.8	0.7
Toshiba	427	525	675	11.3	11.1	11.3
Yamaha	1	1	3	0	0	0

(Continued)



**Table 2-2 (Continued)**

**Each Company's Factory Revenue from Shipments of MOS/BiCMOS Gate Arrays to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
European Companies	189	196	243	5.0	4.2	4.1
Austria Mikro Systeme	3	3	3	0.1	0.1	0.1
GEC Plessey	83	88	121	2.2	1.9	2.0
SGS-Thomson	73	80	89	1.9	1.7	1.5
Siemens	7	6	0	0.2	0.1	0
TEMIC	22	18	29	0.6	0.4	0.5
TCS	1	1	1	0	0	0
Asia/Pacific Companies	88	112	181	2.3	2.4	3.0
Daewoo	2	3	3	0.1	0.1	0.1
Holttek	2	2	6	0.1	0	0.1
Hyundai	2	4	13	0.1	0.1	0.2
LG Semicon	25	35	72	0.7	0.7	1.2
Samsung	57	68	87	1.5	1.4	1.5

Source: Dataquest (April 1996)

**Table 2-3**  
**Each Company's Factory Revenue from Shipments of Bipolar Gate Array ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	873	818	648	100.0	100.0	100.0
North American Companies	248	198	138	28.4	24.2	21.3
Advanced Micro Devices	8	1	0	0.9	0.1	0.1
Applied Micro Circuits Corp.	26	20	18	3.0	2.4	2.8
AT&T	35	34	14	4.0	4.2	2.2
Cherry Semiconductor	1	4	4	0.1	0.5	0.6
Exar	14	7	7	1.6	0.9	1.1
Gennum	4	5	5	0.5	0.6	0.8
Micro Linear	5	5	5	0.6	0.6	0.8
Motorola	99	90	55	11.3	11.0	8.5
National Semiconductor	9	0	0	1.0	0	0
Raytheon	34	25	23	3.9	3.1	3.6
Sipex	2	1	1	0.2	0.1	0.2
Texas Instruments	2	2	1	0.2	0.2	0.2
Other North American Companies	9	4	4	1.0	0.5	0.6
Japanese Companies	561	570	467	64.3	69.7	72.1
Fujitsu	214	235	162	24.5	28.7	25.0
Hitachi	154	168	161	17.6	20.5	24.9
NEC	184	158	134	21.1	19.3	20.7
Oki	9	9	10	1.0	1.1	1.5
European Companies	64	50	43	7.3	6.1	6.6
GEC Plessey	19	18	18	2.2	2.2	2.8
SGS-Thomson	10	13	7	1.1	1.6	1.1
Siemens	22	17	16	2.5	2.1	2.5
TCS	11	0	0	1.3	0	0
Other European Companies	2	2	2	0.2	0.2	0.3

Source: Dataquest (April 1996)

**Table 2-4**  
**Top 40 Companies' Factory Revenue from Shipments of Gate Array ICs to the World**  
 (Millions of U.S. Dollars)

1995 Rank	1994 Rank		1994		1995		Percentage Change	1995 Market Share (%)
			Revenue	Revenue	Revenue	Revenue		
1	2	NEC	863	1,097	27	16.6		
2	1	Fujitsu	877	1,001	14	15.1		
3	3	LSI Logic	575	677	18	10.2		
4	4	Toshiba	525	675	29	10.2		
5	5	Hitachi	475	507	7	7.7		
6	8	Texas Instruments	264	362	37	5.5		
7	6	IBM	280	302	8	4.6		
8	9	Mitsubishi	139	263	89	4.0		
9	7	Motorola	277	262	-5	4.0		
10	11	GEC Plessey	106	139	31	2.1		
11	14	Seiko Epson	91	113	24	1.7		
12	12	Matsushita	95	113	19	1.7		
13	13	SGS-Thomson	93	96	3	1.4		
14	10	VLSI Technology	109	94	-13	1.4		
15	15	OKi	87	93	7	1.4		
16	16	Samsung	68	87	28	1.3		
17	17	Sharp	62	76	23	1.1		
18	24	LG Semicon	35	72	106	1.1		
19	20	AT&T	39	64	64	1.0		
20	18	Gould AMI	43	50	15	0.7		
21	21	Sony	36	43	20	0.7		
22	19	National Semiconductor	40	41	2	0.6		
23	22	Applied Micro Circuits Corp.	36	38	5	0.6		
24	25	Rohm	25	35	42	0.5		
25	33	Ricoh	7	31	348	0.5		
26	27	Sanyo	23	30	30	0.5		
27	30	IMI	18	30	67	0.5		
28	29	TEMIC	18	29	61	0.4		
29	23	Symbios	35	27	-23	0.4		
30	26	Raytheon	25	23	-8	0.3		
31	34	Atmel	7	21	196	0.3		
32	28	Siemens	23	16	-30	0.2		
33	39	Hyundai	4	13	225	0.2		
34	31	Hughes	10	9	-10	0.1		
35	32	Micro Linear	10	9	-10	0.1		
36	35	Universal	7	8	15	0.1		
37	36	Exar	7	7	0	0.1		

(Continued)

**Table 2-4 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Gate Array ICs to the World**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
38	37	ETEQ Microsystems	6	7	16	0.1
39	43	Holtek	2	6	213	0.1
40	38	Gennum	5	5	0	0.1
		All Others	91	53	-42	0.8
		North American Companies	1,874	2,077	11	31.4
		Japanese Companies	3,306	4,080	23	61.6
		European Companies	246	286	16	4.3
		Asia/Pacific Companies	112	181	62	2.7
		Total Market	5,538	6,625	20	100.0

Source: Dataquest (April 1996)

**Table 2-5**  
**Top 30 Companies' Factory Revenue from Shipments of MOS/BiCMOS Gate Array ICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	NEC	705	963	37	16.1
2	2	Fujitsu	642	839	31	14.0
3	3	LSI Logic	575	677	18	11.3
4	4	Toshiba	525	675	29	11.3
5	7	Texas Instruments	262	361	38	6.0
6	5	Hitachi	307	346	13	5.8
7	6	IBM	280	302	8	5.1
8	9	Mitsubishi	139	263	89	4.4
9	8	Motorola	187	207	11	3.5
10	13	GEC Plessey	88	121	38	2.0
11	12	Seiko Epson	91	113	24	1.9
12	11	Matsushita	95	113	19	1.9
13	10	VLSI Technology	109	94	-13	1.6
14	14	SGS-Thomson	80	89	11	1.5
15	16	Samsung	68	87	28	1.5
16	15	Oki	78	83	6	1.4
17	17	Sharp	62	76	23	1.3
18	22	LG Semicon	35	72	106	1.2
19	34	AT&T	5	50	900	0.8
20	18	Gould AMI	43	50	15	0.8
21	20	Sony	36	43	20	0.7
22	19	National Semiconductor	40	41	2	0.7
23	23	Rohm	25	35	42	0.6
24	29	Ricoh	7	31	348	0.5
25	24	Sanyo	23	30	30	0.5
26	26	IMI	18	30	67	0.5
27	25	TEMIC	18	29	61	0.5
28	21	Symbios	35	27	-23	0.5
29	30	Atmel	7	21	196	0.3
30	27	Applied Micro Circuits Corp.	16	20	24	0.3
		All Others	119	89	-25	1.5
		North American Companies	1,676	1,939	16	32.4
		Japanese Companies	2,736	3,614	32	60.5
		European Companies	196	243	24	4.1
		Asia/Pacific Companies	112	181	62	3.0
		Total Market	4,720	5,977	27	100.0

Source: Dataquest (April 1996)

**Table 2-6**  
**Top 20 Companies' Factory Revenue from Shipments of Bipolar Gate Array ICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	Fujitsu	235	162	-31	25.0
2	2	Hitachi	168	161	-4	24.9
3	3	NEC	158	134	-15	20.7
4	4	Motorola	90	55	-39	8.5
5	6	Raytheon	25	23	-8	3.6
6	8	GEC Plessey	18	18	0	2.8
7	7	Applied Micro Circuits Corp.	20	18	-10	2.8
8	9	Siemens	17	16	-6	2.5
9	5	AT&T	34	14	-59	2.2
10	11	Oki	9	10	9	1.5
11	10	SGS-Thomson	13	7	-46	1.1
12	12	Exar	7	7	0	1.1
13	13	Micro Linear	5	5	0	0.8
14	14	Gennum	5	5	0	0.8
15	15	Cherry Semiconductor	4	4	0	0.6
16	16	Texas Instruments	2	1	-30	0.2
17	18	Sipex	1	1	0	0.2
18	17	Advanced Micro Devices	1	0	-60	0.1
		All Others	6	6	0	0.9
		North American Companies	198	138	-30	21.3
		Japanese Companies	570	467	-18	72.1
		European Companies	50	43	-14	6.6
		Asia/Pacific Companies	0	0	NA	0
		Total Market	818	648	-21	100.0

NA = Not available

Source: Dataquest (April 1996)

### Section 3: Estimated Worldwide CBIC Revenue, 1993-1995

**Table 3-1**  
**Each Company's Factory Revenue from Shipments of Cell-Based ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	3,283	4,193	5,819	100.0	100.0	100.0
North American Companies	2,135	2,606	3,517	65.0	62.2	60.4
Analog Devices	15	17	17	0.5	0.4	0.3
AT&T	429	483	658	13.1	11.5	11.3
Atmel	4	2	10	0.1	0	0.2
Gould AMI	39	45	55	1.2	1.1	0.9
Harris	62	47	50	1.9	1.1	0.9
Hewlett-Packard	230	255	343	7.0	6.1	5.9
Hughes	9	4	4	0.3	0.1	0.1
IBM	297	333	417	9.0	7.9	7.2
IMP	13	12	9	0.4	0.3	0.2
Integrated Circuit Systems	33	35	44	1.0	0.8	0.8
LSI Logic	90	248	484	2.7	5.9	8.3
Motorola	22	38	95	0.7	0.9	1.6
National Semiconductor	106	109	103	3.2	2.6	1.8
Raytheon	3	5	6	0.1	0.1	0.1
Rockwell	2	3	4	0.1	0.1	0.1
Sierra Semiconductor	18	14	12	0.5	0.3	0.2
Silicon Systems	8	6	4	0.2	0.1	0.1
Standard Microsystems	4	0	0	0.1	0	0
Symbios	137	238	290	4.2	5.7	5.0
Texas Instruments	344	338	410	10.5	8.1	7.0
VLSI Technology	199	263	385	6.1	6.3	6.6
Other North American Companies	71	111	118	2.2	2.6	2.0
Japanese Companies	632	964	1,457	19.3	23.0	25.0
Fujitsu	152	179	328	4.6	4.3	5.6
Hitachi	39	86	99	1.2	2.1	1.7
Matsushita	81	117	162	2.5	2.8	2.8
Mitsubishi	15	31	35	0.5	0.7	0.6
NEC	117	219	345	3.6	5.2	5.9
Oki	35	62	76	1.1	1.5	1.3
Ricoh	11	12	47	0.3	0.3	0.8
Rohm	4	16	21	0.1	0.4	0.4
Sanyo	10	19	27	0.3	0.5	0.5
Seiko Epson	23	15	16	0.7	0.4	0.3

(Continued)

**Table 3-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Cell-Based ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Sharp	28	32	42	0.9	0.8	0.7
Toshiba	114	173	246	3.5	4.1	4.2
Yamaha	3	3	12	0.1	0.1	0.2
European Companies	501	608	808	15.3	14.5	13.9
ABB-Hafo	20	20	21	0.6	0.5	0.4
Austria Mikro Systeme	67	86	129	2.0	2.1	2.2
Elex	0	5	0	0	0.1	0
Elmos	0	5	7	0	0.1	0.1
Ericsson	15	15	19	0.5	0.4	0.3
European Silicon Structures	36	40	59	1.1	1.0	1.0
GEC Plessey	68	67	78	2.1	1.6	1.3
Micronas	14	20	37	0.4	0.5	0.6
Mietec	139	165	182	4.2	3.9	3.1
SGS-Thomson	80	113	189	2.4	2.7	3.2
Siemens	19	15	29	0.6	0.4	0.5
TEMIC	34	33	26	1.0	0.8	0.4
TCS	9	9	12	0.3	0.2	0.2
Thesys	0	15	20	0	0.4	0.3
Asia/Pacific Companies	15	15	37	0.5	0.4	0.6
Daewoo	0	0	1	0	0	0
Hualon Microelectronics Corp.	1	0	0	0	0	0
LG Semicon	0	0	18	0	0	0.3
Samsung	14	15	18	0.4	0.4	0.3

Source: Dataquest (April 1996)



**Table 3-2**  
**Each Company's Factory Revenue from Shipments of MOS/BiCMOS Cell-Based ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	3,201	4,116	5,748	100.0	100.0	100.0
North American Companies	2,076	2,545	3,456	64.9	61.8	60.1
Analog Devices	15	17	17	0.5	0.4	0.3
AT&T	419	473	650	13.1	11.5	11.3
Atmel	3	2	10	0.1	0	0.2
Gould AMI	39	45	55	1.2	1.1	1.0
Harris	62	47	50	1.9	1.1	0.9
Hewlett-Packard	230	255	343	7.2	6.2	6.0
Hughes	9	4	4	0.3	0.1	0.1
IBM	297	333	417	9.3	8.1	7.3
IMP	13	12	9	0.4	0.3	0.2
Integrated Circuit Systems	33	35	44	1.0	0.9	0.8
LSI Logic	90	248	484	2.8	6.0	8.4
Motorola	22	38	95	0.7	0.9	1.7
National Semiconductor	58	58	50	1.8	1.4	0.9
Raytheon	3	5	6	0.1	0.1	0.1
Rockwell	2	3	4	0.1	0.1	0.1
Sierra Semiconductor	18	14	12	0.6	0.3	0.2
Silicon Systems	8	6	4	0.2	0.1	0.1
Standard Microsystems	4	0	0	0.1	0	0
Symbios	137	238	290	4.3	5.8	5.0
Texas Instruments	344	338	410	10.7	8.2	7.1
VLSI Technology	199	263	385	6.2	6.4	6.7
Other North American Companies	71	111	118	2.2	2.7	2.0
Japanese Companies	614	948	1,447	19.2	23.0	25.2
Fujitsu	134	163	318	4.2	4.0	5.5
Hitachi	39	86	99	1.2	2.1	1.7
Matsushita	81	117	162	2.5	2.8	2.8
Mitsubishi	15	31	35	0.5	0.8	0.6
NEC	117	219	345	3.7	5.3	6.0
Oki	35	62	76	1.1	1.5	1.3
Ricoh	11	12	47	0.3	0.3	0.8
Rohm	4	16	21	0.1	0.4	0.4
Sanyo	10	19	27	0.3	0.5	0.5
Seiko Epson	23	15	16	0.7	0.4	0.3
Sharp	28	32	42	0.9	0.8	0.7
Toshiba	114	173	246	3.6	4.2	4.3

(Continued)

**Table 3-2 (Continued)**

**Each Company's Factory Revenue from Shipments of MOS/BiCMOS Cell-Based ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Yamaha	3	3	12	0.1	0.1	0.2
European Companies	496	608	808	15.5	14.8	14.1
ABB-Hafo	20	20	21	0.6	0.5	0.4
Austria Mikro Systeme	67	86	129	2.1	2.1	2.2
Elex	0	5	0	0	0.1	0
Elmos	0	5	7	0	0.1	0.1
Ericsson	15	15	19	0.5	0.4	0.3
European Silicon Structures	36	40	59	1.1	1.0	1.0
GEC Plessey	63	67	78	2.0	1.6	1.4
Micronas	14	20	37	0.4	0.5	0.6
Mietec	139	165	182	4.3	4.0	3.2
SGS-Thomson	80	113	189	2.5	2.7	3.3
Siemens	19	15	29	0.6	0.4	0.5
TEMIC	34	33	26	1.1	0.8	0.5
TCS	9	9	12	0.3	0.2	0.2
Thesys	0	15	20	0	0.4	0.3
Asia/Pacific Companies	15	15	37	0.5	0.4	0.6
Daewoo	0	0	1	0	0	0
Hualon Microelectronics Corp.	1	0	0	0	0	0
LG Semicon	0	0	18	0	0	0.3
Samsung	14	15	18	0.4	0.4	0.3

Source: Dataquest (April 1996)

**Table 3-3**  
**Each Company's Factory Revenue from Shipments of Bipolar Cell-Based ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	82	77	71	100.0	100.0	100.0
North American Companies	59	61	61	72.0	79.2	85.9
AT&T	10	10	8	12.2	13.0	11.3
Atmel	1	0	0	1.2	0	0
National Semiconductor	48	51	53	58.5	66.2	74.6
Japanese Companies	18	16	10	22.0	20.8	14.1
Fujitsu	18	16	10	22.0	20.8	14.1
European Companies	5	0	0	6.1	0	0
GEC Plessey	5	0	0	6.1	0	0

Source: Dataquest (April 1996)

**Table 3-4**  
**Top 40 Companies' Factory Revenue from Shipments of Cell-Based ICs to the World**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	AT&T	483	658	36	11.3
2	6	LSI Logic	248	484	95	8.3
3	3	IBM	333	417	25	7.2
4	2	Texas Instruments	338	410	21	7.0
5	4	VLSI Technology	263	385	46	6.6
6	8	NEC	219	345	58	5.9
7	5	Hewlett-Packard	255	343	34	5.9
8	9	Fujitsu	179	328	83	5.6
9	7	Symbios	238	290	22	5.0
10	10	Toshiba	173	246	42	4.2
11	13	SGS-Thomson	113	189	67	3.2
12	11	Mietec	165	182	10	3.1
13	12	Matsushita	117	162	39	2.8
14	16	Austria Mikro Systeme	86	129	50	2.2
15	14	National Semiconductor	109	103	-6	1.8
16	15	Hitachi	86	99	15	1.7
17	22	Motorola	38	95	150	1.6
18	17	GEC Plessey	67	78	16	1.3
19	18	Oki	62	76	23	1.3
20	21	European Silicon Structures	40	59	48	1.0
21	20	Gould AMI	45	55	23	0.9
22	19	Harris	47	50	6	0.9
23	38	Ricoh	12	47	292	0.8
24	23	Integrated Circuit Systems	35	44	26	0.8
25	25	Sharp	32	42	31	0.7
26	27	Micronas	20	37	85	0.6
27	26	Mitsubishi	31	35	13	0.6
28	34	Siemens	15	29	93	0.5
29	29	Sanyo	19	27	42	0.5
30	24	TEMIC	33	26	-21	0.4
31	28	ABB-Hafo	20	21	5	0.4
32	31	Rohm	16	21	31	0.4
33	35	Thesys	15	20	33	0.3
34	36	Ericsson	15	19	27	0.3
35	33	Samsung	15	18	20	0.3
36	55	LG Semicon	0	18	NA	0.3
37	30	Analog Devices	17	17	0	0.3

(Continued)

**Table 3-4 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of Cell-Based ICs to the World**  
**(Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
38	32	Seiko Epson	15	16	7	0.3
39	46	Yamaha	3	12	305	0.2
40	37	Sierra Semiconductor	14	12	-14	0.2
		All Others	162	174	8	3.0
		North American Companies	2,606	3,517	35	60.4
		Japanese Companies	964	1,457	51	25.0
		European Companies	608	808	33	13.9
		Asia/Pacific Companies	15	37	147	0.6
		Total Market	4,193	5,819	39	100.0

NA = Not available

Source: Dataquest (April 1996)

**Table 3-5**  
**Top 40 Companies' Factory Revenue from Shipments of MOS/BiCMOS Cell-Based ICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	AT&T	473	650	37	11.3
2	6	LSI Logic	248	484	95	8.4
3	3	IBM	333	417	25	7.3
4	2	Texas Instruments	338	410	21	7.1
5	4	VLSI Technology	263	385	46	6.7
6	8	NEC	219	345	58	6.0
7	5	Hewlett-Packard	255	343	34	6.0
8	11	Fujitsu	163	318	95	5.5
9	7	Symbios	238	290	22	5.0
10	9	Toshiba	173	246	42	4.3
11	13	SGS-Thomson	113	189	67	3.3
12	10	Mietec	165	182	10	3.2
13	12	Matsushita	117	162	39	2.8
14	15	Austria Mikro Systeme	86	129	50	2.2
15	14	Hitachi	86	99	15	1.7
16	22	Motorola	38	95	150	1.7
17	16	GEC Plessey	67	78	16	1.4
18	17	Oki	62	76	23	1.3
19	21	European Silicon Structures	40	59	48	1.0
20	20	Gould AMI	45	55	23	1.0
21	19	Harris	47	50	6	0.9
22	18	National Semiconductor	58	50	-14	0.9
23	39	Ricoh	12	47	292	0.8
24	23	Integrated Circuit Systems	35	44	26	0.8
25	25	Sharp	32	42	31	0.7
26	27	Micronas	20	37	85	0.6
27	26	Mitsubishi	31	35	13	0.6
28	33	Siemens	15	29	93	0.5
29	29	Sanyo	19	27	42	0.5
30	24	TEMIC	33	26	-21	0.5
31	28	ABB-Hafo	20	21	5	0.4
32	31	Rohm	16	21	31	0.4
33	36	Thesys	15	20	33	0.3
34	35	Ericsson	15	19	27	0.3
35	32	Samsung	15	18	20	0.3
36	55	LG Semicon	0	18	NA	0.3
37	30	Analog Devices	17	17	0	0.3

(Continued)

**Table 3-5 (Continued)**  
**Top 40 Companies' Factory Revenue from Shipments of MOS/BiCMOS Cell-Based ICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
38	34	Seiko Epson	15	16	7	0.3
39	47	Yamaha	3	12	305	0.2
40	37	Sierra Semiconductor	14	12	-14	0.2
		All Others	162	174	8	3.0
		North American Companies	2,545	3,456	36	60.1
		Japanese Companies	948	1,447	53	25.2
		European Companies	608	808	33	14.1
		Asia/Pacific Companies	15	37	147	0.6
		Total Market	4,116	5,748	40	100.0

NA = Not available

Source: Dataquest (April 1996)

**Table 3-6**  
**Top Three Companies' Factory Revenue from Shipments of Bipolar Cell-Based ICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	National Semiconductor	51	53	4	74.6
2	2	Fujitsu	16	10	-38	14.1
3	3	AT&T	10	8	-20	11.3
		All Others	0	0	NA	0
		North American Companies	61	61	0	85.9
		Japanese Companies	16	10	-38	14.1
		European Companies	0	0	NA	0
		Asia/Pacific Companies	0	0	NA	0
		Total Market	77	71	-8	100.0

NA = Not available

Source: Dataquest (April 1996)



## Section 4: Estimated Worldwide PLD IC Revenue, 1993-1995

**Table 4-1**  
**Each Company's Factory Revenue from Shipments of PLD ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	1,173	1,309	1,812	100.0	100.0	100.0
North American Companies	1,116	1,277	1,789	95.1	97.6	98.7
Actel	60	76	108	5.1	5.8	6.0
Advanced Micro Devices	280	280	335	23.9	21.4	18.5
Altera	140	199	402	11.9	15.2	22.2
AT&T	32	42	72	2.7	3.2	4.0
Atmel	12	15	18	1.0	1.1	1.0
Cypress Semiconductor	47	55	56	4.0	4.2	3.1
Gould AMI	5	4	4	0.4	0.3	0.2
Intel	45	26	0	3.8	2.0	0
International CMOS Technology	0	12	17	0	0.9	0.9
Lattice	127	134	186	10.8	10.2	10.3
Motorola	1	1	0	0.1	0.1	0
National Semiconductor	17	10	2	1.4	0.8	0.1
QuickLogic	0	8	16	0	0.6	0.9
Texas Instruments	111	94	50	9.5	7.2	2.8
Xilinx	231	321	520	19.7	24.5	28.7
Other North American Companies	8	0	3	0.7	0	0.2
Japanese Companies	2	3	3	0.2	0.2	0.2
Ricoh	1	1	1	0.1	0.1	0.1
Toshiba	1	2	2	0.1	0.2	0.1
European Companies	55	27	17	4.7	2.1	0.9
Philips	49	20	16	4.2	1.5	0.9
SGS-Thomson	5	6	0	0.4	0.5	0
Other European Companies	1	1	1	0.1	0.1	0.1
Asia/Pacific Companies	0	2	3	0	0.2	0.1
Acer	0	2	3	0	0.2	0.1

Source: Dataquest (April 1996)

**Table 4-2**  
**Each Company's Factory Revenue from Shipments of MOS/BiCMOS PLD ICs to the World (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	925	1,134	1,702	100.0	100.0	100.0
North American Companies	913	1,120	1,691	98.7	98.8	99.4
Actel	60	76	108	6.5	6.7	6.3
Advanced Micro Devices	160	188	271	17.3	16.6	15.9
Altera	140	199	402	15.1	17.5	23.6
AT&T	32	42	72	3.5	3.7	4.2
Atmel	12	15	18	1.3	1.3	1.1
Cypress Semiconductor	47	55	56	5.1	4.9	3.3
Gould AMI	5	4	4	0.5	0.4	0.2
Intel	45	26	0	4.9	2.3	0
International CMOS Technology	0	12	17	0	1.1	1.0
Lattice	127	134	186	13.7	11.8	10.9
National Semiconductor	17	10	2	1.8	0.9	0.1
QuickLogic	0	8	16	0	0.7	0.9
Texas Instruments	29	30	16	3.1	2.6	0.9
Xilinx	231	321	520	25.0	28.3	30.6
Other North American Companies	8	0	3	0.9	0	0.2
Japanese Companies	2	3	3	0.2	0.3	0.2
Ricoh	1	1	1	0.1	0.1	0.1
Toshiba	1	2	2	0.1	0.2	0.1
European Companies	10	9	5	1.1	0.8	0.3
Philips	5	3	5	0.5	0.3	0.3
SGS-Thomson	5	6	0	0.5	0.5	0
Asia/Pacific Companies	0	2	3	0	0.2	0.2
Acer	0	2	3	0	0.2	0.2

Source: Dataquest (April 1996)

**Table 4-3**  
**Each Company's Factory Revenue from Shipments of Bipolar PLD ICs to the World**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1993	1994	1995	1993	1994	1995
Total Market	248	175	110	100.0	100.0	100.0
North American Companies	203	157	98	81.9	89.7	89.1
Advanced Micro Devices	120	92	64	48.4	52.6	58.0
Motorola	1	1	0	0.4	0.6	0
Texas Instruments	82	64	34	33.1	36.6	30.8
European Companies	45	18	12	18.1	10.3	10.9
Philips	44	17	11	17.7	9.7	10.0
Other European Companies	1	1	1	0.4	0.6	0.9

Source: Dataquest (April 1996)

**Table 4-4**  
**Top 15 Companies' Factory Revenue from Shipments of PLD ICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	Xilinx	321	520	62	28.7
2	3	Altera	199	402	102	22.2
3	2	Advanced Micro Devices	280	335	20	18.5
4	4	Lattice	134	186	39	10.3
5	6	Actel	76	108	42	6.0
6	8	AT&T	42	72	71	4.0
7	7	Cypress Semiconductor	55	56	2	3.1
8	5	Texas Instruments	94	50	-47	2.8
9	11	Atmel	15	18	20	1.0
10	12	International CMOS Technology	12	17	41	0.9
11	10	Philips	20	16	-20	0.9
12	14	QuickLogic	8	16	100	0.9
13	16	Gould AMI	4	4	0	0.2
14	18	Acer	2	3	35	0.1
15	13	National Semiconductor	10	2	-76	0.1
		All Others	37	7	-81	0.4
		North American Companies	1,277	1,789	40	98.7
		Japanese Companies	3	3	0	0.2
		European Companies	27	17	-37	0.9
		Asia/Pacific Companies	2	3	35	0.1
		Total Market	1,309	1,812	38	100.0

Source: Dataquest (April 1996)

**Table 4-5**  
**Top 15 Companies' Factory Revenue from Shipments of MOS/BiCMOS PLD ICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	Xilinx	321	520	62	30.6
2	2	Altera	199	402	102	23.6
3	3	Advanced Micro Devices	188	271	44	15.9
4	4	Lattice	134	186	39	10.9
5	5	Actel	76	108	42	6.3
6	7	AT&T	42	72	71	4.2
7	6	Cypress Semiconductor	55	56	2	3.3
8	10	Atmel	15	18	20	1.1
9	11	International CMOS Technology	12	17	41	1.0
10	8	Texas Instruments	30	16	-47	0.9
11	13	QuickLogic	8	16	100	0.9
12	16	Philips	3	5	67	0.3
13	15	Gould AMI	4	4	0	0.2
14	18	Acer	2	3	35	0.2
15	12	National Semiconductor	10	2	-80	0.1
		All Others	35	6	-83	0.4
		North American Companies	1,120	1,691	51	99.4
		Japanese Companies	3	3	0	0.2
		European Companies	9	5	-44	0.3
		Asia/Pacific Companies	2	3	35	0.2
		Total Market	1,134	1,702	50	100.0

Source: Dataquest (April 1996)

**Table 4-6**  
**Top Three Companies' Factory Revenue from Shipments of Bipolar PLD ICs to the World (Millions of U.S. Dollars)**

1995 Rank	1994 Rank		1994 Revenue	1995 Revenue	Percentage Change	1995 Market Share (%)
1	1	Advanced Micro Devices	92	64	-30	58.0
2	2	Texas Instruments	64	34	-47	30.8
3	3	Philips	17	11	-35	10.0
		All Others	2	1	-50	0.9
		North American Companies	157	98	-37	89.1
		Japanese Companies	0	0	NA	0
		European Companies	18	12	-33	10.9
		Asia/Pacific Companies	0	0	NA	0
		<b>Total Market</b>	<b>175</b>	<b>110</b>	<b>-37</b>	<b>100.0</b>

NA = Not available

Source: Dataquest (April 1996)

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**For More information...**

Kevin McClure, Market Research Analyst .....(408) 468-8505  
Internet address .....kmccclure@dataquest.com  
Via fax.....(408) 954-1780

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## DATAQUEST WORLDWIDE OFFICES

### NORTH AMERICA

#### Worldwide Headquarters

251 River Oaks Parkway  
San Jose, California 95134-1913  
United States  
Phone: 1-408-468-8000  
Facsimile: 1-408-954-1780

#### East Coast Headquarters

Nine Technology Drive  
P.O. Box 5093  
Westborough, Massachusetts 01581-5093  
United States  
Phone: 1-508-871-5555  
Facsimile: 1-508-871-6262

#### Dataquest Global Events

3990 Westerly Place, Suite 100  
Newport Beach, California 92660  
United States  
Phone: 1-714-476-9117  
Facsimile: 1-714-476-9969

#### Sales Offices:

Washington, DC (Federal)  
New York, NY (Financial)  
Dallas, TX

### LATIN AMERICA

#### Research Affiliates and Sales Offices:

Buenos Aires, Argentina  
Sao Paulo, Brazil  
Santiago, Chile  
Mexico City, Mexico

### EUROPE

#### European Headquarters

Tamesis, The Glanty  
Egham, Surrey TW20 9AW  
United Kingdom  
Phone: +44 1784 431 611  
Facsimile: +44 1784 488 980

#### Dataquest France

Immeuble Défense Bergères  
345, avenue Georges Clémenceau  
TSA 40002  
92882 - Nanterre CTC Cedex 9  
France  
Phone: +33 1 41 35 13 00  
Facsimile: +33 1 41 35 13 13

#### Dataquest Germany

Kronstadter Strasse 9  
81677 München  
Germany  
Phone: +49 89 93 09 09 0  
Facsimile: +49 89 93 03 27 7

#### Sales Offices:

Brussels, Belgium  
Kfar Saba, Israel  
Milan, Italy  
Randburg, South Africa  
Madrid, Spain

### JAPAN

#### Japan Headquarters

Shinkawa Sanko Building  
6th Floor  
1-3-17, Shinkawa  
Chuo-ku, Tokyo 104  
Japan  
Phone: 81-3-5566-0411  
Facsimile: 81-3-5566-0425

### ASIA/PACIFIC

#### Asia/Pacific Headquarters

7/F China Underwriters Centre  
88 Gloucester Road  
Wan Chai  
Hong Kong  
Phone: 852-2824-6168  
Facsimile: 852-2824-6138

#### Dataquest Korea

Suite 2407, Trade Tower  
159 Samsung-dong, Kangnam-gu  
Seoul 135-729  
Korea  
Phone: 822-551-1331  
Facsimile: 822-551-1330

#### Dataquest Taiwan

11F-2, No. 188, Section 5  
Nan King East Road  
Taipei  
Taiwan, R.O.C.  
Phone: 8862-756-0389  
Facsimile: 8862-756-2663

#### Dataquest Singapore

105 Cecil Street  
#06-01/02 The Octagon  
Singapore 069534  
Phone: 65-227-1213  
Facsimile: 65-227-4607

#### Dataquest Thailand

12/F, Vanissa Building  
29 Soi Chidlom  
Ploenchit Road  
Patumwan, Bangkok 10330  
Thailand  
Phone: 662-655-0577  
Facsimile: 662-655-0576

#### Research Affiliates and Sales Offices:

Melbourne, Australia  
Beijing, China

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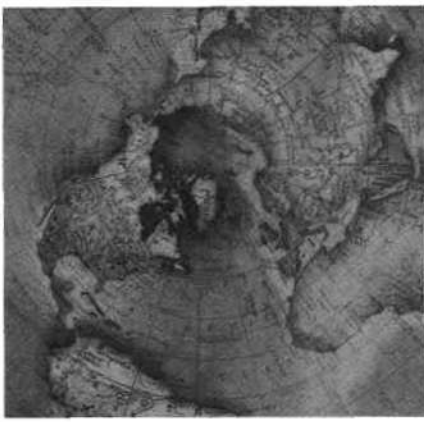
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Ms. Maria Valenzuela  
Dataquest Incorporated  
1-1100

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**Dataquest**

**Final 1996 Worldwide  
Semiconductor Market Share**



**Market Statistics**

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**Program:** Semiconductors Worldwide  
**Product Code:** SEMI-WW-MS-9701  
**Publication Date:** April 14, 1997  
**Filing:** Market Statistics

# **Final 1996 Worldwide Semiconductor Market Share**



**Market Statistics**

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# Final 1996 Worldwide Semiconductor Market Share ---

## Introduction

This document contains detailed information on Dataquest's view of the semiconductor market. Included in this document are the following:

- 1994-1996 market share estimates
- 1995-1996 market share rankings

Worldwide market share estimates combine data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. market consumption or revenue are based on the average exchange rate for the given year. Refer to the section titled "Exchange Rates" for more information regarding these average rates. As a rule, Dataquest's estimates are calculated in local currencies and then converted to U.S. dollars.

More detailed data on this market may be requested through Dataquest's client inquiry service. Qualitative analysis of this data is provided in the Dataquest Perspectives.

## Segmentation

This section outlines the market segments that are specific to this document. Dataquest's objective is to provide data along lines of segmentation that is logical, appropriate to the industry in question, and immediately useful to clients.

Dataquest defines the semiconductor industry as the group of competing companies primarily engaged in manufacturing semiconductors and related solid-state devices. Important products of the semiconductor industry include integrated circuits, discrete devices, and optoelectronics devices.

For market share purposes, Dataquest defines the semiconductor market according to the following functional segmentation scheme:

- Total Semiconductor (Including Hybrids)
- Total Semiconductor (Excluding Hybrids)
  - Total Monolithic Integrated Circuit (Including Hybrids)
  - Total Monolithic Integrated Circuit (Excluding Hybrids)
    - Bipolar Digital IC
      - Bipolar Logic
      - Other Bipolar Memory/Microcomponent/Logic
    - MOS Digital IC
      - MOS Memory
      - MOS Microcomponent
      - MOS Logic

- Monolithic Analog IC
- Hybrid IC
- Discrete Semiconductor
- Optoelectronic Semiconductor

## Definitions

This section lists the definitions that are used by Dataquest to present the data in this document. For a complete listing of all semiconductor market segments tracked by Dataquest, please refer to the Dataquest Semiconductor Market Definitions Guide.

### Product Definitions

**Total Semiconductor (Total Monolithic Integrated Circuit + Total Discrete + Total Optoelectronic).** Defined as an active semiconductor product that contains semiconducting material (such as silicon, germanium, or gallium arsenide, but excluding ceramics) and reacts dynamically to an input signal, either by modifying its shape or adding energy to it. This definition excludes standalone passive components, such as capacitors, resistors, inductors, oscillators, crystals, transformers, and relays.

**Total Monolithic Integrated Circuit (Digital Monolithic Bipolar IC + Digital Monolithic MOS IC + Analog IC).** An IC is defined as a large number of passive and/or active discrete semiconductor circuits integrated into a single package. A monolithic IC is one in which discrete circuits are integrated onto a single die.

**Bipolar Digital IC (Bipolar Digital Memory + Bipolar Digital Microcomponent + Bipolar Digital Logic).** A bipolar digital IC is defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and concurrently, 100 percent of the die area is manufactured using bipolar semiconductor technology. A digital function is one in which data-carrying signals vary in discrete values.

**Bipolar Digital Logic (Bipolar Application-Specific IC + Bipolar Digital Standard Logic + Other Bipolar Logic).** Defined as a bipolar digital semiconductor product in which more than 50 percent of the die area performs logic functions. Excludes bipolar digital microcomponent ICs.

**Other Bipolar Digital Memory/Microcomponent/Logic.** Defined as a bipolar digital semiconductor product in which binary data is stored and electronically retrieved. Includes ECL random-access memory (RAM), read-only memory (ROM), programmable ROM (PROM), last-in/first-out (LIFO) memory, and first-in/first-out (FIFO) memory. Not included are products made with mixed bipolar CMOS (that is, BiCMOS) with TTL or ECL outputs, which are classified as MOS.

**MOS Digital IC (MOS Digital Memory + MOS Digital Microcomponent + MOS Digital Logic).** Defined as a monolithic semiconductor product in which 100 percent of the die area performs digital functions, and, concurrently, where any portion of the die area is manufactured using metal oxide semiconductor (MOS) technology. A digital function is one in which

data-carrying signals vary in discrete values. Includes mixed technology manufacturing, such as BiMOS and BiCMOS, where there is some MOS technology employed.

MOS Digital Memory (DRAM + SRAM + EPROM + EEPROM + Flash Memory + Mask ROM + Other MOS Digital Memory). Defined as a MOS digital IC in which binary data is stored and electronically retrieved.

MOS Digital Microcomponent IC (MOS Digital Microprocessor + MOS Digital Microcontroller + MOS Digital Microperipheral + Programmable Digital Signal Processor). Defined as a MOS digital IC that contains a data processing unit or serves as an interface to such a unit.

MOS Digital Logic IC (MOS Digital Logic Application-Specific IC + MOS Digital Standard Logic IC + Other MOS Digital Logic IC). Defined as a MOS digital IC in which more than 50 percent of the die area performs logic functions. Excludes MOS digital microcomponent ICs.

Total Analog IC (Amplifier/Comparator IC + Voltage Regulator/reference IC + Data Converter/Switch/Multiplexer IC + Interface IC + Telecom IC + Disk Drive IC + Other Special-Function IC + Linear Array/ASIC + Mixed-Signal ASIC + Total Special Consumer IC + Special Automotive IC + Smart Power IC). An analog IC is a semiconductor product that deals in the realm of electrical signal processing, power control, or electrical drive capability. It is one in which some of the inputs or outputs can be defined in terms of continuously or linearly variable voltages, currents, or frequencies. Includes only monolithic analog ICs manufactured using bipolar, MOS, or BiCMOS technologies. A monolithic IC is a single die contained in a single package.

Hybrid Integrated Circuit. Defined as a semiconductor product consisting of more than one die contained in a single package. A hybrid IC may perform 100 percent linear, 100 percent digital, or mixed-signal (both linear and digital) functions. Includes hybrid implementation of all monolithic IC functions described in the following categories. Includes all hybrid ICs manufactured using bipolar, MOS, or BiCMOS technologies.

Total Discrete (Transistor + Diode + Thyristor + Other Discrete). A discrete semiconductor is defined as a unit building block performing a fundamental semiconductor function.

Total Optoelectronic (LED Lamp/Display + Optocoupler + CCD + Laser Diode + Photosensor + Other Optoelectronic). Defined as a semiconductor product in which photons induce the flow of electrons, or vice versa. Other functions may also be integrated onto the product. This category does not include LCD, incandescent displays, fluorescent displays, cathode ray tubes (CRTs), or plasma displays.



## Regional Definitions

### Americas

North America: Includes Canada, Mexico, and the United States (50 states)

South America

Central America

### Japan

Japan is the only single-country region.

### Europe, Africa, and the Middle East

Western Europe: Includes Austria, Belgium, Denmark, Eire (Ireland), Finland, France, Germany (including former East Germany), Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and rest of western Europe (Andorra, Cyprus, Gibraltar, Liechtenstein, Monaco, San Marino, Vatican City, Iceland, Malta, and Turkey).

Eastern Europe: Includes Albania, Bulgaria, the Czech Republic and Slovakia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the republics of the former Yugoslavia, and the republics of the former USSR (Belarus, Russian Federation, Ukraine, Georgia, Moldova, Armenia, Azerbaijan, Kazakhstan, Uzbekistan, Tadjikistan, Kyrgyzstan, and Turkmenistan).

### Asia/Pacific

Includes Hong Kong, Singapore, South Korea, Taiwan, Australia, Bangladesh, Cambodia, China, India, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam.

## Line Item Definitions

Factory revenue is defined as the money value received by a semiconductor manufacturer for its products. Revenue from the sale of semiconductors sold either as finished goods, dies, or wafers to another semiconductor vendor for resale is attributed to the semiconductor vendor that sells the product to a distributor or equipment manufacturer.

Merchant versus captive consumption: Dataquest includes all revenue, both merchant and captive, for semiconductor suppliers selling to the merchant market. The data excludes completely captive suppliers where devices are manufactured solely for the company's own use. A product that is used internally is valued at market price rather than at transfer or factory price.

## Market Share Methodology

Dataquest uses both primary and secondary sources to produce market statistics data. In the fourth quarter of each year, Dataquest surveys all major participants within each industry. Selected companies are resurveyed during the first quarter of the following year to verify final annual

results. This primary research is supplemented with additional primary research and secondary research to verify market size, shipment totals, and pricing information. Sources of data used by Dataquest include the following:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data (such as WSTS, MITI, and U.S. DOC)
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and CD-ROM data banks
- Articles in both the general and trade press
- Reports from financial analysts
- End-user surveys

Dataquest believes that the estimates presented in this document are the most accurate and meaningful statistics available.

Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Dataquest and those provided by other sources.

## Notes on Market Share

In the process of conducting data collection and preparing market statistics information, Dataquest will sometimes consolidate or revise a particular company, model, series, or industry's numbers. In this section, we explain any such changes contained within this document for your reference.

### Notes to Market Share Tables

1. Appian Technology product lines were acquired by Cirrus Logic in 1994.
2. Dialog, Eurosil, Matra, Telefunken, and Siliconix are now known as TEMIC.
3. LG Semicon was formerly known as Goldstar.
4. IMP was formerly known as International Microelectronic Products.
5. Inmos revenue is included in SGS-Thomson revenue.

6. Linfinity was formerly known as Silicon General.
7. NCR was acquired by Hyundai in 1994 and is operated as Symbios Logic Inc.
8. Nippon Steel Semiconductor was formerly known as NMB Semiconductor.
9. Philips revenue includes Signetics revenue.
10. Thomson Semiconductors Specific (TCS) was formed through the merger of Thomson Composants Microndes (TCM) and Thomson Composants Militaires et Spatiaux (TMS).
11. The following companies were added to worldwide market share tables starting in 1996 and may result in higher 1996 market growth rates in certain product areas:
  - C-Cube
  - Chip Express
  - Digital Semiconductor
  - Orbit Semiconductor
  - Sun Microsystems
  - Vanguard
  - VIA Technologies
12. Part of IBM's 1994 and 1995 logic revenue has been reclassified and restated.
13. Rockwell's 1994 revenue has been restated.
14. National Semiconductor's 1994 revenue has been restated.
15. Motorola's 1995 revenue has been restated.
16. Comlinear revenue is included in National Semiconductor's revenue.
17. Silicon Storage Technology has been added to worldwide market share starting in 1995.
18. ABB IXYS is now IXYS and has been placed in Americas companies.
19. Texas Instruments purchased Silicon Systems in 1996.
20. Rockwell purchased Brooktree in 1996.
21. NEC's 1995 revenue has been restated.

## Exchange Rates

Dataquest uses an average annual exchange rate in converting revenue to U.S. dollar amounts. Table 1 outlines these rates for 1994 through 1996.

**Table 1**  
**Exchange Rates**

	1994	1995	1996
Japan (Yen/U.S.\$)	101.81	93.90	108.81
France (Franc/U.S.\$)	5.54	4.97	5.12
Germany (Deutsche Mark/U.S.\$)	1.62	1.43	1.50
United Kingdom (U.S.\$/Pound Sterling)	1.53	1.59	1.56

Source: Dataquest (April 1997)

## Section 1: 1996 Worldwide Market Share

**Table 1-1**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide**  
**(Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	110,513	151,262	141,690	100.0	100.0	100.0
Americas Companies	46,052	60,021	63,617	41.7	39.7	44.9
ACC Microelectronics	49	40	45	0	0	0
Actel	76	109	149	0	0	0.1
Adaptec	125	124	214	0.1	0	0.2
Advanced Micro Devices	2,134	2,337	1,947	1.9	1.5	1.4
Allegro MicroSystems	148	185	200	0.1	0.1	0.1
Alliance Semiconductor	90	220	76	0	0.1	0
Altera	199	402	497	0.2	0.3	0.4
Analog Devices	739	983	1,260	0.7	0.6	0.9
Appian Technology	7	9	10	0	0	0
Applied Micro Circuits Corp.	48	49	56	0	0	0
ATI Technologies	0	0	130	0	0	0
Atmel	375	589	1,024	0.3	0.4	0.7
Brooktree	109	120	0	0	0	0
Burr-Brown	165	186	207	0.1	0.1	0.1
California Micro Devices	10	13	8	0	0	0
Catalyst	50	48	54	0	0	0
C-Cube	0	0	150	0	0	0.1
Cherry Semiconductor	77	87	100	0	0	0
Chip Express	0	0	25	0	0	0
Chips & Technologies	89	138	150	0	0	0.1
CID Technologies	4	5	6	0	0	0
Cirrus Logic	781	1,003	891	0.7	0.7	0.6
Comlinear	16	0	0	0	0	0
Crosspoint Solutions	0	2	2	0	0	0
Cypress Semiconductor	400	553	516	0.4	0.4	0.4
Cyrix	241	212	160	0.2	0.1	0.1
Dallas Semiconductor	154	228	277	0.1	0.2	0.2
Digital	0	0	271	0	0	0.2
DSP Group	18	60	67	0	0	0
Eastman Kodak	3	3	3	0	0	0
Elantec	24	25	35	0	0	0
Electronic Designs	26	43	51	0	0	0
ETEQ Microsystems	6	7	4	0	0	0

**Table 1-1 (Continued)**

**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Exar	169	147	96	0.2	0	0
General Instrument	262	413	362	0.2	0.3	0.3
Gennum	31	34	37	0	0	0
G-Link USA	0	14	15	0	0	0
Gould AMI	136	72	95	0.1	0	0
Harris	665	685	629	0.6	0.5	0.4
Hewlett-Packard	714	648	945	0.6	0.4	0.7
Holt	9	11	0	0	0	0
Honeywell	55	64	71	0	0	0
Hughes	40	36	39	0	0	0
IBM	2,532	3,522	2,740	2.3	2.3	1.9
IC Sensors	5	6	7	0	0	0
IMI	20	35	39	0	0	0
IMP	49	54	35	0	0	0
Integrated Circuit Systems	81	97	79	0	0	0
Integrated Device Technology	385	617	554	0.3	0.4	0.4
Integrated Information Tech.	35	44	51	0	0	0
Integrated Silicon Solutions	60	158	111	0	0.1	0
Intel	10,099	13,172	17,781	9.1	8.7	12.5
International CMOS Technology	12	16	12	0	0	0
International Rectifier	361	486	520	0.3	0.3	0.4
ITT	241	316	274	0.2	0.2	0.2
IXYS	55	65	66	0	0	0
Kulite	20	24	0	0	0	0
Lattice	134	186	200	0.1	0.1	0.1
Level One Communications	0	78	112	0	0	0
Linear Technology	225	305	365	0.2	0.2	0.3
Linfinity	44	50	51	0	0	0
Logic Devices	14	17	14	0	0	0
LSI Logic	901	1,269	1,239	0.8	0.8	0.9
Lucent Technologies	1,307	1,615	2,110	1.2	1.1	1.5
Maxim	169	189	387	0.2	0.1	0.3
Micrel	25	26	24	0	0	0
Micro Linear	41	54	54	0	0	0
Micro Power Systems	23	0	0	0	0	0
Microchip Technology	212	271	330	0.2	0.2	0.2
Micron Technology	1,492	2,601	1,558	1.4	1.7	1.1
Microsemi	100	118	146	0	0	0.1

**Table 1-1 (Continued)**

**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Mitel	100	88	145	0	0	0.1
Motorola	7,238	8,722	8,076	6.5	5.8	5.7
National Semiconductor	2,127	2,408	2,380	1.9	1.6	1.7
Novasensor	13	15	0	0	0	0
Oak Technology	62	84	172	0	0	0.1
Optek	56	62	69	0	0	0
OPTi	130	167	119	0.1	0.1	0
Paradigm	36	55	23	0	0	0
Performance Semiconductor	20	28	0	0	0	0
Powerex	76	98	98	0	0	0
Q Logic	45	61	67	0	0	0
Quality Semiconductor	22	46	45	0	0	0
Quality Technologies	49	61	52	0	0	0
QuickLogic	8	16	25	0	0	0
Ramtron	15	25	14	0	0	0
Raytheon	108	125	131	0	0	0
Rockwell	514	744	1,351	0.5	0.5	1.0
S3	130	315	464	0.1	0.2	0.3
Seeq Technology	22	27	32	0	0	0
Semtech	25	48	66	0	0	0
Sensym	8	0	0	0	0	0
Sierra Semiconductor	120	143	188	0.1	0	0.1
Silicon Storage Technology	0	35	91	0	0	0
Silicon Systems	298	369	0	0.3	0.2	0
Sipex	16	16	13	0	0	0
Solitron	7	8	9	0	0	0
Spectra Diode Labs	10	15	17	0	0	0
Standard Microsystems	100	150	153	0	0	0.1
Sun Microsystems	0	0	170	0	0	0.1
Supertex	30	35	33	0	0	0
Symbios	354	395	458	0.3	0.3	0.3
Symphony Laboratories	12	15	17	0	0	0
Teccor Electronics	60	68	84	0	0	0
Telcom	18	17	18	0	0	0
Texas Instruments	5,548	7,831	7,064	5.0	5.2	5.0
Trident Microsystems	87	139	180	0	0	0.1
Tseng Labs	83	105	26	0	0	0
Unitrode	88	103	98	0	0	0

**Table 1-1 (Continued)**

**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Universal	13	15	0	0	0	0
VLSI Technology	588	672	672	0.5	0.4	0.5
VTC	70	155	172	0	0.1	0.1
WaferScale Integration	21	36	48	0	0	0
Weitek	28	37	0	0	0	0
Western Digital	184	240	0	0.2	0.2	0
Xicor	100	114	123	0	0	0
Xilinx	321	520	566	0.3	0.3	0.4
Zilog	222	265	286	0.2	0.2	0.2
Zoran	0	0	29	0	0	0
Other Americas	39	33	40	0	0	0
<b>Japanese Companies</b>	<b>44,778</b>	<b>60,599</b>	<b>50,884</b>	<b>40.5</b>	<b>40.1</b>	<b>35.9</b>
Fuji Electric	446	566	486	0.4	0.4	0.3
Fujitsu	3,869	5,535	4,427	3.5	3.7	3.1
Hitachi	6,644	9,135	8,071	6.0	6.0	5.7
Matsushita	2,896	3,474	3,003	2.6	2.3	2.1
Mitsubishi	3,772	5,274	4,100	3.4	3.5	2.9
NEC	7,961	11,314	10,428	7.2	7.5	7.4
New JRC	218	237	200	0.2	0.2	0.1
Nippon Steel Semiconductor	160	549	198	0.1	0.4	0.1
Oki	1,471	2,028	1,177	1.3	1.3	0.8
Ricoh	182	213	168	0.2	0.1	0.1
Rohm	1,345	1,934	1,731	1.2	1.3	1.2
Sanken	608	733	622	0.6	0.5	0.4
Sanyo	2,321	2,714	2,491	2.1	1.8	1.8
Seiko Epson	273	313	256	0.2	0.2	0.2
Sharp	2,188	2,592	2,124	2.0	1.7	1.5
Shindengen Electric	242	329	298	0.2	0.2	0.2
Sony	1,876	2,333	1,983	1.7	1.5	1.4
Stanley Electric	0	301	0	0	0.2	0
Toko	91	113	94	0	0	0
Toshiba	7,556	10,076	8,065	6.8	6.7	5.7
Yamaha	382	444	295	0.3	0.3	0.2
Other Japanese	277	392	667	0.3	0.3	0.5
<b>European Companies</b>	<b>9,834</b>	<b>12,837</b>	<b>13,681</b>	<b>8.9</b>	<b>8.5</b>	<b>9.7</b>
ABB-Hafo	40	38	0	0	0	0
Austria Mikro Systeme	110	149	140	0	0	0
Elex	20	33	34	0	0	0



**Table 1-1 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide**  
**(Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Elmos	15	19	7	0	0	0
EM Microelectronics Marin	65	77	85	0	0	0
Ericsson	113	120	170	0.1	0	0.1
Eupec	98	120	160	0	0	0.1
European Silicon Structures	40	59	0	0	0	0
Fagor	27	38	0	0	0	0
GEC Plessey	314	368	338	0.3	0.2	0.2
Micronas	20	43	33	0	0	0
Mietec	178	179	190	0.2	0.1	0.1
Philips	2,920	3,900	4,219	2.6	2.6	3.0
Semikron	112	125	109	0.1	0	0
SGS-Thomson	2,640	3,398	4,112	2.4	2.2	2.9
Siemens	2,090	3,063	3,029	1.9	2.0	2.1
TCS	78	100	83	0	0	0
TEMIC	719	773	813	0.7	0.5	0.6
Thesys	15	20	0	0	0	0
Westcode	41	54	0	0	0	0
Zetex	40	56	54	0	0	0
Other European	84	105	105	0	0	0
Asia/Pacific Companies	9,849	17,805	13,508	8.9	11.8	9.5
Acer	70	80	50	0	0	0
Daewoo	38	49	45	0	0	0
Holtek	70	87	99	0	0	0
Hualon Microelectronics Corp.	89	107	47	0	0	0
Hyundai	1,521	4,132	2,247	1.4	2.7	1.6
Korean Electronic Co.	225	287	268	0.2	0.2	0.2
LG Semicon	1,697	2,863	2,243	1.5	1.9	1.6
Macronix	221	271	354	0.2	0.2	0.2
Mosel Vitelic	259	502	398	0.2	0.3	0.3
Samsung	4,832	8,332	6,464	4.4	5.5	4.6
Silicon Integrated Systems	101	127	127	0	0	0
United Microelectronics Corp.	418	477	492	0.4	0.3	0.3
Vanguard	0	0	225	0	0	0.2
VIA	0	0	110	0	0	0
Winbond Electronics	308	491	339	0.3	0.3	0.2

Source: Dataquest (April 1997)

**Table 1-2**

**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	108,848	149,607	140,222	100.0	100.0	100.0
Americas Companies	45,627	59,835	63,468	41.9	40.0	45.3
ACC Microelectronics	49	40	45	0	0	0
Actel	76	109	149	0	0	0.1
Adaptec	125	124	214	0.1	0	0.2
Advanced Micro Devices	2,134	2,337	1,947	2.0	1.6	1.4
Allegro MicroSystems	148	173	185	0.1	0.1	0.1
Alliance Semiconductor	90	220	76	0	0.1	0
Altera	199	402	497	0.2	0.3	0.4
Analog Devices	687	925	1,218	0.6	0.6	0.9
Appian Technology	7	9	10	0	0	0
Applied Micro Circuits Corp.	48	49	56	0	0	0
ATI Technologies	0	0	130	0	0	0
Atmel	375	589	1,024	0.3	0.4	0.7
Brooktree	109	120	0	0.1	0	0
Burr-Brown	105	126	157	0	0	0.1
California Micro Devices	10	13	8	0	0	0
Catalyst	50	48	54	0	0	0
C-Cube	0	0	150	0	0	0.1
Cherry Semiconductor	77	87	100	0	0	0
Chip Express	0	0	25	0	0	0
Chips & Technologies	89	138	150	0	0	0.1
CID Technologies	4	5	6	0	0	0
Cirrus Logic	781	1,003	891	0.7	0.7	0.6
Comlinear	9	0	0	0	0	0
Crosspoint Solutions	0	2	2	0	0	0
Cypress Semiconductor	400	553	516	0.4	0.4	0.4
Cyrix	241	212	160	0.2	0.1	0.1
Dallas Semiconductor	154	228	277	0.1	0.2	0.2
Digital	0	0	271	0	0	0.2
DSP Group	18	60	67	0	0	0
Eastman Kodak	3	3	3	0	0	0
Elantec	21	22	32	0	0	0
Electronic Designs	26	43	51	0	0	0
ETEQ Microsystems	6	7	4	0	0	0
Exar	169	147	96	0.2	0	0
General Instrument	262	413	362	0.2	0.3	0.3
Gennum	29	32	37	0	0	0

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide**  
**(Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
G-Link USA	0	14	15	0	0	0
Gould AMI	136	72	95	0.1	0	0
Harris	665	685	629	0.6	0.5	0.4
Hewlett-Packard	714	648	945	0.7	0.4	0.7
Holt	9	11	0	0	0	0
Honeywell	55	64	71	0	0	0
Hughes	40	36	39	0	0	0
IBM	2,532	3,522	2,740	2.3	2.4	2.0
IC Sensors	5	6	7	0	0	0
IMI	20	35	39	0	0	0
IMP	49	54	35	0	0	0
Integrated Circuit Systems	81	97	79	0	0	0
Integrated Device Technology	385	617	554	0.4	0.4	0.4
Integrated Information Tech.	35	44	51	0	0	0
Integrated Silicon Solutions	60	158	111	0	0.1	0
Intel	10,099	13,172	17,781	9.3	8.8	12.7
International CMOS Technology	12	16	12	0	0	0
International Rectifier	361	486	520	0.3	0.3	0.4
ITT	241	316	274	0.2	0.2	0.2
IXYS	55	65	66	0	0	0
Kulite	20	24	0	0	0	0
Lattice	134	186	200	0.1	0.1	0.1
Level One Communications	0	78	112	0	0	0
Linear Technology	225	305	365	0.2	0.2	0.3
Linfinity	41	47	48	0	0	0
Logic Devices	14	17	14	0	0	0
LSI Logic	901	1,269	1,239	0.8	0.8	0.9
Lucent Technologies	1,307	1,615	2,110	1.2	1.1	1.5
Maxim	165	185	383	0.2	0.1	0.3
Micrel	25	26	24	0	0	0
Micro Linear	41	54	54	0	0	0
Micro Power Systems	23	0	0	0	0	0
Microchip Technology	212	271	330	0.2	0.2	0.2
Micron Technology	1,492	2,601	1,558	1.4	1.7	1.1
Microsemi	100	118	146	0	0	0.1
Mitel	70	68	129	0	0	0
Motorola	7,012	8,722	8,076	6.4	5.8	5.8
National Semiconductor	2,120	2,400	2,380	1.9	1.6	1.7

**Table 1-2 (Continued)**

**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Novasensor	13	15	0	0	0	0
Oak Technology	62	84	172	0	0	0.1
Optek	56	62	69	0	0	0
OPTi	130	167	119	0.1	0.1	0
Paradigm	36	55	23	0	0	0
Performance Semiconductor	20	28	0	0	0	0
Powerex	76	98	98	0	0	0
Q Logic	45	61	67	0	0	0
Quality Semiconductor	22	46	45	0	0	0
Quality Technologies	49	61	52	0	0	0
QuickLogic	8	16	25	0	0	0
Ramtron	15	25	14	0	0	0
Raytheon	108	125	131	0	0	0
Rockwell	514	744	1,351	0.5	0.5	1.0
S3	130	315	464	0.1	0.2	0.3
Seeq Technology	22	27	32	0	0	0
Semtech	25	48	66	0	0	0
Sensym	8	0	0	0	0	0
Sierra Semiconductor	120	143	188	0.1	0	0.1
Silicon Storage Technology	0	35	91	0	0	0
Silicon Systems	298	369	0	0.3	0.2	0
Sipex	2	2	0	0	0	0
Solitron	5	6	6	0	0	0
Spectra Diode Labs	10	15	17	0	0	0
Standard Microsystems	100	150	153	0	0.1	0.1
Sun Microsystems	0	0	170	0	0	0.1
Supertex	30	35	33	0	0	0
Symbios	354	395	458	0.3	0.3	0.3
Symphony Laboratories	12	15	17	0	0	0
Teccor Electronics	60	68	84	0	0	0
Telcom	18	17	18	0	0	0
Texas Instruments	5,548	7,831	7,064	5.1	5.2	5.0
Trident Microsystems	87	139	180	0	0	0.1
Tseng Labs	83	105	26	0	0	0
Unitrode	73	103	98	0	0	0
Universal	13	15	0	0	0	0
VLSI Technology	588	672	672	0.5	0.4	0.5
VTC	70	155	172	0	0.1	0.1

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide**  
**(Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
WaferScale Integration	21	36	48	0	0	0
Weitek	28	37	0	0	0	0
Western Digital	184	240	0	0.2	0.2	0
Xicor	100	114	123	0	0	0
Xilinx	321	520	566	0.3	0.3	0.4
Zilog	222	265	286	0.2	0.2	0.2
Zoran	0	0	29	0	0	0
Other Americas	39	33	40	0	0	0
<b>Japanese Companies</b>	<b>43,642</b>	<b>59,230</b>	<b>49,639</b>	<b>40.1</b>	<b>39.6</b>	<b>35.4</b>
Fuji Electric	424	543	465	0.4	0.4	0.3
Fujitsu	3,753	5,386	4,293	3.4	3.6	3.1
Hitachi	6,508	8,998	7,953	6.0	6.0	5.7
Matsushita	2,896	3,474	3,003	2.7	2.3	2.1
Mitsubishi	3,663	5,076	3,913	3.4	3.4	2.8
NEC	7,863	11,184	10,303	7.2	7.5	7.3
New JRC	218	237	200	0.2	0.2	0.1
Nippon Steel Semiconductor	160	549	198	0.1	0.4	0.1
Oki	1,458	2,015	1,164	1.3	1.3	0.8
Ricoh	182	213	168	0.2	0.1	0.1
Rohm	1,273	1,856	1,658	1.2	1.2	1.2
Sanken	368	450	368	0.3	0.3	0.3
Sanyo	2,147	2,521	2,314	2.0	1.7	1.7
Seiko Epson	273	313	256	0.3	0.2	0.2
Sharp	2,188	2,592	2,124	2.0	1.7	1.5
Shindengen Electric	194	301	277	0.2	0.2	0.2
Sony	1,835	2,292	1,918	1.7	1.5	1.4
Stanley Electric	0	301	0	0	0.2	0
Toko	83	105	86	0	0	0
Toshiba	7,497	10,002	8,029	6.9	6.7	5.7
Yamaha	382	444	295	0.4	0.3	0.2
Other Japanese	277	378	654	0.3	0.3	0.5
<b>European Companies</b>	<b>9,730</b>	<b>12,737</b>	<b>13,607</b>	<b>8.9</b>	<b>8.5</b>	<b>9.7</b>
ABB-Hafo	32	33	0	0	0	0
Austria Mikro Systeme	110	149	140	0.1	0	0
Elex	20	33	34	0	0	0
Elmos	15	19	7	0	0	0
EM Microelectronics Marin	65	77	85	0	0	0
Ericsson	94	105	157	0	0	0.1

**Table 1-2 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Semiconductors Worldwide**  
**(Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Eupec	98	120	160	0	0	0.1
European Silicon Structures	40	59	0	0	0	0
Fagor	27	38	0	0	0	0
GEC Plessey	308	365	338	0.3	0.2	0.2
Micronas	20	33	33	0	0	0
Mietec	178	179	190	0.2	0.1	0.1
Philips	2,866	3,854	4,179	2.6	2.6	3.0
Semikron	112	125	109	0.1	0	0
SGS-Thomson	2,640	3,398	4,112	2.4	2.3	2.9
Siemens	2,090	3,063	3,029	1.9	2.0	2.2
TCS	78	100	83	0	0	0
TEMIC	719	773	813	0.7	0.5	0.6
Thesys	15	20	0	0	0	0
Westcode	41	54	0	0	0	0
Zetex	40	56	54	0	0	0
Other European	67	84	84	0	0	0
Asia/Pacific Companies	9,849	17,805	13,508	9.0	11.9	9.6
Acer	70	80	50	0	0	0
Daewoo	38	49	45	0	0	0
Holtek	70	87	99	0	0	0
Hualon Microelectronics Corp.	89	107	47	0	0	0
Hyundai	1,521	4,132	2,247	1.4	2.8	1.6
Korean Electronic Co.	225	287	268	0.2	0.2	0.2
LG Semicon	1,697	2,863	2,243	1.6	1.9	1.6
Macronix	221	271	354	0.2	0.2	0.3
Mosel Vitelic	259	502	398	0.2	0.3	0.3
Samsung	4,832	8,332	6,464	4.4	5.6	4.6
Silicon Integrated Systems	101	127	127	0	0	0
United Microelectronics Corp.	418	477	492	0.4	0.3	0.4
Vanguard	0	0	225	0	0	0.2
VIA	0	0	110	0	0	0
Winbond Electronics	308	491	339	0.3	0.3	0.2

Source: Dataquest (April 1997)

**Table 1-3**  
**Each Company's Factory Revenue from Shipments of Total ICs Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	95,861	132,136	123,300	100.0	100.0	100.0
Americas Companies	42,814	55,754	59,376	44.7	42.2	48.2
ACC Microelectronics	49	40	45	0	0	0
Actel	76	109	149	0	0	0.1
Adaptec	125	124	214	0.1	0	0.2
Advanced Micro Devices	2,134	2,337	1,947	2.2	1.8	1.6
Allegro MicroSystems	139	156	181	0.1	0.1	0.1
Alliance Semiconductor	90	220	76	0	0.2	0
Altera	199	402	497	0.2	0.3	0.4
Analog Devices	739	983	1,260	0.8	0.7	1.0
Appian Technology	7	9	10	0	0	0
Applied Micro Circuits Corp.	48	49	56	0	0	0
ATI Technologies	0	0	130	0	0	0.1
Atmel	375	589	1,024	0.4	0.4	0.8
Brooktree	109	120	0	0.1	0	0
Burr-Brown	165	186	207	0.2	0.1	0.2
California Micro Devices	10	13	8	0	0	0
Catalyst	50	48	54	0	0	0
C-Cube	0	0	150	0	0	0.1
Cherry Semiconductor	77	87	100	0	0	0
Chip Express	0	0	25	0	0	0
Chips & Technologies	89	138	150	0	0.1	0.1
Cirrus Logic	781	1,003	891	0.8	0.8	0.7
Comlinear	16	0	0	0	0	0
Crosspoint Solutions	0	2	2	0	0	0
Cypress Semiconductor	400	553	516	0.4	0.4	0.4
Cyrix	241	212	160	0.3	0.2	0.1
Dallas Semiconductor	154	228	277	0.2	0.2	0.2
Digital	0	0	271	0	0	0.2
DSP Group	18	60	67	0	0	0
Elantec	24	25	35	0	0	0
Electronic Designs	26	43	51	0	0	0
ETEQ Microsystems	6	7	4	0	0	0
Exar	169	147	96	0.2	0.1	0
Gennum	31	34	37	0	0	0
G-Link USA	0	14	15	0	0	0
Gould AMI	136	72	95	0.1	0	0
Harris	478	457	397	0.5	0.3	0.3

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total ICs Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Hewlett-Packard	255	342	380	0.3	0.3	0.3
Holt	9	11	0	0	0	0
Honeywell	23	27	30	0	0	0
Hughes	40	36	39	0	0	0
IBM	2,532	3,522	2,740	2.6	2.7	2.2
IMI	20	35	39	0	0	0
IMP	49	54	35	0	0	0
Integrated Circuit Systems	81	97	79	0	0	0
Integrated Device Technology	385	617	554	0.4	0.5	0.4
Integrated Information Tech.	35	44	51	0	0	0
Integrated Silicon Solutions	60	158	111	0	0.1	0
Intel	10,099	13,172	17,781	10.5	10.0	14.4
International CMOS Technology	12	16	12	0	0	0
International Rectifier	8	18	27	0	0	0
ITT	127	124	193	0.1	0	0.2
Kulite	20	24	0	0	0	0
Lattice	134	186	200	0.1	0.1	0.2
Level One Communications	0	78	112	0	0	0
Linear Technology	225	305	365	0.2	0.2	0.3
Linfinitiy	44	50	51	0	0	0
Logic Devices	14	17	14	0	0	0
LSI Logic	901	1,269	1,239	0.9	1.0	1.0
Lucent Technologies	1,250	1,534	2,020	1.3	1.2	1.6
Maxim	169	189	387	0.2	0.1	0.3
Micrel	25	26	24	0	0	0
Micro Linear	41	54	54	0	0	0
Micro Power Systems	23	0	0	0	0	0
Microchip Technology	212	271	330	0.2	0.2	0.3
Micron Technology	1,492	2,601	1,558	1.6	2.0	1.3
Mitel	100	88	123	0.1	0	0
Motorola	6,096	7,022	6,584	6.4	5.3	5.3
National Semiconductor	2,028	2,244	2,223	2.1	1.7	1.8
Novasensor	13	15	0	0	0	0
Oak Technology	62	84	172	0	0	0.1
Optek	7	8	9	0	0	0
OPTi	130	167	119	0.1	0.1	0
Paradigm	36	55	23	0	0	0
Performance Semiconductor	20	28	0	0	0	0



**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total ICs Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Q Logic	45	61	67	0	0	0
Quality Semiconductor	22	46	45	0	0	0
QuickLogic	8	16	25	0	0	0
Ramtron	15	25	14	0	0	0
Raytheon	100	112	118	0.1	0	0
Rockwell	514	744	1,351	0.5	0.6	1.1
S3	130	315	464	0.1	0.2	0.4
Seeq Technology	22	27	32	0	0	0
Semtech	5	19	42	0	0	0
Sierra Semiconductor	120	143	188	0.1	0.1	0.2
Silicon Storage Technology	0	35	91	0	0	0
Silicon Systems	298	369	0	0.3	0.3	0
Sipex	16	16	13	0	0	0
Solitron	2	2	4	0	0	0
Standard Microsystems	100	150	153	0.1	0.1	0.1
Sun Microsystems	0	0	170	0	0	0.1
Supertex	19	19	17	0	0	0
Symbios	354	395	458	0.4	0.3	0.4
Symphony Laboratories	12	15	17	0	0	0
Telcom	18	17	18	0	0	0
Texas Instruments	5,471	7,772	6,974	5.7	5.9	5.7
Trident Microsystems	87	139	180	0	0.1	0.1
Tseng Labs	83	105	26	0	0	0
Unitrode	88	103	98	0	0	0
Universal	13	15	0	0	0	0
VLSI Technology	588	672	672	0.6	0.5	0.5
VTC	70	155	172	0	0.1	0.1
WaferScale Integration	21	36	48	0	0	0
Weitek	28	37	0	0	0	0
Western Digital	184	240	0	0.2	0.2	0
Xicor	100	114	123	0.1	0	0
Xilinx	321	520	566	0.3	0.4	0.5
Zilog	222	265	286	0.2	0.2	0.2
Zoran	0	0	29	0	0	0
Other Americas	0	0	40	0	0	0
Japanese Companies	36,288	49,722	40,568	37.9	37.6	32.9
Fuji Electric	89	98	85	0	0	0
Fujitsu	3,542	5,084	3,986	3.7	3.8	3.2

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total ICs Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Hitachi	5,757	8,162	6,973	6.0	6.2	5.7
Matsushita	1,968	2,347	1,988	2.1	1.8	1.6
Mitsubishi	3,172	4,644	3,504	3.3	3.5	2.8
NEC	7,159	10,281	9,354	7.5	7.8	7.6
New JRC	205	223	188	0.2	0.2	0.2
Nippon Steel Semiconductor	160	549	198	0.2	0.4	0.2
OKI	1,437	1,988	1,138	1.5	1.5	0.9
Ricoh	182	213	168	0.2	0.2	0.1
Rohm	643	877	757	0.7	0.7	0.6
Sanken	240	283	254	0.3	0.2	0.2
Sanyo	1,782	2,059	1,902	1.9	1.6	1.5
Seiko Epson	273	313	256	0.3	0.2	0.2
Sharp	1,678	1,956	1,507	1.8	1.5	1.2
Shindengen Electric	48	28	21	0	0	0
Sony	1,513	1,898	1,567	1.6	1.4	1.3
Toko	40	45	39	0	0	0
Toshiba	5,931	8,025	6,204	6.2	6.1	5.0
Yamaha	382	444	295	0.4	0.3	0.2
Other Japanese	87	205	184	0	0.2	0.1
European Companies	7,278	9,418	10,380	7.6	7.1	8.4
ABB-Hafo	28	24	0	0	0	0
Austria Mikro Systeme	110	149	140	0.1	0.1	0.1
Ellex	20	31	34	0	0	0
Elmos	15	19	7	0	0	0
EM Microelectronics Marin	65	77	85	0	0	0
Ericsson	83	84	119	0	0	0
European Silicon Structures	40	59	0	0	0	0
GEC Plessey	286	332	303	0.3	0.3	0.2
Micronas	20	43	33	0	0	0
Mietec	178	179	190	0.2	0.1	0.2
Philips	2,159	2,844	3,278	2.3	2.2	2.7
SGS-Thomson	2,207	2,807	3,526	2.3	2.1	2.9
Siemens	1,586	2,314	2,238	1.7	1.8	1.8
TCS	51	65	58	0	0	0
TEMIC	391	342	347	0.4	0.3	0.3
Thesys	15	20	0	0	0	0
Zetex	3	4	1	0	0	0
Other European	21	25	21	0	0	0

**Table 1-3 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total ICs Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Asia/Pacific Companies	9,481	17,242	12,976	9.9	13.0	10.5
Acer	70	80	50	0	0	0
Daewoo	38	49	45	0	0	0
Holtek	70	87	99	0	0	0
Hualon Microelectronics Corp.	89	107	47	0	0	0
Hyundai	1,521	4,132	2,247	1.6	3.1	1.8
Korean Electronic Co.	47	45	51	0	0	0
LG Semicon	1,697	2,863	2,243	1.8	2.2	1.8
Macronix	221	271	354	0.2	0.2	0.3
Mosel Vitelic	259	502	398	0.3	0.4	0.3
Samsung	4,642	8,011	6,149	4.8	6.1	5.0
Silicon Integrated Systems	101	127	127	0.1	0	0.1
United Microelectronics Corp.	418	477	492	0.4	0.4	0.4
Vanguard	0	0	225	0	0	0.2
VIA	0	0	110	0	0	0
Winbond Electronics	308	491	339	0.3	0.4	0.3

Source: Dataquest (April 1997)

**Table 1-4**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	94,196	130,481	121,832	100.0	100.0	100.0
Americas Companies	42,389	55,568	59,227	45.0	42.6	48.6
ACC Microelectronics	49	40	45	0	0	0
Actel	76	109	149	0	0	0.1
Adaptec	125	124	214	0.1	0	0.2
Advanced Micro Devices	2,134	2,337	1,947	2.3	1.8	1.6
Allegro MicroSystems	139	144	166	0.1	0.1	0.1
Alliance Semiconductor	90	220	76	0	0.2	0
Altera	199	402	497	0.2	0.3	0.4
Analog Devices	687	925	1,218	0.7	0.7	1.0
Appian Technology	7	9	10	0	0	0
Applied Micro Circuits Corp.	48	49	56	0	0	0
ATI Technologies	0	0	130	0	0	0.1
Atmel	375	589	1,024	0.4	0.5	0.8
Brooktree	109	120	0	0.1	0	0
Burr-Brown	105	126	157	0.1	0	0.1
California Micro Devices	10	13	8	0	0	0
Catalyst	50	48	54	0	0	0
C-Cube	0	0	150	0	0	0.1
Cherry Semiconductor	77	87	100	0	0	0
Chip Express	0	0	25	0	0	0
Chips & Technologies	89	138	150	0	0.1	0.1
Cirrus Logic	781	1,003	891	0.8	0.8	0.7
Comlinear	9	0	0	0	0	0
Crosspoint Solutions	0	2	2	0	0	0
Cypress Semiconductor	400	553	516	0.4	0.4	0.4
Cyrix	241	212	160	0.3	0.2	0.1
Dallas Semiconductor	154	228	277	0.2	0.2	0.2
Digital	0	0	271	0	0	0.2
DSP Group	18	60	67	0	0	0
Elantec	21	22	32	0	0	0
Electronic Designs	26	43	51	0	0	0
ETEQ Microsystems	6	7	4	0	0	0
Exar	169	147	96	0.2	0.1	0
Gennum	29	32	37	0	0	0
G-Link USA	0	14	15	0	0	0
Gould AMI	136	72	95	0.1	0	0
Harris	478	457	397	0.5	0.4	0.3

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Hewlett-Packard	255	342	380	0.3	0.3	0.3
Holt	9	11	0	0	0	0
Honeywell	23	27	30	0	0	0
Hughes	40	36	39	0	0	0
IBM	2,532	3,522	2,740	2.7	2.7	2.2
IMI	20	35	39	0	0	0
IMP	49	54	35	0	0	0
Integrated Circuit Systems	81	97	79	0	0	0
Integrated Device Technology	385	617	554	0.4	0.5	0.5
Integrated Information Tech.	35	44	51	0	0	0
Integrated Silicon Solutions	60	158	111	0	0.1	0
Intel	10,099	13,172	17,781	10.7	10.1	14.6
International CMOS Technology	12	16	12	0	0	0
International Rectifier	8	18	27	0	0	0
ITT	127	124	193	0.1	0	0.2
Kulite	20	24	0	0	0	0
Lattice	134	186	200	0.1	0.1	0.2
Level One Communications	0	78	112	0	0	0
Linear Technology	225	305	365	0.2	0.2	0.3
Linfinity	41	47	48	0	0	0
Logic Devices	14	17	14	0	0	0
LSI Logic	901	1,269	1,239	1.0	1.0	1.0
Lucent Technologies	1,250	1,534	2,020	1.3	1.2	1.7
Maxim	165	185	383	0.2	0.1	0.3
Micrel	25	26	24	0	0	0
Micro Linear	41	54	54	0	0	0
Micro Power Systems	23	0	0	0	0	0
Microchip Technology	212	271	330	0.2	0.2	0.3
Micron Technology	1,492	2,601	1,558	1.6	2.0	1.3
Mitel	70	68	107	0	0	0
Motorola	5,870	7,022	6,584	6.2	5.4	5.4
National Semiconductor	2,021	2,236	2,223	2.1	1.7	1.8
Novasensor	13	15	0	0	0	0
Oak Technology	62	84	172	0	0	0.1
Optek	7	8	9	0	0	0
OPTi	130	167	119	0.1	0.1	0
Paradigm	36	55	23	0	0	0
Performance Semiconductor	20	28	0	0	0	0

**Table 1-4 (Continued)**

**Each Company's Factory Revenue from Shipments of Total Integrated Circuits Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Q Logic	45	61	67	0	0	0
Quality Semiconductor	22	46	45	0	0	0
QuickLogic	8	16	25	0	0	0
Ramtron	15	25	14	0	0	0
Raytheon	100	112	118	0.1	0	0
Rockwell	514	744	1,351	0.5	0.6	1.1
S3	130	315	464	0.1	0.2	0.4
Seeq Technology	22	27	32	0	0	0
Semtech	5	19	42	0	0	0
Sierra Semiconductor	120	143	188	0.1	0.1	0.2
Silicon Storage Technology	0	35	91	0	0	0
Silicon Systems	298	369	0	0.3	0.3	0
Sipex	2	2	0	0	0	0
Solitron	0	0	1	0	0	0
Standard Microsystems	100	150	153	0.1	0.1	0.1
Sun Microsystems	0	0	170	0	0	0.1
Supertex	19	19	17	0	0	0
Symbios	354	395	458	0.4	0.3	0.4
Symphony Laboratories	12	15	17	0	0	0
Telcom	18	17	18	0	0	0
Texas Instruments	5,471	7,772	6,974	5.8	6.0	5.7
Trident Microsystems	87	139	180	0	0.1	0.1
Tseng Labs	83	105	26	0	0	0
Unitrode	73	103	98	0	0	0
Universal	13	15	0	0	0	0
VLSI Technology	588	672	672	0.6	0.5	0.6
VTC	70	155	172	0	0.1	0.1
WaferScale Integration	21	36	48	0	0	0
Weitek	28	37	0	0	0	0
Western Digital	184	240	0	0.2	0.2	0
Xicor	100	114	123	0.1	0	0.1
Xilinx	321	520	566	0.3	0.4	0.5
Zilog	222	265	286	0.2	0.2	0.2
Zoran	0	0	29	0	0	0
Other Americas	0	0	40	0	0	0
Japanese Companies	35,152	48,353	39,323	37.3	37.1	32.3
Fuji Electric	67	75	64	0	0	0
Fujitsu	3,426	4,935	3,852	3.6	3.8	3.2

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Hitachi	5,621	8,025	6,855	6.0	6.2	5.6
Matsushita	1,968	2,347	1,988	2.1	1.8	1.6
Mitsubishi	3,063	4,446	3,317	3.3	3.4	2.7
NEC	7,061	10,151	9,229	7.5	7.8	7.6
New JRC	205	223	188	0.2	0.2	0.2
Nippon Steel Semiconductor	160	549	198	0.2	0.4	0.2
Oki	1,424	1,975	1,125	1.5	1.5	0.9
Ricoh	182	213	168	0.2	0.2	0.1
Rohm	571	799	684	0.6	0.6	0.6
Sanyo	1,608	1,866	1,725	1.7	1.4	1.4
Seiko Epson	273	313	256	0.3	0.2	0.2
Sharp	1,678	1,956	1,507	1.8	1.5	1.2
Sony	1,472	1,857	1,502	1.6	1.4	1.2
Toko	32	37	31	0	0	0
Toshiba	5,872	7,951	6,168	6.2	6.1	5.1
Yamaha	382	444	295	0.4	0.3	0.2
Other Japanese	87	191	171	0	0.1	0.1
European Companies	7,174	9,318	10,306	7.6	7.1	8.5
ABB-Hafo	20	19	0	0	0	0
Austria Mikro Systeme	110	149	140	0.1	0.1	0.1
Elex	20	31	34	0	0	0
Elmos	15	19	7	0	0	0
EM Microelectronics Marin	65	77	85	0	0	0
Ericsson	64	69	106	0	0	0
European Silicon Structures	40	59	0	0	0	0
GEC Plessey	280	329	303	0.3	0.3	0.2
Micronas	20	33	33	0	0	0
Mietec	178	179	190	0.2	0.1	0.2
Philips	2,105	2,798	3,238	2.2	2.1	2.7
SGS-Thomson	2,207	2,807	3,526	2.3	2.2	2.9
Siemens	1,586	2,314	2,238	1.7	1.8	1.8
TCS	51	65	58	0	0	0
TEMIC	391	342	347	0.4	0.3	0.3
Thesys	15	20	0	0	0	0
Zetex	3	4	1	0	0	0
Other European	4	4	0	0	0	0

**Table 1-4 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Integrated Circuits**  
**Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Asia/Pacific Companies	9,481	17,242	12,976	10.1	13.2	10.7
Acer	70	80	50	0	0	0
Daewoo	38	49	45	0	0	0
Holttek	70	87	99	0	0	0
Hualon Microelectronics Corp.	89	107	47	0	0	0
Hyundai	1,521	4,132	2,247	1.6	3.2	1.8
Korean Electronic Co.	47	45	51	0	0	0
LG Semicon	1,697	2,863	2,243	1.8	2.2	1.8
Macronix	221	271	354	0.2	0.2	0.3
Mosel Vitelic	259	502	398	0.3	0.4	0.3
Samsung	4,642	8,011	6,149	4.9	6.1	5.0
Silicon Integrated Systems	101	127	127	0.1	0	0.1
United Microelectronics Corp.	418	477	492	0.4	0.4	0.4
Vanguard	0	0	225	0	0	0.2
VIA	0	0	110	0	0	0
Winbond Electronics	308	491	339	0.3	0.4	0.3

Source: Dataquest (April 1997)



**Table 1-5**  
**Each Company's Factory Revenue from Shipments of Bipolar Digital Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	2,912	2,455	1,849	100.0	100.0	100.0
Americas Companies	1,473	1,295	953	50.6	52.7	51.5
Advanced Micro Devices	143	100	62	4.9	4.1	3.4
Applied Micro Circuits Corp.	20	19	30	0.7	0.8	1.6
Harris	6	4	4	0.2	0.2	0.2
Lucent Technologies	63	50	70	2.2	2.0	3.8
Motorola	421	381	271	14.5	15.5	14.7
National Semiconductor	221	209	161	7.6	8.5	8.7
Raytheon	22	19	15	0.8	0.8	0.8
Texas Instruments	577	513	340	19.8	20.9	18.4
Japanese Companies	1,207	972	752	41.4	39.6	40.7
Fujitsu	395	203	90	13.6	8.3	4.9
Hitachi	465	442	451	16.0	18.0	24.4
Matsushita	29	29	19	1.0	1.2	1.0
Mitsubishi	23	37	25	0.8	1.5	1.4
NEC	194	109	90	6.7	4.4	4.9
Oki	33	36	4	1.1	1.5	0.2
Toshiba	68	116	73	2.3	4.7	3.9
European Companies	186	174	134	6.4	7.1	7.2
GEC Plessey	16	10	12	0.5	0.4	0.6
Philips	121	123	90	4.2	5.0	4.9
SGS-Thomson	12	6	0	0.4	0.2	0
Siemens	33	31	32	1.1	1.3	1.7
Other European	4	4	0	0.1	0.2	0
Asia/Pacific Companies	46	14	10	1.6	0.6	0.5
LG Semicon	46	14	10	1.6	0.6	0.5

Source: Dataquest (April 1997)

**Table 1-6**  
**Each Company's Factory Revenue from Shipments of Bipolar Logic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
<b>Total Market</b>	<b>2,678</b>	<b>2,182</b>	<b>1,620</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Americas Companies</b>	<b>1,402</b>	<b>1,154</b>	<b>922</b>	<b>52.4</b>	<b>52.9</b>	<b>56.9</b>
Advanced Micro Devices	102	69	62	3.8	3.2	3.8
Applied Micro Circuits Corp.	20	19	30	0.7	0.9	1.9
Harris	6	4	4	0.2	0.2	0.2
Lucent Technologies	60	45	70	2.2	2.1	4.3
Motorola	420	359	251	15.7	16.5	15.5
National Semiconductor	212	138	157	7.9	6.3	9.7
Raytheon	17	15	12	0.6	0.7	0.7
Texas Instruments	565	505	336	21.1	23.1	20.7
<b>Japanese Companies</b>	<b>1,058</b>	<b>854</b>	<b>577</b>	<b>39.5</b>	<b>39.1</b>	<b>35.6</b>
Fujitsu	363	183	70	13.6	8.4	4.3
Hitachi	372	361	372	13.9	16.5	23.0
Matsushita	26	26	19	1.0	1.2	1.2
Mitsubishi	23	37	25	0.9	1.7	1.5
NEC	178	100	82	6.6	4.6	5.1
Oki	33	36	4	1.2	1.6	0.2
Toshiba	63	111	5	2.4	5.1	0.3
<b>European Companies</b>	<b>172</b>	<b>160</b>	<b>111</b>	<b>6.4</b>	<b>7.3</b>	<b>6.9</b>
GEC Plessey	16	10	0	0.6	0.5	0
Philips	107	109	79	4.0	5.0	4.9
SGS-Thomson	12	6	0	0.4	0.3	0
Siemens	33	31	32	1.2	1.4	2.0
Other European	4	4	0	0.1	0.2	0
<b>Asia/Pacific Companies</b>	<b>46</b>	<b>14</b>	<b>10</b>	<b>1.7</b>	<b>0.6</b>	<b>0.6</b>
LG Semicon	46	14	10	1.7	0.6	0.6

Source: Dataquest (April 1997)

**Table 1-7**  
**Each Company's Factory Revenue from Shipments of Other Bipolar Logic/Memory/**  
**Microcomponents Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	234	273	229	100.0	100.0	100.0
Americas Companies	71	141	31	30.3	51.6	13.5
Advanced Micro Devices	41	31	0	17.5	11.4	0
Lucent Technologies	3	5	0	1.3	1.8	0
Motorola	1	22	20	0.4	8.1	8.7
National Semiconductor	9	71	4	3.8	26.0	1.7
Raytheon	5	4	3	2.1	1.5	1.3
Texas Instruments	12	8	4	5.1	2.9	1.7
Japanese Companies	149	118	175	63.7	43.2	76.4
Fujitsu	32	20	20	13.7	7.3	8.7
Hitachi	93	81	79	39.7	29.7	34.5
Matsushita	3	3	0	1.3	1.1	0
NEC	16	9	8	6.8	3.3	3.5
Toshiba	5	5	68	2.1	1.8	29.7
European Companies	14	14	23	6.0	5.1	10.0
GEC Plessey	0	0	12	0	0	5.2
Philips	14	14	11	6.0	5.1	4.8

Source: Dataquest (April 1997)

**Table 1-8**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	76,021	110,410	100,683	100.0	100.0	100.0
Americas Companies	34,456	46,979	49,752	45.3	42.5	49.4
ACC Microelectronics	49	40	45	0	0	0
Actel	76	109	149	0	0	0.1
Adaptec	125	124	214	0.2	0.1	0.2
Advanced Micro Devices	1,804	2,064	1,770	2.4	1.9	1.8
Allegro MicroSystems	5	0	0	0	0	0
Alliance Semiconductor	90	220	76	0.1	0.2	0
Altera	199	402	497	0.3	0.4	0.5
Analog Devices	85	116	258	0.1	0.1	0.3
Appian Technology	7	9	10	0	0	0
Applied Micro Circuits Corp.	21	25	21	0	0	0
ATI Technologies	0	0	130	0	0	0.1
Atmel	363	573	988	0.5	0.5	1.0
California Micro Devices	5	6	5	0	0	0
Catalyst	49	48	54	0	0	0
C-Cube	0	0	150	0	0	0.1
Chip Express	0	0	25	0	0	0
Chips & Technologies	89	138	150	0.1	0.1	0.1
Cirrus Logic	681	887	741	0.9	0.8	0.7
Crosspoint Solutions	0	2	2	0	0	0
Cypress Semiconductor	400	553	516	0.5	0.5	0.5
Cyrix	241	212	160	0.3	0.2	0.2
Dallas Semiconductor	154	228	230	0.2	0.2	0.2
Digital	0	0	271	0	0	0.3
DSP Group	18	60	67	0	0	0
Electronic Designs	26	43	51	0	0	0
ETEQ Microsystems	6	7	4	0	0	0
Exar	0	16	9	0	0	0
G-Link USA	0	14	15	0	0	0
Gould AMI	105	72	95	0.1	0	0
Harris	188	193	162	0.2	0.2	0.2
Hewlett-Packard	255	342	380	0.3	0.3	0.4
Holt	2	3	0	0	0	0
Hughes	21	20	21	0	0	0
IBM	2,532	3,522	2,740	3.3	3.2	2.7
IMI	18	30	34	0	0	0
IMP	9	12	0	0	0	0

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Integrated Circuit Systems	42	52	50	0	0	0
Integrated Device Technology	385	617	554	0.5	0.6	0.6
Integrated Information Tech.	35	44	51	0	0	0
Integrated Silicon Solutions	60	158	111	0	0.1	0.1
Intel	10,079	13,163	17,781	13.3	11.9	17.7
International CMOS Technology	12	16	12	0	0	0
ITT	103	110	183	0.1	0	0.2
Lattice	134	186	200	0.2	0.2	0.2
Logic Devices	14	17	14	0	0	0
LSI Logic	901	1,269	1,239	1.2	1.1	1.2
Lucent Technologies	785	1,200	1,649	1.0	1.1	1.6
Micrel	7	7	6	0	0	0
Micro Linear	6	0	0	0	0	0
Microchip Technology	212	271	330	0.3	0.2	0.3
Micron Technology	1,492	2,601	1,558	2.0	2.4	1.5
Motorola	4,525	5,610	5,103	6.0	5.1	5.1
National Semiconductor	893	993	1,022	1.2	0.9	1.0
Oak Technology	62	84	172	0	0	0.2
OPTi	130	167	119	0.2	0.2	0.1
Paradigm	36	55	23	0	0	0
Performance Semiconductor	20	28	0	0	0	0
Q Logic	45	61	67	0	0	0
Quality Semiconductor	22	46	45	0	0	0
QuickLogic	8	16	25	0	0	0
Ramtron	15	25	14	0	0	0
Rockwell	514	744	1,230	0.7	0.7	1.2
S3	130	315	464	0.2	0.3	0.5
Seeq Technology	22	27	12	0	0	0
Sierra Semiconductor	35	47	62	0	0	0
Silicon Storage Technology	0	35	91	0	0	0
Standard Microsystems	100	150	153	0.1	0.1	0.2
Sun Microsystems	0	0	170	0	0	0.2
Supertex	6	6	5	0	0	0
Symbios	298	293	306	0.4	0.3	0.3
Symphony Laboratories	12	15	17	0	0	0
Texas Instruments	4,052	6,325	4,904	5.3	5.7	4.9
Trident Microsystems	87	139	180	0.1	0.1	0.2
Tseng Labs	83	105	26	0.1	0	0

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Universal	7	8	0	0	0	0
VLSI Technology	588	672	672	0.8	0.6	0.7
WaferScale Integration	21	36	48	0	0	0
Weitek	28	37	0	0	0	0
Western Digital	184	240	0	0.2	0.2	0
Xicor	100	114	123	0.1	0.1	0.1
Xilinx	321	520	566	0.4	0.5	0.6
Zilog	222	265	286	0.3	0.2	0.3
Zoran	0	0	29	0	0	0
Other Americas	0	0	40	0	0	0
<b>Japanese Companies</b>	<b>29,034</b>	<b>41,677</b>	<b>33,361</b>	<b>38.2</b>	<b>37.7</b>	<b>33.1</b>
Fuji Electric	40	46	41	0	0	0
Fujitsu	2,876	4,417	3,471	3.8	4.0	3.4
Hitachi	4,799	7,228	5,995	6.3	6.5	6.0
Matsushita	1,328	1,679	1,422	1.7	1.5	1.4
Mitsubishi	2,584	3,954	2,895	3.4	3.6	2.9
NEC	6,361	9,401	8,515	8.4	8.5	8.5
New JRC	32	40	28	0	0	0
Nippon Steel Semiconductor	160	549	198	0.2	0.5	0.2
Oki	1,365	1,911	1,103	1.8	1.7	1.1
Ricoh	168	175	118	0.2	0.2	0.1
Rohm	210	376	327	0.3	0.3	0.3
Sanyo	797	972	945	1.0	0.9	0.9
Seiko Epson	260	297	242	0.3	0.3	0.2
Sharp	1,582	1,851	1,415	2.1	1.7	1.4
Sony	1,007	1,303	1,050	1.3	1.2	1.0
Toshiba	5,015	6,920	5,186	6.6	6.3	5.2
Yamaha	363	416	289	0.5	0.4	0.3
Other Japanese	87	142	121	0.1	0.1	0.1
<b>European Companies</b>	<b>3,499</b>	<b>4,931</b>	<b>5,040</b>	<b>4.6</b>	<b>4.5</b>	<b>5.0</b>
Austria Mikro Systeme	46	68	54	0	0	0
Elex	20	23	13	0	0	0
Elmos	15	19	7	0	0	0
EM Microelectronics Marin	0	2	4	0	0	0
Ericsson	15	19	19	0	0	0
European Silicon Structures	40	48	0	0	0	0
GEC Plessey	129	164	128	0.2	0.1	0.1
Mietec	32	35	32	0	0	0

**Table 1-8 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Philips	1,027	1,418	1,857	1.4	1.3	1.8
SGS-Thomson	998	1,318	1,484	1.3	1.2	1.5
Siemens	1,007	1,591	1,226	1.3	1.4	1.2
TCS	31	41	44	0	0	0
TEMIC	124	165	172	0.2	0.1	0.2
Thesys	15	20	0	0	0	0
Asia/Pacific Companies	9,032	16,823	12,530	11.9	15.2	12.4
Acer	70	80	50	0	0	0
Daewoo	21	27	21	0	0	0
Holtek	70	87	99	0	0	0
Hualon Microelectronics Corp.	80	98	42	0.1	0	0
Hyundai	1,521	4,130	2,246	2.0	3.7	2.2
LG Semicon	1,606	2,807	2,193	2.1	2.5	2.2
Macronix	221	271	354	0.3	0.2	0.4
Mosel Vitelic	259	502	398	0.3	0.5	0.4
Samsung	4,409	7,775	5,889	5.8	7.0	5.8
Silicon Integrated Systems	101	127	127	0.1	0.1	0.1
United Microelectronics Corp.	418	477	492	0.5	0.4	0.5
Vanguard	0	0	225	0	0	0.2
VIA	0	0	110	0	0	0.1
Winbond Electronics	256	442	284	0.3	0.4	0.3

Source: Dataquest (April 1997)

**Table 1-9**  
**Each Company's Factory Revenue from Shipments of MOS Memory Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	33,505	55,287	37,807	100.0	100.0	100.0
Americas Companies	8,430	13,641	9,399	25.2	24.7	24.9
Advanced Micro Devices	442	719	711	1.3	1.3	1.9
Alliance Semiconductor	90	210	66	0.3	0.4	0.2
Atmel	331	478	793	1.0	0.9	2.1
Catalyst	49	48	54	0.1	0	0.1
Cypress Semiconductor	285	424	382	0.9	0.8	1.0
Dallas Semiconductor	30	56	0	0	0.1	0
Electronic Designs	26	43	51	0	0	0.1
G-Link USA	0	14	15	0	0	0
Gould AMI	44	0	0	0.1	0	0
Harris	12	18	9	0	0	0
IBM	1,520	2,100	996	4.5	3.8	2.6
IMP	1	0	0	0	0	0
Integrated Device Technology	252	444	378	0.8	0.8	1.0
Integrated Silicon Solutions	60	158	111	0.2	0.3	0.3
Intel	458	766	950	1.4	1.4	2.5
ITT	10	0	0	0	0	0
Logic Devices	2	5	2	0	0	0
Lucent Technologies	3	3	0	0	0	0
Microchip Technology	82	102	117	0.2	0.2	0.3
Micron Technology	1,492	2,601	1,558	4.5	4.7	4.1
Motorola	948	1,237	827	2.8	2.2	2.2
National Semiconductor	179	188	127	0.5	0.3	0.3
Paradigm	36	55	23	0.1	0	0
Performance Semiconductor	5	7	0	0	0	0
Quality Semiconductor	7	14	1	0	0	0
Ramtron	15	25	14	0	0	0
Seeq Technology	5	6	0	0	0	0
Silicon Storage Technology	0	35	91	0	0	0.2
Texas Instruments	1,931	3,754	1,984	5.8	6.8	5.2
WaferScale Integration	15	17	16	0	0	0
Xicor	100	114	123	0.3	0.2	0.3
Japanese Companies	15,519	24,062	15,708	46.3	43.5	41.5
Fujitsu	1,692	2,589	1,656	5.0	4.7	4.4
Hitachi	3,232	5,132	3,514	9.6	9.3	9.3
Matsushita	396	492	300	1.2	0.9	0.8
Mitsubishi	1,652	2,547	1,614	4.9	4.6	4.3



**Table 1-9 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Memory Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
NEC	3,096	5,353	3,913	9.2	9.7	10.3
Nippon Steel Semiconductor	160	549	198	0.5	1.0	0.5
Oki	697	1,228	541	2.1	2.2	1.4
Ricoh	19	6	3	0	0	0
Rohm	56	61	51	0.2	0.1	0.1
Sanyo	183	257	302	0.5	0.5	0.8
Seiko Epson	42	41	19	0.1	0	0
Sharp	867	1,030	727	2.6	1.9	1.9
Sony	387	489	330	1.2	0.9	0.9
Toshiba	3,018	4,264	2,513	9.0	7.7	6.6
Yamaha	1	1	1	0	0	0
Other Japanese	21	23	26	0	0	0
European Companies	1,484	2,023	1,669	4.4	3.7	4.4
Philips	14	0	0	0	0	0
SGS-Thomson	589	646	738	1.8	1.2	2.0
Siemens	858	1,353	911	2.6	2.4	2.4
TEMIC	23	24	20	0	0	0
Asia/Pacific Companies	8,072	15,561	11,031	24.1	28.1	29.2
Holtek	0	0	2	0	0	0
Hualon Microelectronics Corp.	46	54	23	0.1	0	0
Hyundai	1,515	4,116	2,236	4.5	7.4	5.9
LG Semicon	1,525	2,635	2,021	4.6	4.8	5.3
Macronix	200	236	288	0.6	0.4	0.8
Mosel Vitelic	259	502	398	0.8	0.9	1.1
Samsung	4,194	7,498	5,501	12.5	13.6	14.6
United Microelectronics Corp.	191	203	177	0.6	0.4	0.5
Vanguard	0	0	225	0	0	0.6
Winbond Electronics	142	317	160	0.4	0.6	0.4

Source: Dataquest (April 1997)

**Table 1-10**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponents**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	26,408	34,504	41,321	100.0	100.0	100.0
Americas Companies	18,843	24,204	30,302	71.4	70.1	73.3
ACC Microelectronics	49	40	45	0.2	0.1	0.1
Adaptec	125	124	214	0.5	0.4	0.5
Advanced Micro Devices	1,021	925	624	3.9	2.7	1.5
Alliance Semiconductor	0	10	10	0	0	0
Analog Devices	85	116	258	0.3	0.3	0.6
Appian Technology	7	9	10	0	0	0
ATI Technologies	0	0	130	0	0	0.3
Atmel	5	28	49	0	0	0.1
California Micro Devices	5	6	5	0	0	0
C-Cube	0	0	150	0	0	0.4
Chips & Technologies	89	138	150	0.3	0.4	0.4
Cirrus Logic	681	887	741	2.6	2.6	1.8
Cypress Semiconductor	40	50	64	0.2	0.1	0.2
Cyrix	241	212	160	0.9	0.6	0.4
Dallas Semiconductor	22	35	113	0	0.1	0.3
Digital	0	0	271	0	0	0.7
DSP Group	18	60	67	0	0.2	0.2
Harris	52	67	49	0.2	0.2	0.1
Hughes	3	3	3	0	0	0
IBM	399	703	741	1.5	2.0	1.8
IMP	8	1	0	0	0	0
Integrated Device Technology	51	63	70	0.2	0.2	0.2
Integrated Information Tech.	35	44	51	0.1	0.1	0.1
Intel	9,595	12,397	16,831	36.3	35.9	40.7
ITT	12	15	43	0	0	0.1
LSI Logic	78	107	103	0.3	0.3	0.2
Lucent Technologies	305	510	635	1.2	1.5	1.5
Micro Linear	6	0	0	0	0	0
Microchip Technology	130	169	213	0.5	0.5	0.5
Motorola	2,363	2,987	3,153	8.9	8.7	7.6
National Semiconductor	452	542	627	1.7	1.6	1.5
Oak Technology	62	84	172	0.2	0.2	0.4
OPTi	130	167	119	0.5	0.5	0.3
Performance Semiconductor	15	21	0	0	0	0
Q Logic	45	61	67	0.2	0.2	0.2
Rockwell	509	738	1,226	1.9	2.1	3.0

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponents**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
S3	130	315	464	0.5	0.9	1.1
Seeq Technology	17	21	12	0	0	0
Sierra Semiconductor	35	47	62	0.1	0.1	0.2
Standard Microsystems	100	150	153	0.4	0.4	0.4
Sun Microsystems	0	0	170	0	0	0.4
Supertex	1	1	0	0	0	0
Symbios	81	85	102	0.3	0.2	0.2
Symphony Laboratories	12	15	17	0	0	0
Texas Instruments	1,006	1,254	1,550	3.8	3.6	3.8
Trident Microsystems	87	139	180	0.3	0.4	0.4
Tseng Labs	83	105	26	0.3	0.3	0
VLSI Technology	216	193	57	0.8	0.6	0.1
WaferScale Integration	3	18	30	0	0	0
Weitek	28	37	0	0.1	0.1	0
Western Digital	184	240	0	0.7	0.7	0
Zilog	222	265	286	0.8	0.8	0.7
Zoran	0	0	29	0	0	0
Japanese Companies	6,137	8,093	8,115	23.2	23.5	19.6
Fuji Electric	2	3	3	0	0	0
Fujitsu	390	650	677	1.5	1.9	1.6
Hitachi	998	1,441	1,629	3.8	4.2	3.9
Matsushita	460	555	534	1.7	1.6	1.3
Mitsubishi	698	982	901	2.6	2.8	2.2
NEC	1,678	2,061	2,179	6.4	6.0	5.3
New JRC	2	4	5	0	0	0
Oki	217	233	175	0.8	0.7	0.4
Ricoh	83	75	76	0.3	0.2	0.2
Rohm	50	71	66	0.2	0.2	0.2
Sanyo	161	187	164	0.6	0.5	0.4
Seiko Epson	21	28	22	0	0	0
Sharp	192	221	184	0.7	0.6	0.4
Sony	194	233	189	0.7	0.7	0.5
Toshiba	718	1,094	1,197	2.7	3.2	2.9
Yamaha	273	245	107	1.0	0.7	0.3
Other Japanese	0	10	7	0	0	0
European Companies	851	1,433	1,977	3.2	4.2	4.8
Elex	15	23	13	0	0	0
EM Microelectronics Marin	0	2	4	0	0	0

**Table 1-10 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Microcomponents**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
GEC Plessey	11	10	10	0	0	0
Philips	403	662	1,085	1.5	1.9	2.6
SGS-Thomson	227	437	482	0.9	1.3	1.2
Siemens	128	209	284	0.5	0.6	0.7
TCS	16	22	21	0	0	0
TEMIC	51	68	78	0.2	0.2	0.2
Asia/Pacific Companies	577	774	927	2.2	2.2	2.2
Acer	68	77	50	0.3	0.2	0.1
Daewoo	17	23	18	0	0	0
Holttek	20	34	44	0	0	0.1
Hyundai	2	1	1	0	0	0
LG Semicon	29	56	59	0.1	0.2	0.1
Macronix	21	35	20	0	0.1	0
Samsung	44	87	99	0.2	0.3	0.2
Silicon Integrated Systems	101	127	127	0.4	0.4	0.3
United Microelectronics Corp.	227	274	315	0.9	0.8	0.8
VIA	0	0	110	0	0	0.3
Winbond Electronics	48	60	84	0.2	0.2	0.2

Source: Dataquest (April 1997)

**Table 1-11**  
**Each Company's Factory Revenue from Shipments of MOS Digital Logic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	16,108	20,619	21,555	100.0	100.0	100.0
Americas Companies	7,183	9,134	10,051	44.6	44.3	46.6
Actel	76	109	149	0.5	0.5	0.7
Advanced Micro Devices	341	420	435	2.1	2.0	2.0
Allegro MicroSystems	5	0	0	0	0	0
Altera	199	402	497	1.2	1.9	2.3
Applied Micro Circuits Corp.	21	25	21	0.1	0.1	0
Atmel	27	67	146	0.2	0.3	0.7
Chip Express	0	0	25	0	0	0.1
Crosspoint Solutions	0	2	2	0	0	0
Cypress Semiconductor	75	79	70	0.5	0.4	0.3
Dallas Semiconductor	102	137	117	0.6	0.7	0.5
ETEQ Microsystems	6	7	4	0	0	0
Exar	0	16	9	0	0	0
Gould AMI	61	72	95	0.4	0.3	0.4
Harris	124	108	104	0.8	0.5	0.5
Hewlett-Packard	255	342	380	1.6	1.7	1.8
Holt	2	3	0	0	0	0
Hughes	18	17	18	0.1	0	0
IBM	613	719	1,003	3.8	3.5	4.7
IMI	18	30	34	0.1	0.1	0.2
IMP	0	11	0	0	0	0
Integrated Circuit Systems	42	52	50	0.3	0.3	0.2
Integrated Device Technology	82	110	106	0.5	0.5	0.5
Intel	26	0	0	0.2	0	0
International CMOS Technology	12	16	12	0	0	0
ITT	81	95	140	0.5	0.5	0.6
Lattice	134	186	200	0.8	0.9	0.9
Logic Devices	12	12	12	0	0	0
LSI Logic	823	1,162	1,136	5.1	5.6	5.3
Lucent Technologies	477	687	1,014	3.0	3.3	4.7
Micrel	7	7	6	0	0	0
Motorola	1,214	1,386	1,123	7.5	6.7	5.2
National Semiconductor	262	263	268	1.6	1.3	1.2
Quality Semiconductor	15	32	44	0	0.2	0.2
QuickLogic	8	16	25	0	0	0.1
Rockwell	5	6	4	0	0	0
Supertex	5	5	5	0	0	0

**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital Logic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Symbios	217	208	204	1.3	1.0	0.9
Texas Instruments	1,115	1,317	1,370	6.9	6.4	6.4
Universal	7	8	0	0	0	0
VLSI Technology	372	479	615	2.3	2.3	2.9
WaferScale Integration	3	1	2	0	0	0
Xilinx	321	520	566	2.0	2.5	2.6
Other Americas	0	0	40	0	0	0.2
<b>Japanese Companies</b>	<b>7,378</b>	<b>9,522</b>	<b>9,538</b>	<b>45.8</b>	<b>46.2</b>	<b>44.2</b>
Fuji Electric	38	43	38	0.2	0.2	0.2
Fujitsu	794	1,178	1,138	4.9	5.7	5.3
Hitachi	569	655	852	3.5	3.2	4.0
Matsushita	472	632	588	2.9	3.1	2.7
Mitsubishi	234	425	380	1.5	2.1	1.8
NEC	1,587	1,987	2,423	9.9	9.6	11.2
New JRC	30	36	23	0.2	0.2	0.1
Oki	451	450	387	2.8	2.2	1.8
Ricoh	66	94	39	0.4	0.5	0.2
Rohm	104	244	210	0.6	1.2	1.0
Sanyo	453	528	479	2.8	2.6	2.2
Seiko Epson	197	228	201	1.2	1.1	0.9
Sharp	523	600	504	3.2	2.9	2.3
Sony	426	581	531	2.6	2.8	2.5
Toshiba	1,279	1,562	1,476	7.9	7.6	6.8
Yamaha	89	170	181	0.6	0.8	0.8
Other Japanese	66	109	88	0.4	0.5	0.4
<b>European Companies</b>	<b>1,164</b>	<b>1,475</b>	<b>1,394</b>	<b>7.2</b>	<b>7.2</b>	<b>6.5</b>
Austria Mikro Systeme	46	68	54	0.3	0.3	0.3
Elex	5	0	0	0	0	0
Elmos	15	19	7	0	0	0
Ericsson	15	19	19	0	0	0
European Silicon Structures	40	48	0	0.2	0.2	0
GEC Plessey	118	154	118	0.7	0.7	0.5
Mietec	32	35	32	0.2	0.2	0.1
Philips	610	756	772	3.8	3.7	3.6
SGS-Thomson	182	235	264	1.1	1.1	1.2
Siemens	21	29	31	0.1	0.1	0.1
TCS	15	19	23	0	0	0.1
TEMIC	50	73	74	0.3	0.4	0.3

**Table 1-11 (Continued)**  
**Each Company's Factory Revenue from Shipments of MOS Digital Logic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Thesys	15	20	0	0	0	0
Asia/Pacific Companies	383	488	572	2.4	2.4	2.7
Acer	2	3	0	0	0	0
Daewoo	4	4	3	0	0	0
Holtek	50	53	53	0.3	0.3	0.2
Hualon Microelectronics Corp.	34	44	19	0.2	0.2	0
Hyundai	4	13	9	0	0	0
LG Semicon	52	116	113	0.3	0.6	0.5
Macronix	0	0	46	0	0	0.2
Samsung	171	190	289	1.1	0.9	1.3
Winbond Electronics	66	65	40	0.4	0.3	0.2

Source: Dataquest (April 1997)

**Table 1-12**  
**Each Company's Factory Revenue from Shipments of Analog-Monolithic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	15,263	17,616	19,300	100.0	100.0	100.0
Americas Companies	6,460	7,294	8,522	42.3	41.4	44.2
Advanced Micro Devices	187	173	115	1.2	1.0	0.6
Allegro MicroSystems	134	144	166	0.9	0.8	0.9
Analog Devices	602	809	960	3.9	4.6	5.0
Applied Micro Circuits Corp.	7	5	5	0	0	0
Atmel	12	16	36	0	0	0.2
Brooktree	109	120	0	0.7	0.7	0
Burr-Brown	105	126	157	0.7	0.7	0.8
California Micro Devices	5	7	3	0	0	0
Catalyst	1	0	0	0	0	0
Cherry Semiconductor	77	87	100	0.5	0.5	0.5
Cirrus Logic	100	116	150	0.7	0.7	0.8
Comlinear	9	0	0	0	0	0
Dallas Semiconductor	0	0	47	0	0	0.2
Elantec	21	22	32	0.1	0.1	0.2
Exar	169	131	87	1.1	0.7	0.5
Gennum	29	32	37	0.2	0.2	0.2
Gould AMI	31	0	0	0.2	0	0
Harris	284	260	231	1.9	1.5	1.2
Holt	7	8	0	0	0	0
Honeywell	23	27	30	0.2	0.2	0.2
Hughes	19	16	18	0.1	0	0
IMI	2	5	5	0	0	0
IMP	40	42	35	0.3	0.2	0.2
Integrated Circuit Systems	39	45	29	0.3	0.3	0.2
Intel	20	9	0	0.1	0	0
International Rectifier	8	18	27	0	0.1	0.1
ITT	24	14	10	0.2	0	0
Kulite	20	24	0	0.1	0.1	0
Level One Communications	0	78	112	0	0.4	0.6
Linear Technology	225	305	365	1.5	1.7	1.9
Linfinitiy	41	47	48	0.3	0.3	0.2
Lucent Technologies	402	284	301	2.6	1.6	1.6
Maxim	165	185	383	1.1	1.1	2.0
Micrel	18	19	18	0.1	0.1	0
Micro Linear	35	54	54	0.2	0.3	0.3
Micro Power Systems	23	0	0	0.2	0	0



**Table 1-12 (Continued)**  
**Each Company's Factory Revenue from Shipments of Analog-Monolithic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Mitel	70	68	107	0.5	0.4	0.6
Motorola	924	1,031	1,210	6.1	5.9	6.3
National Semiconductor	907	1,034	1,040	5.9	5.9	5.4
Novasensor	13	15	0	0	0	0
Optek	7	8	9	0	0	0
Raytheon	78	93	103	0.5	0.5	0.5
Rockwell	0	0	121	0	0	0.6
Seeq Technology	0	0	20	0	0	0.1
Semtech	5	19	42	0	0.1	0.2
Sierra Semiconductor	85	96	126	0.6	0.5	0.7
Silicon Systems	298	369	0	2.0	2.1	0
Sipex	2	2	0	0	0	0
Solitron	0	0	1	0	0	0
Supertex	13	13	12	0	0	0
Symbios	56	102	152	0.4	0.6	0.8
Telcom	18	17	18	0.1	0	0
Texas Instruments	842	934	1,730	5.5	5.3	9.0
Unitrode	73	103	98	0.5	0.6	0.5
Universal	6	7	0	0	0	0
VTC	70	155	172	0.5	0.9	0.9
<b>Japanese Companies</b>	<b>4,911</b>	<b>5,704</b>	<b>5,210</b>	<b>32.2</b>	<b>32.4</b>	<b>27.0</b>
Fuji Electric	27	29	23	0.2	0.2	0.1
Fujitsu	155	315	291	1.0	1.8	1.5
Hitachi	357	355	409	2.3	2.0	2.1
Matsushita	611	639	547	4.0	3.6	2.8
Mitsubishi	456	455	397	3.0	2.6	2.1
NEC	506	641	624	3.3	3.6	3.2
New JRC	173	183	160	1.1	1.0	0.8
Oki	26	28	18	0.2	0.2	0
Ricoh	14	38	50	0	0.2	0.3
Rohm	361	423	357	2.4	2.4	1.8
Sanyo	811	894	780	5.3	5.1	4.0
Seiko Epson	13	16	14	0	0	0
Sharp	96	105	92	0.6	0.6	0.5
Sony	465	554	452	3.0	3.1	2.3
Toko	32	37	31	0.2	0.2	0.2
Toshiba	789	915	909	5.2	5.2	4.7
Yamaha	19	28	6	0.1	0.2	0
Other Japanese	0	49	50	0	0.3	0.3

**Table 1-12 (Continued)**  
**Each Company's Factory Revenue from Shipments of Analog-Monolithic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
European Companies	3,489	4,213	5,132	22.9	23.9	26.6
ABB-Hafo	20	19	0	0.1	0.1	0
Austria Mikro Systeme	64	81	86	0.4	0.5	0.4
Elex	0	8	21	0	0	0.1
EM Microelectronics Marin	65	75	81	0.4	0.4	0.4
Ericsson	49	50	87	0.3	0.3	0.5
European Silicon Structures	0	11	0	0	0	0
GEC Plessey	135	155	163	0.9	0.9	0.8
Micronas	20	33	33	0.1	0.2	0.2
Mietec	146	144	158	1.0	0.8	0.8
Philips	957	1,257	1,291	6.3	7.1	6.7
SGS-Thomson	1,197	1,483	2,042	7.8	8.4	10.6
Siemens	546	692	980	3.6	3.9	5.1
TCS	20	24	14	0.1	0.1	0
TEMIC	267	177	175	1.7	1.0	0.9
Zetex	3	4	1	0	0	0
Asia/Pacific Companies	403	405	436	2.6	2.3	2.3
Daewoo	17	22	24	0.1	0.1	0.1
Hualon Microelectronics Corp.	9	9	5	0	0	0
Hyundai	0	2	1	0	0	0
Korean Electronic Co.	47	45	51	0.3	0.3	0.3
LG Semicon	45	42	40	0.3	0.2	0.2
Samsung	233	236	260	1.5	1.3	1.3
Winbond Electronics	52	49	55	0.3	0.3	0.3

Source: Dataquest (April 1997)

**Table 1-13**  
**Each Company's Factory Revenue from Shipments of Total Discrete Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	10,763	14,314	13,475	100.0	100.0	100.0
Americas Companies	2,539	3,720	3,417	23.6	26.0	25.4
Allegro MicroSystems	9	29	19	0	0.2	0.1
General Instrument	262	413	362	2.4	2.9	2.7
Harris	187	228	232	1.7	1.6	1.7
Hewlett-Packard	99	146	140	0.9	1.0	1.0
International Rectifier	353	468	493	3.3	3.3	3.7
ITT	114	192	81	1.1	1.3	0.6
IXYS	55	65	66	0.5	0.5	0.5
Lucent Technologies	6	0	0	0	0	0
Microsemi	100	118	146	0.9	0.8	1.1
Motorola	1,097	1,650	1,452	10.2	11.5	10.8
National Semiconductor	99	164	157	0.9	1.1	1.2
Optek	1	1	1	0	0	0
Powerex	76	98	98	0.7	0.7	0.7
Raytheon	8	13	13	0	0	0
Semtech	20	29	24	0.2	0.2	0.2
Solitron	5	6	5	0	0	0
Supertex	11	16	16	0.1	0.1	0.1
Teccor Electronics	60	68	84	0.6	0.5	0.6
Texas Instruments	32	16	28	0.3	0.1	0.2
Japanese Companies	5,692	7,142	6,774	52.9	49.9	50.3
Fuji Electric	357	468	401	3.3	3.3	3.0
Fujitsu	192	283	290	1.8	2.0	2.2
Hitachi	798	889	977	7.4	6.2	7.3
Matsushita	511	631	565	4.7	4.4	4.2
Mitsubishi	424	479	452	3.9	3.3	3.4
NEC	652	831	818	6.1	5.8	6.1
New JRC	2	2	3	0	0	0
Oki	10	12	11	0	0	0
Rohm	524	771	681	4.9	5.4	5.1
Sanken	334	398	328	3.1	2.8	2.4
Sanyo	389	488	441	3.6	3.4	3.3
Shindengen Electric	194	301	277	1.8	2.1	2.1
Sony	50	53	43	0.5	0.4	0.3
Toko	51	68	55	0.5	0.5	0.4
Toshiba	1,204	1,428	1,390	11.2	10.0	10.3
Other Japanese	0	40	42	0	0.3	0.3

**Table 1-13 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Discrete Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
European Companies	2,178	2,915	2,784	20.2	20.4	20.7
Elex	0	2	0	0	0	0
Ericsson	15	20	28	0.1	0.1	0.2
Eupec	98	120	160	0.9	0.8	1.2
Fagor	27	38	0	0.3	0.3	0
GEC Plessey	28	36	35	0.3	0.3	0.3
Philips	761	1,056	941	7.1	7.4	7.0
Semikron	112	125	109	1.0	0.9	0.8
SGS-Thomson	433	591	586	4.0	4.1	4.3
Siemens	284	435	452	2.6	3.0	3.4
TCS	1	1	0	0	0	0
TEMIC	235	321	353	2.2	2.2	2.6
Westcode	41	54	0	0.4	0.4	0
Zetex	36	51	52	0.3	0.4	0.4
Other European	52	65	68	0.5	0.5	0.5
Asia/Pacific Companies	354	537	500	3.3	3.8	3.7
Korean Electronic Co.	167	220	193	1.6	1.5	1.4
Samsung	187	317	307	1.7	2.2	2.3

Source: Dataquest (April 1997)

**Table 1-14**  
**Each Company's Factory Revenue from Shipments of Total Optical Semiconductors**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	3,889	4,812	4,915	100.0	100.0	100.0
Americas Companies	699	547	824	18.0	11.4	16.8
CID Technologies	4	5	6	0.1	0.1	0.1
Eastman Kodak	3	3	3	0	0	0
Hewlett-Packard	360	160	425	9.3	3.3	8.6
Honeywell	32	37	41	0.8	0.8	0.8
IC Sensors	5	6	7	0.1	0.1	0.1
Lucent Technologies	51	81	90	1.3	1.7	1.8
Mitel	0	0	22	0	0	0.4
Motorola	45	50	40	1.2	1.0	0.8
Optek	48	53	59	1.2	1.1	1.2
Quality Technologies	49	61	52	1.3	1.3	1.1
Sensym	8	0	0	0.2	0	0
Spectra Diode Labs	10	15	17	0.3	0.3	0.3
Texas Instruments	45	43	62	1.2	0.9	1.3
Other Americas	39	33	0	1.0	0.7	0
Japanese Companies	2,798	3,735	3,542	71.9	77.6	72.1
Fujitsu	135	168	151	3.5	3.5	3.1
Hitachi	89	84	121	2.3	1.7	2.5
Matsushita	417	496	450	10.7	10.3	9.2
Mitsubishi	176	151	144	4.5	3.1	2.9
NEC	150	202	256	3.9	4.2	5.2
New JRC	11	12	9	0.3	0.2	0.2
Oki	24	28	28	0.6	0.6	0.6
Rohm	178	286	293	4.6	5.9	6.0
Sanken	34	52	40	0.9	1.1	0.8
Sanyo	150	167	148	3.9	3.5	3.0
Sharp	510	636	617	13.1	13.2	12.6
Sony	313	382	373	8.0	7.9	7.6
Stanley Electric	0	301	0	0	6.3	0
Toshiba	421	623	471	10.8	12.9	9.6
Other Japanese	190	147	441	4.9	3.1	9.0
European Companies	378	504	517	9.7	10.5	10.5
ABB-Hafo	12	14	0	0.3	0.3	0
Ericsson	15	16	23	0.4	0.3	0.5
Siemens	220	314	339	5.7	6.5	6.9

**Table 1-14 (Continued)**  
**Each Company's Factory Revenue from Shipments of Total Optical Semiconductors**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
TCS	26	34	25	0.7	0.7	0.5
TEMIC	93	110	113	2.4	2.3	2.3
Zetex	1	1	1	0	0	0
Other European	11	15	16	0.3	0.3	0.3
Asia/Pacific Companies	14	26	32	0.4	0.5	0.7
Korean Electronic Co.	11	22	24	0.3	0.5	0.5
Samsung	3	4	8	0	0	0.2

Source: Dataquest (April 1997)

**Table 1-15**  
**Each Company's Factory Revenue from Shipments of Hybrid Analog Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1994	1995	1996	1994	1995	1996
Total Market	1,665	1,655	1,468	100.0	100.0	100.0
Americas Companies	425	186	149	25.5	11.2	10.1
Allegro MicroSystems	0	12	15	0	0.7	1.0
Analog Devices	52	58	42	3.1	3.5	2.9
Burr-Brown	60	60	50	3.6	3.6	3.4
Comlinear	7	0	0	0.4	0	0
Elantec	3	3	3	0.2	0.2	0.2
Gennum	2	2	0	0.1	0.1	0
Linfinit	3	3	3	0.2	0.2	0.2
Maxim	4	4	4	0.2	0.2	0.3
Mitel	30	20	16	1.8	1.2	1.1
Motorola	226	0	0	13.6	0	0
National Semiconductor	7	8	0	0.4	0.5	0
Sipex	14	14	13	0.8	0.8	0.9
Solitron	2	2	3	0.1	0.1	0.2
Unitrode	15	0	0	0.9	0	0
Japanese Companies	1,136	1,369	1,245	68.2	82.7	84.8
Fuji Electric	22	23	21	1.3	1.4	1.4
Fujitsu	116	149	134	7.0	9.0	9.1
Hitachi	136	137	118	8.2	8.3	8.0
Mitsubishi	109	198	187	6.5	12.0	12.7
NEC	98	130	125	5.9	7.9	8.5
Oki	13	13	13	0.8	0.8	0.9
Rohm	72	78	73	4.3	4.7	5.0
Sanken	240	283	254	14.4	17.1	17.3
Sanyo	174	193	177	10.5	11.7	12.1
Shindengen Electric	48	28	21	2.9	1.7	1.4
Sony	41	41	65	2.5	2.5	4.4
Toko	8	8	8	0.5	0.5	0.5
Toshiba	59	74	36	3.5	4.5	2.5
Other Japanese	0	14	13	0	0.8	0.9
European Companies	104	100	74	6.2	6.0	5.0
ABB-Hafo	8	5	0	0.5	0.3	0
Ericsson	19	15	13	1.1	0.9	0.9
GEC Plessey	6	3	0	0.4	0.2	0
Micronas	0	10	0	0	0.6	0
Philips	54	46	40	3.2	2.8	2.7
Other European	17	21	21	1.0	1.3	1.4

Source: Dataquest (April 1997)

## Section 2: 1996 Worldwide Market Share Rankings

**Table 2-1**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total Semiconductors Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Intel	13,172	17,781	35.0	12.5
2	2	NEC	11,314	10,428	-7.8	7.4
5	3	Motorola	8,722	8,076	-7.4	5.7
4	4	Hitachi	9,135	8,071	-11.6	5.7
3	5	Toshiba	10,076	8,065	-20.0	5.7
7	6	Texas Instruments	7,831	7,064	-9.8	5.0
6	7	Samsung	8,332	6,464	-22.4	4.6
8	8	Fujitsu	5,535	4,427	-20.0	3.1
11	9	Philips	3,900	4,219	8.2	3.0
14	10	SGS-Thomson	3,398	4,112	21.0	2.9
9	11	Mitsubishi	5,274	4,100	-22.3	2.9
15	12	Siemens	3,063	3,029	-1.1	2.1
13	13	Matsushita	3,474	3,003	-13.6	2.1
12	14	IBM	3,522	2,740	-22.2	1.9
17	15	Sanyo	2,714	2,491	-8.2	1.8
20	16	National Semiconductor	2,408	2,380	-1.2	1.7
10	17	Hyundai	4,132	2,247	-45.6	1.6
16	18	LG Semicon	2,863	2,243	-21.7	1.6
19	19	Sharp	2,592	2,124	-18.1	1.5
25	20	Lucent Technologies	1,615	2,110	30.7	1.5
22	21	Sony	2,333	1,983	-15.0	1.4
21	22	Advanced Micro Devices	2,337	1,947	-16.7	1.4
24	23	Rohm	1,934	1,731	-10.5	1.2
18	24	Micron Technology	2,601	1,558	-40.1	1.1
30	25	Rockwell	744	1,351	81.6	1.0
28	26	Analog Devices	983	1,260	28.2	0.9
26	27	LSI Logic	1,269	1,239	-2.4	0.9
23	28	Oki	2,028	1,177	-42.0	0.8
36	29	Atmel	589	1,024	73.9	0.7
34	30	Hewlett-Packard	648	945	45.8	0.7
27	31	Cirrus Logic	1,003	891	-11.2	0.6
29	32	TEMIC	773	813	5.2	0.6
33	33	VLSI Technology	672	672	0	0.5
32	34	Harris	685	629	-8.2	0.4



**Table 2-1 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total Semiconductors Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
31	35	Sanken	733	622	-15.1	0.4
40	36	Xilinx	520	566	8.8	0.4
35	37	Integrated Device Technology	617	554	-10.2	0.4
43	38	International Rectifier	486	520	7.0	0.4
38	39	Cypress Semiconductor	553	516	-6.7	0.4
47	40	Altera	402	497	23.6	0.4
		All Others	16,280	16,021	-1.6	11.3
		Americas Companies	60,021	63,617	6.0	44.9
		Japanese Companies	60,599	50,884	-16.0	35.9
		European Companies	12,837	13,681	6.6	9.7
		Asia/Pacific Companies	17,805	13,508	-24.1	9.5
		Total Market	151,262	141,690	-6.3	100.0

Source: Dataquest (April 1997)

**Table 2-2**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total Semiconductors Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Intel	13,172	17,781	35.0	12.7
2	2	NEC	11,184	10,303	-7.9	7.3
5	3	Motorola	8,722	8,076	-7.4	5.8
3	4	Toshiba	10,002	8,029	-19.7	5.7
4	5	Hitachi	8,998	7,953	-11.6	5.7
7	6	Texas Instruments	7,831	7,064	-9.8	5.0
6	7	Samsung	8,332	6,464	-22.4	4.6
8	8	Fujitsu	5,386	4,293	-20.3	3.1
11	9	Philips	3,854	4,179	8.4	3.0
14	10	SGS-Thomson	3,398	4,112	21.0	2.9
9	11	Mitsubishi	5,076	3,913	-22.9	2.8
15	12	Siemens	3,063	3,029	-1.1	2.2
13	13	Matsushita	3,474	3,003	-13.6	2.1
12	14	IBM	3,522	2,740	-22.2	2.0
20	15	National Semiconductor	2,400	2,380	-0.8	1.7
19	16	Sanyo	2,521	2,314	-8.2	1.7
10	17	Hyundai	4,132	2,247	-45.6	1.6
16	18	LG Semicon	2,863	2,243	-21.7	1.6
18	19	Sharp	2,592	2,124	-18.1	1.5
25	20	Lucent Technologies	1,615	2,110	30.7	1.5
21	21	Advanced Micro Devices	2,337	1,947	-16.7	1.4
22	22	Sony	2,292	1,918	-16.3	1.4
24	23	Rohm	1,856	1,658	-10.7	1.2
17	24	Micron Technology	2,601	1,558	-40.1	1.1
30	25	Rockwell	744	1,351	81.6	1.0
26	26	LSI Logic	1,269	1,239	-2.4	0.9
28	27	Analog Devices	925	1,218	31.7	0.9
23	28	Oki	2,015	1,164	-42.2	0.8
35	29	Atmel	589	1,024	73.9	0.7
33	30	Hewlett-Packard	648	945	45.8	0.7
27	31	Cirrus Logic	1,003	891	-11.2	0.6
29	32	TEMIC	773	813	5.2	0.6
32	33	VLSI Technology	672	672	0	0.5
31	34	Harris	685	629	-8.2	0.4
39	35	Xilinx	520	566	8.8	0.4
34	36	Integrated Device Technology	617	554	-10.2	0.4
42	37	International Rectifier	486	520	7.0	0.4

**Table 2-2 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total Semiconductors Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
36	38	Cypress Semiconductor	553	516	-6.7	0.4
47	39	Altera	402	497	23.6	0.4
43	40	United Microelectronics Corp.	477	492	3.1	0.4
		All Others	16,006	15,693	-2.0	11.2
		Americas Companies	59,835	63,468	6.1	45.3
		Japanese Companies	59,230	49,639	-16.2	35.4
		European Companies	12,737	13,607	6.8	9.7
		Asia/Pacific Companies	17,805	13,508	-24.1	9.6
		Total Market	149,607	140,222	-6.3	100.0

Source: Dataquest (April 1997)

**Table 2-3**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total ICs**  
**Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Intel	13,172	17,781	35.0	14.4
2	2	NEC	10,281	9,354	-9.0	7.6
6	3	Texas Instruments	7,772	6,974	-10.3	5.7
3	4	Hitachi	8,162	6,973	-14.6	5.7
7	5	Motorola	7,022	6,584	-6.2	5.3
4	6	Toshiba	8,025	6,204	-22.7	5.0
5	7	Samsung	8,011	6,149	-23.2	5.0
8	8	Fujitsu	5,084	3,986	-21.6	3.2
14	9	SGS-Thomson	2,807	3,526	25.6	2.9
9	10	Mitsubishi	4,644	3,504	-24.5	2.8
13	11	Philips	2,844	3,278	15.3	2.7
11	12	IBM	3,522	2,740	-22.2	2.2
10	13	Hyundai	4,132	2,247	-45.6	1.8
12	14	LG Semicon	2,863	2,243	-21.7	1.8
18	15	Siemens	2,314	2,238	-3.3	1.8
19	16	National Semiconductor	2,244	2,223	-0.9	1.8
24	17	Lucent Technologies	1,534	2,020	31.7	1.6
16	18	Matsushita	2,347	1,988	-15.3	1.6
17	19	Advanced Micro Devices	2,337	1,947	-16.7	1.6
20	20	Sanyo	2,059	1,902	-7.6	1.5
23	21	Sony	1,898	1,567	-17.4	1.3
15	22	Micron Technology	2,601	1,558	-40.1	1.3
22	23	Sharp	1,956	1,507	-23.0	1.2
29	24	Rockwell	744	1,351	81.6	1.1
27	25	Analog Devices	983	1,260	28.2	1.0
25	26	LSI Logic	1,269	1,239	-2.4	1.0
21	27	Oki	1,988	1,138	-42.8	0.9
32	28	Atmel	589	1,024	73.9	0.8
26	29	Cirrus Logic	1,003	891	-11.2	0.7
28	30	Rohm	877	757	-13.7	0.6
30	31	VLSI Technology	672	672	0	0.5
35	32	Xilinx	520	566	8.8	0.5
31	33	Integrated Device Technology	617	554	-10.2	0.4
33	34	Cypress Semiconductor	553	516	-6.7	0.4
41	35	Altera	402	497	23.6	0.4
38	36	United Microelectronics Corp.	477	492	3.1	0.4
47	37	S3	315	464	47.3	0.4

**Table 2-3 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total ICs**  
**Worldwide (Including Hybrid) (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
42	38	Symbios	395	458	15.9	0.4
36	39	Mosel Vitelic	502	398	-20.7	0.3
39	40	Harris	457	397	-13.1	0.3
		All Others	12,142	12,133	-0.1	9.8
		Americas Companies	55,754	59,376	6.5	48.2
		Japanese Companies	49,722	40,568	-18.4	32.9
		European Companies	9,418	10,380	10.2	8.4
		Asia/Pacific Companies	17,242	12,976	-24.7	10.5
		Total Market	132,136	123,300	-6.7	100.0

Source: Dataquest (April 1997)

**Table 2-4**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total Integrated Circuits Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Intel	13,172	17,781	35.0	14.6
2	2	NEC	10,151	9,229	-9.1	7.6
6	3	Texas Instruments	7,772	6,974	-10.3	5.7
3	4	Hitachi	8,025	6,855	-14.6	5.6
7	5	Motorola	7,022	6,584	-6.2	5.4
5	6	Toshiba	7,951	6,168	-22.4	5.1
4	7	Samsung	8,011	6,149	-23.2	5.0
8	8	Fujitsu	4,935	3,852	-21.9	3.2
13	9	SGS-Thomson	2,807	3,526	25.6	2.9
9	10	Mitsubishi	4,446	3,317	-25.4	2.7
14	11	Philips	2,798	3,238	15.7	2.7
11	12	IBM	3,522	2,740	-22.2	2.2
10	13	Hyundai	4,132	2,247	-45.6	1.8
12	14	LG Semicon	2,863	2,243	-21.7	1.8
18	15	Siemens	2,314	2,238	-3.3	1.8
19	16	National Semiconductor	2,236	2,223	-0.6	1.8
24	17	Lucent Technologies	1,534	2,020	31.7	1.7
16	18	Matsushita	2,347	1,988	-15.3	1.6
17	19	Advanced Micro Devices	2,337	1,947	-16.7	1.6
22	20	Sanyo	1,866	1,725	-7.6	1.4
15	21	Micron Technology	2,601	1,558	-40.1	1.3
21	22	Sharp	1,956	1,507	-23.0	1.2
23	23	Sony	1,857	1,502	-19.1	1.2
29	24	Rockwell	744	1,351	81.6	1.1
25	25	LSI Logic	1,269	1,239	-2.4	1.0
27	26	Analog Devices	925	1,218	31.7	1.0
20	27	Oki	1,975	1,125	-43.0	0.9
32	28	Atmel	589	1,024	73.9	0.8
26	29	Cirrus Logic	1,003	891	-11.2	0.7
28	30	Rohm	799	684	-14.4	0.6
30	31	VLSI Technology	672	672	0	0.6
35	32	Xilinx	520	566	8.8	0.5
31	33	Integrated Device Technology	617	554	-10.2	0.5
33	34	Cypress Semiconductor	553	516	-6.7	0.4
41	35	Altera	402	497	23.6	0.4
38	36	United Microelectronics Corp.	477	492	3.1	0.4
47	37	S3	315	464	47.3	0.4

**Table 2-4 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total Integrated Circuits Worldwide (Excluding Hybrid) (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
42	38	Symbios	395	458	15.9	0.4
36	39	Mosel Vitelic	502	398	-20.7	0.3
39	40	Harris	457	397	-13.1	0.3
		All Others	11,612	11,675	0.5	9.6
		Americas Companies	55,568	59,227	6.6	48.6
		Japanese Companies	48,353	39,323	-18.7	32.3
		European Companies	9,318	10,306	10.6	8.5
		Asia/Pacific Companies	17,242	12,976	-24.7	10.7
		Total Market	130,481	121,832	-6.6	100.0

Source: Dataquest (April 1997)

**Table 2-5**  
**Top 20 Worldwide Companies' Factory Revenue from Shipments of Bipolar Digital**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
2	1	Hitachi	442	451	2.0	24.4
1	2	Texas Instruments	513	340	-33.7	18.4
3	3	Motorola	381	271	-28.9	14.7
4	4	National Semiconductor	209	161	-23.0	8.7
5	5	Fujitsu	203	90	-55.7	4.9
6	6	Philips	123	90	-26.8	4.9
8	7	NEC	109	90	-17.4	4.9
7	8	Toshiba	116	73	-37.1	3.9
10	9	Lucent Technologies	50	70	40.0	3.8
9	10	Advanced Micro Devices	100	62	-38.0	3.4
13	11	Siemens	31	32	3.2	1.7
16	12	Applied Micro Circuits Corp.	19	30	57.9	1.6
11	13	Mitsubishi	37	25	-32.4	1.4
14	14	Matsushita	29	19	-34.5	1.0
15	15	Raytheon	19	15	-21.1	0.8
18	16	GEC Plessey	10	12	20.0	0.6
17	17	LG Semicon	14	10	-28.6	0.5
12	18	Oki	36	4	-88.9	0.2
20	19	Harris	4	4	0	0.2
19	20	SGS-Thomson	6	0	-100.0	0
		All Others	4	-	-100.0	0
		Americas Companies	1,295	953	-26.4	51.5
		Japanese Companies	972	752	-22.6	40.7
		European Companies	174	134	-23.0	7.2
		Asia/Pacific Companies	14	10	-28.6	0.5
		Total Market	2,455	1,849	-24.7	100.0

Source: Dataquest (April 1997)



**Table 2-6**  
**Top 20 Worldwide Companies' Factory Revenue from Shipments of Bipolar Logic**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
2	1	Hitachi	361	372	3.0	23.0
1	2	Texas Instruments	505	336	-33.5	20.7
3	3	Motorola	359	251	-30.1	15.5
5	4	National Semiconductor	138	157	13.8	9.7
8	5	NEC	100	82	-18.0	5.1
7	6	Philips	109	79	-27.5	4.9
4	7	Fujitsu	183	70	-61.7	4.3
10	8	Lucent Technologies	45	70	55.6	4.3
9	9	Advanced Micro Devices	69	62	-10.1	3.8
13	10	Siemens	31	32	3.2	2.0
15	11	Applied Micro Circuits Corp.	19	30	57.9	1.9
11	12	Mitsubishi	37	25	-32.4	1.5
14	13	Matsushita	26	19	-26.9	1.2
16	14	Raytheon	15	12	-20.0	0.7
17	15	LG Semicon	14	10	-28.6	0.6
6	16	Toshiba	111	5	-95.5	0.3
12	17	Oki	36	4	-88.9	0.2
20	18	Harris	4	4	0	0.2
18	19	GEC Plessey	10	0	-100.0	0
19	20	SGS-Thomson	6	0	-100.0	0
		All Others	4	-	-100.0	0
		Americas Companies	1,154	922	-20.1	56.9
		Japanese Companies	854	577	-32.4	35.6
		European Companies	160	111	-30.6	6.9
		Asia/Pacific Companies	14	10	-28.6	0.6
		Total Market	2,182	1,620	-25.8	100.0

Source: Dataquest (April 1997)

**Table 2-7**  
**Top 13 Worldwide Companies' Factory Revenue from Shipments of Other Bipolar Logic/**  
**Memory/Microcomponents Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Hitachi	81	79	-2.5	34.5
10	2	Toshiba	5	68	1,260.0	29.7
4	3	Motorola	22	20	-9.1	8.7
5	4	Fujitsu	20	20	0	8.7
19	5	GEC Plessey	0	12	NA	5.2
6	6	Philips	14	11	-21.4	4.8
7	7	NEC	9	8	-11.1	3.5
2	8	National Semiconductor	71	4	-94.4	1.7
8	9	Texas Instruments	8	4	-50.0	1.7
11	10	Raytheon	4	3	-25.0	1.3
3	11	Advanced Micro Devices	31	0	-100.0	0
9	12	Lucent Technologies	5	0	-100.0	0
12	13	Matsushita	3	0	-100.0	0
		All Others	-	-	NA	0
		Americas Companies	141	31	-78.0	13.5
		Japanese Companies	118	175	48.3	76.4
		European Companies	14	23	64.3	10.0
		Asia/Pacific Companies	0	0	NA	0
		Total Market	273	229	-16.1	100.0

NA = Not applicable

Source: Dataquest (April 1997)

**Table 2-8**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of MOS Digital ICs**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Intel	13,163	17,781	35.1	17.7
2	2	NEC	9,401	8,515	-9.4	8.5
4	3	Hitachi	7,228	5,995	-17.1	6.0
3	4	Samsung	7,775	5,889	-24.3	5.8
5	5	Toshiba	6,920	5,186	-25.1	5.2
7	6	Motorola	5,610	5,103	-9.0	5.1
6	7	Texas Instruments	6,325	4,904	-22.5	4.9
8	8	Fujitsu	4,417	3,471	-21.4	3.4
10	9	Mitsubishi	3,954	2,895	-26.8	2.9
11	10	IBM	3,522	2,740	-22.2	2.7
9	11	Hyundai	4,130	2,246	-45.6	2.2
12	12	LG Semicon	2,807	2,193	-21.9	2.2
19	13	Philips	1,418	1,857	31.0	1.8
14	14	Advanced Micro Devices	2,064	1,770	-14.2	1.8
23	15	Lucent Technologies	1,200	1,649	37.4	1.6
13	16	Micron Technology	2,601	1,558	-40.1	1.5
20	17	SGS-Thomson	1,318	1,484	12.6	1.5
17	18	Matsushita	1,679	1,422	-15.3	1.4
16	19	Sharp	1,851	1,415	-23.6	1.4
22	20	LSI Logic	1,269	1,239	-2.4	1.2
27	21	Rockwell	744	1,230	65.3	1.2
18	22	Siemens	1,591	1,226	-22.9	1.2
15	23	Oki	1,911	1,103	-42.3	1.1
21	24	Sony	1,303	1,050	-19.4	1.0
24	25	National Semiconductor	993	1,022	2.9	1.0
30	26	Atmel	573	988	72.4	1.0
25	27	Sanyo	972	945	-2.8	0.9
26	28	Cirrus Logic	887	741	-16.5	0.7
28	29	VLSI Technology	672	672	0	0.7
33	30	Xilinx	520	566	8.8	0.6
29	31	Integrated Device Technology	617	554	-10.2	0.6
31	32	Cypress Semiconductor	553	516	-6.7	0.5
38	33	Altera	402	497	23.6	0.5
35	34	United Microelectronics Corp.	477	492	3.1	0.5
41	35	S3	315	464	47.3	0.5
34	36	Mosel Vitelic	502	398	-20.7	0.4
40	37	Hewlett-Packard	342	380	11.1	0.4

**Table 2-8 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of MOS Digital ICs**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
44	38	Macronix	271	354	30.6	0.4
45	39	Microchip Technology	271	330	21.8	0.3
39	40	Rohm	376	327	-13.0	0.3
		All Others	7,466	7,516	0.7	7.5
		Americas Companies	46,979	49,752	5.9	49.4
		Japanese Companies	41,677	33,361	-20.0	33.1
		European Companies	4,931	5,040	2.2	5.0
		Asia/Pacific Companies	16,823	12,530	-25.5	12.4
		Total Market	110,410	100,683	-8.8	100.0

Source: Dataquest (April 1997)

**Table 2-9**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of MOS Memory**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Samsung	7,498	5,501	-26.6	14.6
2	2	NEC	5,353	3,913	-26.9	10.3
3	3	Hitachi	5,132	3,514	-31.5	9.3
4	4	Toshiba	4,264	2,513	-41.1	6.6
5	5	Hyundai	4,116	2,236	-45.7	5.9
7	6	LG Semicon	2,635	2,021	-23.3	5.3
6	7	Texas Instruments	3,754	1,984	-47.1	5.2
9	8	Fujitsu	2,589	1,656	-36.0	4.4
10	9	Mitsubishi	2,547	1,614	-36.6	4.3
8	10	Micron Technology	2,601	1,558	-40.1	4.1
11	11	IBM	2,100	996	-52.6	2.6
16	12	Intel	766	950	24.0	2.5
12	13	Siemens	1,353	911	-32.7	2.4
13	14	Motorola	1,237	827	-33.1	2.2
23	15	Atmel	478	793	65.9	2.1
18	16	SGS-Thomson	646	738	14.2	2.0
15	17	Sharp	1,030	727	-29.4	1.9
17	18	Advanced Micro Devices	719	711	-1.1	1.9
14	19	Oki	1,228	541	-55.9	1.4
20	20	Mosel Vitelic	502	398	-20.7	1.1
25	21	Cypress Semiconductor	424	382	-9.9	1.0
24	22	Integrated Device Technology	444	378	-14.9	1.0
22	23	Sony	489	330	-32.5	0.9
27	24	Sanyo	257	302	17.5	0.8
21	25	Matsushita	492	300	-39.0	0.8
28	26	Macronix	236	288	22.0	0.8
68	27	Vanguard	0	225	NA	0.6
19	28	Nippon Steel Semiconductor	549	198	-63.9	0.5
30	29	United Microelectronics Corp.	203	177	-12.8	0.5
26	30	Winbond Electronics	317	160	-49.5	0.4
31	31	National Semiconductor	188	127	-32.4	0.3
33	32	Xicor	114	123	7.9	0.3
34	33	Microchip Technology	102	117	14.7	0.3
32	34	Integrated Silicon Solutions	158	111	-29.7	0.3
42	35	Silicon Storage Technology	35	91	160.0	0.2
29	36	Alliance Semiconductor	210	66	-68.6	0.2
39	37	Catalyst	48	54	12.5	0.1

**Table 2-9 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of MOS Memory**  
**Worldwide (Millions of U.S. Dollars)**

<b>1995 Rank</b>	<b>1996 Rank</b>		<b>1995 Revenue</b>	<b>1996 Revenue</b>	<b>Percentage Change</b>	<b>1996 Market Share (%)</b>
35	38	Rohm	61	51	-16.4	0.1
40	39	Electronic Designs	43	51	18.6	0.1
37	40	Paradigm	55	23	-58.2	0
		All Others	314	151	-51.9	0.4
		Americas Companies	13,641	9,399	-31.1	24.9
		Japanese Companies	24,062	15,708	-34.7	41.5
		European Companies	2,023	1,669	-17.5	4.4
		Asia/Pacific Companies	15,561	11,031	-29.1	29.2
		Total Market	55,287	37,807	-31.6	100.0

Source: Dataquest (April 1997)

**Table 2-10**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of MOS**  
**Microcomponents Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank	Company	1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Intel	12,397	16,831	35.8	40.7
2	2	Motorola	2,987	3,153	5.6	7.6
3	3	NEC	2,061	2,179	5.7	5.3
4	4	Hitachi	1,441	1,629	13.0	3.9
5	5	Texas Instruments	1,254	1,550	23.6	3.8
10	6	Rockwell	738	1,226	66.1	3.0
6	7	Toshiba	1,094	1,197	9.4	2.9
12	8	Philips	662	1,085	63.9	2.6
7	9	Mitsubishi	982	901	-8.2	2.2
9	10	Cirrus Logic	887	741	-16.5	1.8
11	11	IBM	703	741	5.4	1.8
13	12	Fujitsu	650	677	4.2	1.6
16	13	Lucent Technologies	510	635	24.5	1.5
15	14	National Semiconductor	542	627	15.7	1.5
8	15	Advanced Micro Devices	925	624	-32.5	1.5
14	16	Matsushita	555	534	-3.8	1.3
17	17	SGS-Thomson	437	482	10.3	1.2
18	18	SGS	315	464	47.3	1.1
19	19	United Microelectronics Corp.	274	315	15.0	0.8
20	20	Zilog	265	286	7.9	0.7
27	21	Siemens	209	284	35.9	0.7
100	22	Digital	0	271	NA	0.7
37	23	Analog Devices	116	258	122.4	0.6
36	24	Adaptec	124	214	72.6	0.5
30	25	Microchip Technology	169	213	26.0	0.5
24	26	Sony	233	189	-18.9	0.5
25	27	Sharp	221	184	-16.7	0.4
33	28	Trident Microsystems	139	180	29.5	0.4
23	29	OKi	233	175	-24.9	0.4
42	30	Oak Technology	84	172	104.8	0.4
102	31	Sun Microsystems	0	170	NA	0.4
29	32	Sanyo	187	164	-12.3	0.4
26	33	Cyrix	212	160	-24.5	0.4
32	34	Standard Microsystems	150	153	2.0	0.4
34	35	Chips & Technologies	138	150	8.7	0.4
103	36	C-Cube	0	150	NA	0.4
105	37	ATT Technologies	0	130	NA	0.3

**Table 2-10 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of MOS**  
**Microcomponents Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
35	38	Silicon Integrated Systems	127	127	0	0.3
31	39	OPTi	167	119	-28.7	0.3
59	40	Dallas Semiconductor	35	113	222.9	0.3
		All Others	2,281	1,868	-18.1	4.5
		Americas Companies	24,204	30,302	25.2	73.3
		Japanese Companies	8,093	8,115	0.3	19.6
		European Companies	1,433	1,977	38.0	4.8
		Asia/Pacific Companies	774	927	19.8	2.2
		Total Market	34,504	41,321	19.8	100.0

NA = Not applicable

Source: Dataquest (April 1997)



**Table 2-11**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of MOS Digital Logic**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	NEC	1,987	2,423	21.9	11.2
2	2	Toshiba	1,562	1,476	-5.5	6.8
4	3	Texas Instruments	1,317	1,370	4.0	6.4
5	4	Fujitsu	1,178	1,138	-3.4	5.3
6	5	LSI Logic	1,162	1,136	-2.2	5.3
3	6	Motorola	1,386	1,123	-19.0	5.2
9	7	Lucent Technologies	687	1,014	47.6	4.7
8	8	IBM	719	1,003	39.5	4.7
10	9	Hitachi	655	852	30.1	4.0
7	10	Philips	756	772	2.1	3.6
16	11	VLSI Technology	479	615	28.4	2.9
11	12	Matsushita	632	588	-7.0	2.7
15	13	Xilinx	520	566	8.8	2.6
13	14	Sony	581	531	-8.6	2.5
12	15	Sharp	600	504	-16.0	2.3
20	16	Altera	402	497	23.6	2.3
14	17	Sanyo	528	479	-9.3	2.2
19	18	Advanced Micro Devices	420	435	3.6	2.0
17	19	Oki	450	387	-14.0	1.8
18	20	Mitsubishi	425	380	-10.6	1.8
21	21	Hewlett-Packard	342	380	11.1	1.8
27	22	Samsung	190	289	52.1	1.3
22	23	National Semiconductor	263	268	1.9	1.2
24	24	SGS-Thomson	235	264	12.3	1.2
23	25	Rohm	244	210	-13.9	1.0
26	26	Symbios	208	204	-1.9	0.9
25	27	Seiko Epson	228	201	-11.8	0.9
28	28	Lattice	186	200	7.5	0.9
29	29	Yamaha	170	181	6.5	0.8
34	30	Actel	109	149	36.7	0.7
42	31	Atmel	67	146	117.9	0.7
36	32	ITT	95	140	47.4	0.6
30	33	GEC Plessey	154	118	-23.4	0.5
31	34	Dallas Semiconductor	137	117	-14.6	0.5
32	35	LG Semicon	116	113	-2.6	0.5
33	36	Integrated Device Technology	110	106	-3.6	0.5
35	37	Harris	108	104	-3.7	0.5

**Table 2-11 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of MOS Digital Logic**  
**Worldwide (Millions of U.S. Dollars)**

<b>1995 Rank</b>	<b>1996 Rank</b>		<b>1995 Revenue</b>	<b>1996 Revenue</b>	<b>Percentage Change</b>	<b>1996 Market Share (%)</b>
40	38	Gould AMI	72	95	31.9	0.4
39	39	TEMIC	73	74	1.4	0.3
38	40	Cypress Semiconductor	79	70	-11.4	0.3
		All Others	987	837	-15.2	3.9
		Americas Companies	9,134	10,051	10.0	46.6
		Japanese Companies	9,522	9,538	0.2	44.2
		European Companies	1,475	1,394	-5.5	6.5
		Asia/Pacific Companies	488	572	17.2	2.7
		Total Market	20,619	21,555	4.5	100.0

Source: Dataquest (April 1997)

**Table 2-12**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Analog-Monolithic**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	SGS-Thomson	1,483	2,042	37.7	10.6
5	2	Texas Instruments	934	1,730	85.2	9.0
2	3	Philips	1,257	1,291	2.7	6.7
4	4	Motorola	1,031	1,210	17.4	6.3
3	5	National Semiconductor	1,034	1,040	0.6	5.4
9	6	Siemens	692	980	41.6	5.1
8	7	Analog Devices	809	960	18.7	5.0
6	8	Toshiba	915	909	-0.7	4.7
7	9	Sanyo	894	780	-12.8	4.0
10	10	NEC	641	624	-2.7	3.2
11	11	Matsushita	639	547	-14.4	2.8
12	12	Sony	554	452	-18.4	2.3
16	13	Hitachi	355	409	15.2	2.1
13	14	Mitsubishi	455	397	-12.7	2.1
22	15	Maxim	185	383	107.0	2.0
18	16	Linear Technology	305	365	19.7	1.9
14	17	Rohm	423	357	-15.6	1.8
19	18	Lucent Technologies	284	301	6.0	1.6
17	19	Fujitsu	315	291	-7.6	1.5
21	20	Samsung	236	260	10.2	1.3
20	21	Harris	260	231	-11.2	1.2
24	22	TEMIC	177	175	-1.1	0.9
27	23	VTC	155	172	11.0	0.9
29	24	Allegro MicroSystems	144	166	15.3	0.9
26	25	GEC Plessey	155	163	5.2	0.8
23	26	New JRC	183	160	-12.6	0.8
28	27	Mietec	144	158	9.7	0.8
31	28	Burr-Brown	126	157	24.6	0.8
36	29	Symbios	102	152	49.0	0.8
33	30	Cirrus Logic	116	150	29.3	0.8
37	31	Sierra Semiconductor	96	126	31.3	0.7
109	32	Rockwell	0	121	NA	0.6
25	33	Advanced Micro Devices	173	115	-33.5	0.6
41	34	Level One Communications	78	112	43.6	0.6
43	35	Mitel	68	107	57.4	0.6
38	36	Raytheon	93	103	10.8	0.5
39	37	Cherry Semiconductor	87	100	14.9	0.5

**Table 2-12 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Analog-Monolithic Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
35	38	Unitrode	103	98	-4.9	0.5
34	39	Sharp	105	92	-12.4	0.5
30	40	Exar	131	87	-33.6	0.5
		All Others	1,679	1,227	-26.9	6.4
		Americas Companies	7,294	8,522	16.8	44.2
		Japanese Companies	5,704	5,210	-8.7	27.0
		European Companies	4,213	5,132	21.8	26.6
		Asia/Pacific Companies	405	436	7.7	2.3
		Total Market	17,616	19,300	9.6	100.0

Source: Dataquest (April 1997)

**Table 2-13**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total Discrete**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Motorola	1,650	1,452	-12.0	10.8
2	2	Toshiba	1,428	1,390	-2.7	10.3
4	3	Hitachi	889	977	9.9	7.3
3	4	Philips	1,056	941	-10.9	7.0
5	5	NEC	831	818	-1.6	6.1
6	6	Rohm	771	681	-11.7	5.1
8	7	SGS-Thomson	591	586	-0.8	4.3
7	8	Matsushita	631	565	-10.5	4.2
11	9	International Rectifier	468	493	5.3	3.7
10	10	Mitsubishi	479	452	-5.6	3.4
13	11	Siemens	435	452	3.9	3.4
9	12	Sanyo	488	441	-9.6	3.3
12	13	Fuji Electric	468	401	-14.3	3.0
14	14	General Instrument	413	362	-12.3	2.7
16	15	TEMIC	321	353	10.0	2.6
15	16	Sanken	398	328	-17.6	2.4
17	17	Samsung	317	307	-3.2	2.3
19	18	Fujitsu	283	290	2.5	2.2
18	19	Shindengen Electric	301	277	-8.0	2.1
20	20	Harris	228	232	1.8	1.7
21	21	Korean Electronic Co.	220	193	-12.3	1.4
26	22	Eupec	120	160	33.3	1.2
23	23	National Semiconductor	164	157	-4.3	1.2
27	24	Microsemi	118	146	23.7	1.1
24	25	Hewlett-Packard	146	140	-4.1	1.0
25	26	Semikron	125	109	-12.8	0.8
28	27	Powerex	98	98	0	0.7
30	28	Teccor Electronics	68	84	23.5	0.6
22	29	ITT	192	81	-57.8	0.6
31	30	IXYS	65	66	1.5	0.5
29	31	Toko	68	55	-19.1	0.4
34	32	Zetex	51	52	2.0	0.4
33	33	Sony	53	43	-18.9	0.3
36	34	GEC Plessey	36	35	-2.8	0.3
39	35	Ericsson	20	28	40.0	0.2
40	36	Texas Instruments	16	28	75.0	0.2
38	37	Semtech	29	24	-17.2	0.2

**Table 2-13 (Continued)**  
**Top 40 Worldwide Companies' Factory Revenue from Shipments of Total Discrete**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
37	38	Allegro MicroSystems	29	19	-34.5	0.1
41	39	Supertex	16	16	0	0.1
42	40	Raytheon	13	13	0	0
		All Others	221	130	-41.2	1.0
		Americas Companies	3,720	3,417	-8.1	25.4
		Japanese Companies	7,142	6,774	-5.2	50.3
		European Companies	2,915	2,784	-4.5	20.7
		Asia/Pacific Companies	537	500	-6.9	3.7
		Total Market	14,314	13,475	-5.9	100.0

Source: Dataquest (April 1997)

**Table 2-14**  
**Top 349 Worldwide Companies' Factory Revenue from Shipments of Total Optical Semiconductors Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Sharp	636	617	-3.0	12.6
2	2	Toshiba	623	471	-24.4	9.6
3	3	Matsushita	496	450	-9.3	9.2
11	4	Hewlett-Packard	160	425	165.6	8.6
4	5	Sony	382	373	-2.4	7.6
5	6	Siemens	314	339	8.0	6.9
7	7	Rohm	286	293	2.4	6.0
8	8	NEC	202	256	26.7	5.2
9	9	Fujitsu	168	151	-10.1	3.1
10	10	Sanyo	167	148	-11.4	3.0
12	11	Mitsubishi	151	144	-4.6	2.9
14	12	Hitachi	84	121	44.0	2.5
13	13	TEMIC	110	113	2.7	2.3
15	14	Lucent Technologies	81	90	11.1	1.8
20	15	Texas Instruments	43	62	44.2	1.3
17	16	Optek	53	59	11.3	1.2
16	17	Quality Technologies	61	52	-14.8	1.1
21	18	Honeywell	37	41	10.8	0.8
18	19	Sanken	52	40	-23.1	0.8
19	20	Motorola	50	40	-20.0	0.8
23	21	Oki	28	28	0	0.6
22	22	TCS	34	25	-26.5	0.5
24	23	Korean Electronic Co.	22	24	9.1	0.5
25	24	Ericsson	16	23	43.8	0.5
71	25	Mitel	0	22	NA	0.4
26	26	Spectra Diode Labs	15	17	13.3	0.3
28	27	New JRC	12	9	-25.0	0.2
31	28	Samsung	4	8	100.0	0.2
29	29	IC Sensors	6	7	16.7	0.1
30	30	CID Technologies	5	6	20.0	0.1
32	31	Eastman Kodak	3	3	0	0
33	32	Zetex	1	1	0	0
6	33	Stanley Electric	301	0	-100.0	0

**Table 2-14 (Continued)**  
**Top 349 Worldwide Companies' Factory Revenue from Shipments of Total Optical Semiconductors Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
27	34	ABB-Hafo	14	0	-100.0	0
		All Others	195	457	134.4	9.3
		Americas Companies	547	824	50.6	16.8
		Japanese Companies	3,735	3,542	-5.2	72.1
		European Companies	504	517	2.6	10.5
		Asia/Pacific Companies	26	32	23.1	0.7
		Total Market	4,812	4,915	2.1	100.0

Source: Dataquest (April 1997)



**Table 2-15**  
**Top 29 Worldwide Companies' Factory Revenue from Shipments of Hybrid Analog**  
**Worldwide (Millions of U.S. Dollars)**

1995 Rank	1996 Rank		1995 Revenue	1996 Revenue	Percentage Change	1996 Market Share (%)
1	1	Sanken	283	254	-10.2	17.3
2	2	Mitsubishi	198	187	-5.6	12.7
3	3	Sanyo	193	177	-8.3	12.1
4	4	Fujitsu	149	134	-10.1	9.1
6	5	NEC	130	125	-3.8	8.5
5	6	Hitachi	137	118	-13.9	8.0
7	7	Rohm	78	73	-6.4	5.0
12	8	Sony	41	65	58.5	4.4
9	9	Burr-Brown	60	50	-16.7	3.4
10	10	Analog Devices	58	42	-27.6	2.9
11	11	Philips	46	40	-13.0	2.7
8	12	Toshiba	74	36	-51.4	2.5
13	13	Shindengen Electric	28	21	-25.0	1.4
14	14	Fuji Electric	23	21	-8.7	1.4
15	15	Mitel	20	16	-20.0	1.1
19	16	Allegro MicroSystems	12	15	25.0	1.0
16	17	Ericsson	15	13	-13.3	0.9
17	18	Sipex	14	13	-7.1	0.9
18	19	Oki	13	13	0	0.9
22	20	Toko	8	8	0	0.5
24	21	Maxim	4	4	0	0.3
26	22	Linfinity	3	3	0	0.2
27	23	Elantec	3	3	0	0.2
28	24	Solitron	2	3	50.0	0.2
20	25	Micronas	10	0	-100.0	0
21	26	National Semiconductor	8	0	-100.0	0
23	27	ABB-Hafo	5	0	-100.0	0
25	28	GEC Plessey	3	0	-100.0	0
29	29	Gennum	2	0	-100.0	0
		All Others	35	34	-2.9	2.3
		Americas Companies	186	149	-19.9	10.1
		Japanese Companies	1,369	1,245	-9.1	84.8
		European Companies	100	74	-26.0	5.0
		Asia/Pacific Companies	0	-	NA	0
		Total Market	1,655	1,468	-11.3	100.0

NA = Not applicable

Source: Dataquest (April 1997)

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**For More Information...**

Kevin McClure, Market Research Analyst ..... (408) 468-8505  
Internet address ..... [kevin.mcclure@dataquest.com](mailto:kevin.mcclure@dataquest.com)  
Via fax ..... (408) 954-1780  
Dataquest Interactive ..... <http://www.dataquest.com>

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## DATAQUEST WORLDWIDE OFFICES

### NORTH AMERICA

#### Worldwide Headquarters

251 River Oaks Parkway  
San Jose, California 95134-1913  
United States  
Phone: 1-408-468-8000  
Facsimile: 1-408-954-1780

#### East Coast Headquarters

Nine Technology Drive  
P.O. Box 5093  
Westborough, Massachusetts 01581-5093  
United States  
Phone: 1-508-871-5555  
Facsimile: 1-508-871-6262

#### Dataquest Global Events

3990 Westerly Place, Suite 100  
Newport Beach, California 92660  
United States  
Phone: 1-714-476-9117  
Facsimile: 1-714-476-9969

#### Sales Offices:

Washington, DC (Federal)  
New York, NY (Financial)  
Dallas, TX

### LATIN AMERICA

#### Research Affiliates and Sales Offices:

Buenos Aires, Argentina  
Sao Paulo, Brazil  
Santiago, Chile  
Mexico City, Mexico

### EUROPE

#### European Headquarters

Tamesis, The Glanty  
Egham, Surrey TW20 9AW  
United Kingdom  
Phone: +44 1784 431 611  
Facsimile: +44 1784 488 980

#### Dataquest France

Immeuble Défense Bergères  
345, avenue Georges Clémenceau  
TSA 40002  
92882 - Nanterre CTC Cedex 9  
France  
Phone: +33 1 41 35 13 00  
Facsimile: +33 1 41 35 13 13

#### Dataquest Germany

Kronstadter Strasse 9  
81677 München  
Germany  
Phone: +49 89 93 09 09 0  
Facsimile: +49 89 93 03 27 7

#### Sales Offices:

Brussels, Belgium  
Kfar Saba, Israel  
Milan, Italy  
Randburg, South Africa  
Madrid, Spain

### JAPAN

#### Japan Headquarters

Aobadai Hills 4-7-7  
Aobadai  
Meguro-ku, Tokyo 153  
Japan  
Phone: 81-3-3481-3670  
Facsimile: 81-3-3481-3644

### ASIA/PACIFIC

#### Asia/Pacific Headquarters

Suite 5904-7, Central Plaza  
18 Harbour Road, Wanchai  
Hong Kong  
Phone: 852-2824-6168  
Facsimile: 852-2824-6138

#### Dataquest Korea

Suite 2407, Trade Tower  
159 Samsung-dong, Kangnam-gu  
Seoul 135-729  
Korea  
Phone: 822-551-1331  
Facsimile: 822-551-1330

#### Dataquest Taiwan

11F-2, No. 188, Section 5  
Nan King East Road  
Taipei  
Taiwan, R.O.C.  
Phone: 8862-756-0389  
Facsimile: 8862-756-2663

#### Dataquest Singapore

105 Cecil Street  
#06-01/02 The Octagon  
Singapore 069534  
Phone: 65-227-1213  
Facsimile: 65-227-4607

#### Dataquest Thailand

12/F, Vanissa Building  
29 Soi Chidlom  
Ploenchit Road  
Patumwan, Bangkok 10330  
Thailand  
Phone: 662-655-0577  
Facsimile: 662-655-0576

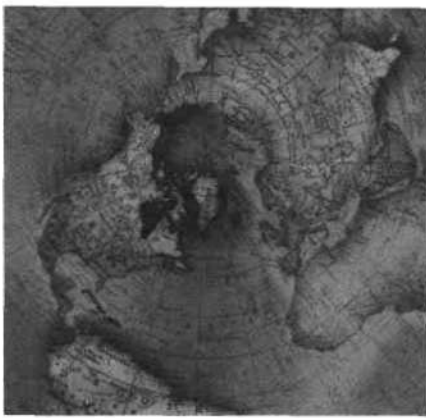
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# **Final 1997 Worldwide Semiconductor Market Share**



**Market Statistics**

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**Program:** Semiconductors Worldwide  
**Product Code:** SEMI-WW-MS-9801  
**Publication Date:** April 27, 1998  
**Filing:** Market Statistics

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# Chapter 1 Final 1997 Worldwide Semiconductor Market Share \_\_\_\_\_

## Introduction

This document contains detailed information on Dataquest's view of the semiconductor market. Included in this document are the following:

- 1995-1997 market share estimates
- 1996-1997 market share rankings

Worldwide market share estimates combine data from many countries, each of which has a different and fluctuating exchange rate. Estimates of non-U.S. market consumption or revenue are based on the average exchange rate for the given year. Refer to the section titled "Exchange Rates" for more information regarding these average rates. As a rule, Dataquest's estimates are calculated in local currencies and then converted to U.S. dollars.

More detailed data on this market may be requested through Dataquest's client inquiry service. Qualitative analysis of this data is provided in Dataquest Perspectives.

## Segmentation and Definitions

A detailed explanation of device segmentation and related definitions is contained in the Semiconductor Market Definitions Guide (SCND-WW-GU-9801).

## Market Share Methodology

Dataquest uses both primary and secondary sources to produce market statistics data. In the fourth quarter of each year, Dataquest surveys all major participants within each industry. Selected companies are resurveyed during the first quarter of the following year to verify final annual results. This primary research is supplemented with additional primary research and secondary research to verify market size, shipment totals, and pricing information. Sources of data used by Dataquest include the following:

- Information published by major industry participants
- Estimates made by knowledgeable and reliable industry spokespersons
- Government data or trade association data (such as WSTS, MITI, and U.S. DOC)
- Published product literature and price lists
- Interviews with knowledgeable manufacturers, distributors, and users
- Relevant economic data
- Information and data from online and CD-ROM data banks
- Articles in both the general and trade press



- Reports from financial analysts
- End-user surveys

Dataquest believes that the estimates presented in this document are the most accurate and meaningful statistics available.

Despite the care taken in gathering, analyzing, and categorizing the data in a meaningful way, careful attention must be paid to the definitions and assumptions used herein when interpreting the estimates presented in this document. Various companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Dataquest and those provided by other sources.

## Notes on Market Share

In the process of conducting data collection and preparing market statistics information, Dataquest will sometimes consolidate or revise a particular company, model, series, or industry's numbers. In this section, we explain any such changes contained within this document for your reference.

### Notes to Market Share Tables

1. Cyrix was acquired by National Semiconductor in 1997.
2. National Semiconductor divested itself of Fairchild in 1997.
3. National Semiconductor's 1997 revenue includes all of Cyrix's 1997 revenue and part of Fairchild's calendar first quarter revenue.
4. Power Innovations was formed through the acquisition of the Power Semiconductor interests of Texas Instruments.
5. Melexis was formerly known as Elex.
6. Micronas acquired ITT in 1997.
7. The following companies were added to the market share database in 1997:
  - Fairchild
  - Vitesse
  - TriQuint
  - Power Innovations
  - Robert Bosch
  - Stanley
8. Toko is now tracked in other Japanese companies.
9. IBM's 1996 revenue was restated in 1997.

## Exchange Rates

Dataquest uses an average annual exchange rate in converting revenue to U.S. dollar amounts. Table 1-1 outlines these rates for 1995 through 1997.

**Table 1-1**  
**Exchange Rates**

	1995	1996	1997
Japan (Yen/U.S.\$)	93.90	108.81	121.10
France (Franc/U.S.\$)	4.97	5.12	5.84
Germany (Deutsche Mark/U.S.\$)	1.43	1.50	1.73
United Kingdom (U.S.\$/Pound Sterling)	1.59	1.56	1.64

Source: Dataquest (April 1998)

*Project Analyst: Kevin McClure*

## Chapter 2

# Market Share Tables

Tables 2-1 through 2-10 show each company's factory revenue by technology category. Tables 2-11 through 2-20 show the top companies' factory revenue by technology category.

**Table 2-1**  
**Each Company's Vendor Revenue from Shipments of Total Semiconductors Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>151,262</b>	<b>142,150</b>	<b>147,165</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>60,021</b>	<b>64,076</b>	<b>72,339</b>	<b>39.7</b>	<b>45.1</b>	<b>49.2</b>
8x8	44	51	60	0	0	0
ACC Microelectronics	40	45	50	0	0	0
Actel	109	149	156	0	0.1	0.1
Adaptec	124	214	238	0	0.2	0.2
Advanced Micro Devices	2,337	1,947	2,341	1.5	1.4	1.6
Allegro MicroSystems	185	200	155	0.1	0.1	0.1
Alliance Semiconductor	220	76	120	0.1	0	0
Altera	402	497	631	0.3	0.3	0.4
Anadigics	0	0	97	0	0	0
Analog Devices	983	1,260	1,370	0.6	0.9	0.9
Appian Technology	9	10	11	0	0	0
Applied Micro Circuits Corp.	49	56	36	0	0	0
ATI Technologies	0	130	260	0	0	0.2
Atmel	589	1,024	950	0.4	0.7	0.6
Burr-Brown	186	207	165	0.1	0.1	0.1
C-Cube	0	150	171	0	0.1	0.1
California Micro Devices	13	8	1	0	0	0
Catalyst	48	54	70	0	0	0
Cherry Semiconductor	87	100	112	0	0	0
Chip Express	0	25	31	0	0	0
Chips & Technologies	138	150	131	0	0.1	0
CID Technologies	5	6	6	0	0	0
Cirrus Logic	1,003	891	880	0.7	0.6	0.6
Crosspoint Solutions	2	2	1	0	0	0
Cypress Semiconductor	553	516	496	0.4	0.4	0.3
Dallas Semiconductor	228	277	304	0.2	0.2	0.2
Digital	0	271	359	0	0.2	0.2
DSP Group	60	67	76	0	0	0
Eastman Kodak	3	3	3	0	0	0
Elantec	25	35	36	0	0	0

**Table 2-1 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total Semiconductors Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Electronic Designs	43	51	10	0	0	0
ESS	0	0	245	0	0	0.2
Eteq Microsystems	7	4	4	0	0	0
Exar	147	96	102	0	0	0
Fairchild	0	0	448	0	0	0.3
G-Link USA	14	15	34	0	0	0
General Semiconductor	413	362	370	0.3	0.3	0.3
Gernum	34	37	39	0	0	0
Gould AMI	72	95	194	0	0	0.1
Harris Semiconductor	685	629	697	0.5	0.4	0.5
Hewlett-Packard	648	945	1,025	0.4	0.7	0.7
Honeywell	64	71	68	0	0	0
Hughes	36	39	38	0	0	0
ISD	0	0	48	0	0	0
IBM	3,522	3,200	3,391	2.3	2.3	2.3
IC Sensors	6	7	7	0	0	0
IMI	35	39	36	0	0	0
IMP	54	35	19	0	0	0
Integrated Circuit Systems	97	79	95	0	0	0
Integrated Device Technology	617	554	536	0.4	0.4	0.4
Integrated Silicon Solution	158	111	125	0.1	0	0
Intel	13,172	17,781	21,746	8.7	12.5	14.8
International CMOS Technology	16	12	5	0	0	0
International Rectifier	486	520	511	0.3	0.4	0.3
Ixys	65	66	69	0	0	0
Lattice	186	200	242	0.1	0.1	0.2
Level One Communications	78	112	127	0	0	0
Linear Technology	305	365	419	0.2	0.3	0.3
Linfinit	50	51	53	0	0	0
Logic Devices	17	14	14	0	0	0
LSI Logic	1,269	1,239	1,290	0.8	0.9	0.9
Lucent Technologies	1,615	2,110	2,762	1.1	1.5	1.9
Maxim	189	387	463	0.1	0.3	0.3
Micrel	26	24	104	0	0	0
Micro Linear	54	54	62	0	0	0
Microchip Technology	271	330	422	0.2	0.2	0.3
Micron Technology	2,601	1,558	1,704	1.7	1.1	1.2
Microsemi	118	146	156	0	0.1	0.1

**Table 2-1 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total Semiconductors Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Mitel	88	145	159	0	0.1	0.1
Motorola	8,722	8,076	8,067	5.8	5.7	5.5
National Semiconductor	2,408	2,380	2,759	1.6	1.7	1.9
NeoMagic	0	0	120	0	0	0
Oak Technology	84	172	163	0	0.1	0.1
Optek	62	69	73	0	0	0
OPTi	167	119	68	0.1	0	0
Paradigm	55	23	11	0	0	0
PMC Sierra Semiconductor	143	188	214	0	0.1	0.1
Powerex	98	98	98	0	0	0
Q Logic	61	67	73	0	0	0
Quality Semiconductor	46	45	47	0	0	0
Quality Technologies	61	52	54	0	0	0
QuickLogic	16	25	29	0	0	0
Ramtron	25	14	15	0	0	0
Raytheon	125	131	127	0	0	0
Rockwell	744	1,351	1,487	0.5	1	1
S3	315	464	437	0.2	0.3	0.3
Seeq Technology	27	32	31	0	0	0
Semtech	48	66	100	0	0	0
Silicon Storage Technology	35	91	75	0	0	0
Solitron	8	9	6	0	0	0
Spectra Diode Labs	15	17	17	0	0	0
Standard Microsystems	150	153	175	0	0.1	0.1
Sun Microsystems	0	170	550	0	0.1	0.4
Supertex	35	33	34	0	0	0
Symbios	395	458	418	0.3	0.3	0.3
Symphony Laboratories	15	17	19	0	0	0
Teccor Electronics	68	83	92	0	0	0
Telcom-	17	18	56	0	0	0
Texas Instruments	7,831	7,064	7,352	5.2	5	5
Trident Microsystems	139	180	144	0	0.1	0
TriQuint	0	0	72	0	0	0
Tseng Labs	105	26	8	0	0	0
Unitrode	103	98	118	0	0	0
Vitesse	0	0	118	0	0	0
VLSI Technology	672	672	713	0.4	0.5	0.5
VTC	155	172	110	0.1	0.1	0

**Table 2-1 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total Semiconductors Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
WaferScale Integration	36	48	50	0	0	0
Xicor	114	123	122	0	0	0
Xilinx	520	566	612	0.3	0.4	0.4
Zilog	265	286	262	0.2	0.2	0.2
Zoran	0	29	34	0	0	0
Other Americas Companies	33	40	53	0	0	0
<b>Japanese Companies</b>	<b>60,599</b>	<b>50,884</b>	<b>47,825</b>	<b>40.1</b>	<b>35.8</b>	<b>32.5</b>
Fuji Electric	566	486	417	0.4	0.3	0.3
Fujitsu	5,535	4,427	4,622	3.7	3.1	3.1
Hitachi	9,135	8,071	6,298	6	5.7	4.3
Matsushita	3,474	3,003	2,847	2.3	2.1	1.9
Mitsubishi	5,274	4,100	3,925	3.5	2.9	2.7
NEC	11,314	10,428	10,222	7.5	7.3	6.9
New JRC	237	200	230	0.2	0.1	0.2
Nippon Steel Semiconductor	549	198	145	0.4	0.1	0
Oki	2,028	1,177	1,062	1.3	0.8	0.7
Ricoh	213	168	163	0.1	0.1	0.1
Rohm	1,934	1,731	2,053	1.3	1.2	1.4
Sanken	733	622	540	0.5	0.4	0.4
SANYO	2,714	2,491	2,471	1.8	1.8	1.7
Seiko Epson	313	256	205	0.2	0.2	0.1
Sharp	2,592	2,124	2,145	1.7	1.5	1.5
Shindengen Electric	329	298	266	0.2	0.2	0.2
Sony	2,333	1,983	1,974	1.5	1.4	1.3
Stanley	301	0	294	0.2	0	0.2
Toshiba	10,076	8,065	7,253	6.7	5.7	4.9
Yamaha	444	295	239	0.3	0.2	0.2
Other Japanese Companies	392	667	454	0.3	0.5	0.3
<b>European Companies</b>	<b>12,837</b>	<b>13,682</b>	<b>14,809</b>	<b>8.5</b>	<b>9.6</b>	<b>10.1</b>
Alcatel Microelectronics	179	190	215	0.1	0.1	0.1
Austria Mikro Systeme	149	140	130	0	0	0
Elmos	19	7	9	0	0	0
EM Microelectronics Marin	77	85	89	0	0	0
Ericsson	120	170	180	0	0.1	0.1
Eupec	120	160	111	0	0.1	0
Fagor	38	0	32	0	0	0
GEC Plessey	368	338	295	0.2	0.2	0.2
Melexis	33	34	22	0	0	0

**Table 2-1 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total Semiconductors Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Micronas	43	33	285	0	0	0.2
Philips	3,900	4,220	4,440	2.6	3	3
Power Innovations	0	0	29	0	0	0
Robert Bosch	0	0	240	0	0	0.2
Semikron	125	109	116	0	0	0
SGS-Thomson	3,398	4,112	4,019	2.2	2.9	2.7
Siemens	3,063	3,029	3,441	2	2.1	2.3
TCS	100	83	123	0	0	0
TEMIC	773	813	856	0.5	0.6	0.6
Zetex	56	54	93	0	0	0
Other European Companies	105	105	84	0	0	0
<b>Asia/Pacific Companies</b>	<b>17,805</b>	<b>13,508</b>	<b>12,192</b>	<b>11.8</b>	<b>9.5</b>	<b>8.3</b>
Acer	80	50	115	0	0	0
Daewoo	49	45	50	0	0	0
Holtek	87	99	117	0	0	0
Hualon Microelectronics Corp.	107	47	46	0	0	0
Hyundai	4,132	2,247	1,939	2.7	1.6	1.3
Korean Electronic Co.	287	268	300	0.2	0.2	0.2
LG Semicon	2,863	2,243	1,792	1.9	1.6	1.2
Macronix	271	354	365	0.2	0.2	0.2
Mosel Vitelic	502	398	316	0.3	0.3	0.2
Samsung	8,332	6,464	5,856	5.5	4.5	4
Silicon Integrated Systems	127	127	110	0	0	0
United Microelectronics	477	492	378	0.3	0.3	0.3
Vanguard	0	225	334	0	0.2	0.2
VIA	0	110	151	0	0	0.1
Winbond Electronics	491	339	323	0.3	0.2	0.2

Source: Dataquest (April 1998)

**Table 2-2**  
**Each Company's Vendor Revenue from Shipments of Total ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>132,136</b>	<b>123,761</b>	<b>127,571</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>55,754</b>	<b>59,836</b>	<b>67,952</b>	<b>42.2</b>	<b>48.3</b>	<b>53.3</b>
8x8	44	51	60	0	0	0
ACC Microelectronics	40	45	50	0	0	0
Actel	109	149	156	0	0.1	0.1
Adaptec	124	214	238	0	0.2	0.2
Advanced Micro Devices	2,337	1,947	2,341	1.8	1.6	1.8
Allegro MicroSystems	156	181	153	0.1	0.1	0.1
Alliance Semiconductor	220	76	120	0.2	0	0
Altera	402	497	631	0.3	0.4	0.5
Anadigics	0	0	97	0	0	0
Analog Devices	983	1,260	1,370	0.7	1	1.1
Appian Technology	9	10	11	0	0	0
Applied Micro Circuits Corp.	49	56	36	0	0	0
ATI Technologies	0	130	260	0	0.1	0.2
Atmel	589	1,024	950	0.4	0.8	0.7
Burr-Brown	186	207	165	0.1	0.2	0.1
C-Cube	0	150	171	0	0.1	0.1
California Micro Devices	13	8	1	0	0	0
Catalyst	48	54	70	0	0	0
Cherry Semiconductor	87	100	112	0	0	0
Chip Express	0	25	31	0	0	0
Chips & Technologies	138	150	131	0.1	0.1	0.1
Cirrus Logic	1,003	891	880	0.8	0.7	0.7
Crosspoint Solutions	2	2	1	0	0	0
Cypress Semiconductor	553	516	496	0.4	0.4	0.4
Dallas Semiconductor	228	277	304	0.2	0.2	0.2
Digital	0	271	359	0	0.2	0.3
DSP Group	60	67	76	0	0	0
Elantec	25	35	36	0	0	0
Electronic Designs	43	51	10	0	0	0
ESS	0	0	245	0	0	0.2
Eteq Microsystems	7	4	4	0	0	0
Exar	147	96	102	0.1	0	0
Fairchild	0	0	307	0	0	0.2
G-Link USA	14	15	34	0	0	0
Gennum	34	37	39	0	0	0
Gould AMI	72	95	194	0	0	0.2



**Table 2-2 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Harris Semiconductor	457	397	467	0.3	0.3	0.4
Hewlett-Packard	342	380	466	0.3	0.3	0.4
Honeywell	27	30	30	0	0	0
Hughes	36	39	38	0	0	0
ISD	0	0	48	0	0	0
IBM	3,522	3,200	3,391	2.7	2.6	2.7
IMI	35	39	36	0	0	0
IMP	54	35	19	0	0	0
Integrated Circuit Systems	97	79	95	0	0	0
Integrated Device Technology	617	554	536	0.5	0.4	0.4
Integrated Silicon Solution	158	111	125	0.1	0	0
Intel	13,172	17,781	21,746	10	14.4	17
International CMOS Technology	16	12	5	0	0	0
International Rectifier	18	27	31	0	0	0
Lattice	186	200	242	0.1	0.2	0.2
Level One Communications	78	112	127	0	0	0
Linear Technology	305	365	419	0.2	0.3	0.3
Linfinit	50	51	53	0	0	0
Logic Devices	17	14	14	0	0	0
LSI Logic	1,269	1,239	1,290	1	1	1
Lucent Technologies	1,534	2,020	2,489	1.2	1.6	2
Maxim	189	387	463	0.1	0.3	0.4
Micrel	26	24	104	0	0	0
Micro Linear	54	54	62	0	0	0
Microchip Technology	271	330	422	0.2	0.3	0.3
Micron Technology	2,601	1,558	1,704	2	1.3	1.3
Mitel	88	123	143	0	0	0.1
Motorola	7,022	6,584	6,585	5.3	5.3	5.2
National Semiconductor	2,244	2,223	2,624	1.7	1.8	2.1
NeoMagic	0	0	120	0	0	0
Oak Technology	84	172	163	0	0.1	0.1
Optek	8	9	20	0	0	0
OPTi	167	119	68	0.1	0	0
Paradigm	55	23	11	0	0	0
PMC Sierra Semiconductor	143	188	214	0.1	0.2	0.2
Q Logic	61	67	73	0	0	0
Quality Semiconductor	46	45	47	0	0	0
QuickLogic	16	25	29	0	0	0

**Table 2-2 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Ramtron	25	14	15	0	0	0
Raytheon	112	118	113	0	0	0
Rockwell	744	1,351	1,487	0.6	1.1	1.2
S3	315	464	437	0.2	0.4	0.3
Seeq Technology	27	32	31	0	0	0
Semtech	19	42	90	0	0	0
Silicon Storage Technology	35	91	75	0	0	0
Solitron	2	4	1	0	0	0
Standard Microsystems	150	153	175	0.1	0.1	0.1
Sun Microsystems	0	170	550	0	0.1	0.4
Supertex	19	17	17	0	0	0
Symbios	395	458	418	0.3	0.4	0.3
Symphony Laboratories	15	17	19	0	0	0
Telcom-	17	18	56	0	0	0
Texas Instruments	7,772	6,974	7,292	5.9	5.6	5.7
Trident Microsystems	139	180	144	0.1	0.1	0.1
TriQuint	0	0	72	0	0	0
Tseng Labs	105	26	8	0	0	0
Unitrode	103	98	118	0	0	0
Vitesse	0	0	118	0	0	0
VLSI Technology	672	672	713	0.5	0.5	0.6
VTC	155	172	110	0.1	0.1	0
WaferScale Integration	36	48	50	0	0	0
Xicor	114	123	122	0	0	0
Xilinx	520	566	612	0.4	0.5	0.5
Zilog	265	286	262	0.2	0.2	0.2
Zoran	0	29	34	0	0	0
Other Americas Companies	0	40	53	0	0	0
<b>Japanese Companies</b>	<b>49,722</b>	<b>40,568</b>	<b>36,882</b>	<b>37.6</b>	<b>32.8</b>	<b>28.9</b>
Fuji Electric	98	85	61	0	0	0
Fujitsu	5,084	3,986	4,135	3.8	3.2	3.2
Hitachi	8,162	6,973	5,233	6.2	5.6	4.1
Matsushita	2,347	1,988	1,882	1.8	1.6	1.5
Mitsubishi	4,644	3,504	3,280	3.5	2.8	2.6
NEC	10,281	9,354	9,014	7.8	7.6	7.1
New JRC	223	188	227	0.2	0.2	0.2
Nippon Steel Semiconductor	549	198	145	0.4	0.2	0.1
Oki	1,988	1,138	1,018	1.5	0.9	0.8

**Table 2-2 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Ricoh	213	168	163	0.2	0.1	0.1
Rohm	877	757	869	0.7	0.6	0.7
Sanken	283	254	70	0.2	0.2	0
SANYO	2,059	1,902	1,818	1.6	1.5	1.4
Seiko Epson	313	256	205	0.2	0.2	0.2
Sharp	1,956	1,507	1,430	1.5	1.2	1.1
Shindengen Electric	28	21	0	0	0	0
Sony	1,898	1,567	1,541	1.4	1.3	1.2
Toshiba	8,025	6,204	5,340	6.1	5	4.2
Yamaha	444	295	239	0.3	0.2	0.2
Other Japanese Companies	205	184	212	0.2	0.1	0.2
<b>European Companies</b>	<b>9,418</b>	<b>10,381</b>	<b>11,152</b>	<b>7.1</b>	<b>8.4</b>	<b>8.7</b>
Alcatel Microelectronics	179	190	215	0.1	0.2	0.2
Austria Mikro Systeme	149	140	130	0.1	0.1	0.1
Elmos	19	7	9	0	0	0
EM Microelectronics Marin	77	85	89	0	0	0
Ericsson	84	119	130	0	0	0.1
GEC Plessey	332	303	268	0.3	0.2	0.2
Melexis	31	34	22	0	0	0
Micronas	43	33	230	0	0	0.2
Philips	2,844	3,279	3,416	2.2	2.6	2.7
Robert Bosch	0	0	155	0	0	0.1
SGS-Thomson	2,807	3,526	3,447	2.1	2.8	2.7
Siemens	2,314	2,238	2,503	1.8	1.8	2
TCS	65	58	70	0	0	0
TEMIC	342	347	461	0.3	0.3	0.4
Zetex	4	1	7	0	0	0
Other European Companies	25	21	0	0	0	0
<b>Asia/Pacific Companies</b>	<b>17,242</b>	<b>12,976</b>	<b>11,585</b>	<b>13</b>	<b>10.5</b>	<b>9.1</b>
Acer	80	50	115	0	0	0
Daewoo	49	45	50	0	0	0
Holtek	87	99	117	0	0	0
Hualon Microelectronics Corp.	107	47	46	0	0	0
Hyundai	4,132	2,247	1,939	3.1	1.8	1.5
Korean Electronic Co.	45	51	60	0	0	0
LG Semicon	2,863	2,243	1,792	2.2	1.8	1.4
Macronix	271	354	365	0.2	0.3	0.3
Mosel Vitelic	502	398	316	0.4	0.3	0.2

**Table 2-2 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Samsung	8,011	6,149	5,489	6.1	5	4.3
Silicon Integrated Systems	127	127	110	0	0.1	0
United Microelectronics	477	492	378	0.4	0.4	0.3
Vanguard	0	225	334	0	0.2	0.3
VIA	0	110	151	0	0	0.1
Winbond Electronics	491	339	323	0.4	0.3	0.3

Source: Dataquest (April 1998)

**Table 2-3**  
**Each Company's Vendor Revenue from Shipments of Bipolar Digital Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>2,455</b>	<b>1,849</b>	<b>1,239</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>1,295</b>	<b>953</b>	<b>609</b>	<b>52.7</b>	<b>51.5</b>	<b>49.2</b>
Advanced Micro Devices	100	62	28	4.1	3.4	2.3
Applied Micro Circuits Corp.	19	30	0	0.8	1.6	0
Harris Semiconductor	4	4	0	0.2	0.2	0
Lucent Technologies	50	70	10	2	3.8	0.8
Motorola	381	271	264	15.5	14.7	21.3
National Semiconductor	209	161	14	8.5	8.7	1.1
Raytheon	19	15	0	0.8	0.8	0
Texas Instruments	513	340	293	20.9	18.4	23.6
<b>Japanese Companies</b>	<b>972</b>	<b>752</b>	<b>485</b>	<b>39.6</b>	<b>40.7</b>	<b>39.1</b>
Fujitsu	203	90	63	8.3	4.9	5.1
Hitachi	442	451	262	18	24.4	21.1
Matsushita	29	19	19	1.2	1	1.5
Mitsubishi	37	25	24	1.5	1.4	1.9
NEC	109	90	82	4.4	4.9	6.6
Oki	36	4	3	1.5	0.2	0.2
Toshiba	116	73	32	4.7	3.9	2.6
<b>European Companies</b>	<b>174</b>	<b>134</b>	<b>117</b>	<b>7.1</b>	<b>7.2</b>	<b>9.4</b>
GEC Plessey	10	12	0	0.4	0.6	0
Philips	123	90	80	5	4.9	6.5
SGS-Thomson	6	0	0	0.2	0	0
Siemens	31	32	37	1.3	1.7	3
Other European Companies	4	0	0	0.2	0	0
<b>Asia/Pacific Companies</b>	<b>14</b>	<b>10</b>	<b>28</b>	<b>0.6</b>	<b>0.5</b>	<b>2.3</b>
LG Semicon	14	10	8	0.6	0.5	0.6
Mosel Vitelic	0	0	20	0	0	1.6

Source: Dataquest (April 1998)

**Table 2-4**  
**Each Company's Vendor Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>110,410</b>	<b>102,209</b>	<b>104,680</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>46,979</b>	<b>50,721</b>	<b>57,414</b>	<b>42.5</b>	<b>49.6</b>	<b>54.8</b>
8x8	44	51	60	0	0	0
ACC Microelectronics	40	45	50	0	0	0
Actel	109	149	156	0	0.1	0.1
Adaptec	124	214	238	0.1	0.2	0.2
Advanced Micro Devices	2,064	1,770	2,123	1.9	1.7	2
Allegro MicroSystems	0	7	9	0	0	0
Alliance Semiconductor	220	76	120	0.2	0	0.1
Altera	402	497	631	0.4	0.5	0.6
Analog Devices	116	272	306	0.1	0.3	0.3
Appian Technology	9	10	11	0	0	0
Applied Micro Circuits Corp.	25	23	33	0	0	0
ATI Technologies	0	130	260	0	0.1	0.2
Atmel	573	1,024	919	0.5	1	0.9
C-Cube	0	150	171	0	0.1	0.2
California Micro Devices	6	5	1	0	0	0
Catalyst	48	54	70	0	0	0
Cherry Semiconductor	0	0	11	0	0	0
Chip Express	0	25	31	0	0	0
Chips & Technologies	138	150	131	0.1	0.1	0.1
Cirrus Logic	887	741	604	0.8	0.7	0.6
Crosspoint Solutions	2	2	1	0	0	0
Cypress Semiconductor	553	516	496	0.5	0.5	0.5
Dallas Semiconductor	228	230	251	0.2	0.2	0.2
Digital	0	271	359	0	0.3	0.3
DSP Group	60	67	76	0	0	0
Electronic Designs	43	51	10	0	0	0
ESS	0	0	240	0	0	0.2
Eteq Microsystems	7	4	4	0	0	0
Exar	16	24	33	0	0	0
Fairchild	0	0	307	0	0	0.3
G-Link USA	14	15	34	0	0	0
Gennum	0	0	9	0	0	0
Gould AMI	72	95	194	0	0	0.2
Harris Semiconductor	193	198	209	0.2	0.2	0.2
Hewlett-Packard	342	380	466	0.3	0.4	0.4
Hughes	20	39	38	0	0	0

**Table 2-4 (Continued)**  
**Each Company's Vendor Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
ISD	0	0	48	0	0	0
IBM	3,522	3,200	3,391	3.2	3.1	3.2
IMI	30	39	36	0	0	0
IMP	12	5	0	0	0	0
Integrated Circuit Systems	52	63	77	0	0	0
Integrated Device Technology	617	554	536	0.6	0.5	0.5
Integrated Silicon Solution	158	111	125	0.1	0.1	0.1
Intel	13,163	17,781	21,746	11.9	17.4	20.8
International CMOS Technology	16	12	5	0	0	0
Lattice	186	200	242	0.2	0.2	0.2
Logic Devices	17	14	14	0	0	0
LSI Logic	1,269	1,239	1,290	1.1	1.2	1.2
Lucent Technologies	1,200	1,715	2,374	1.1	1.7	2.3
Micrel	7	6	0	0	0	0
Micro Linear	0	3	11	0	0	0
Microchip Technology	271	330	422	0.2	0.3	0.4
Micron Technology	2,601	1,558	1,704	2.4	1.5	1.6
Mitel	0	24	15	0	0	0
Motorola	5,610	5,113	4,903	5.1	5	4.7
National Semiconductor	993	1,047	1,252	0.9	1	1.2
NeoMagic	0	0	120	0	0	0.1
Oak Technology	84	172	163	0	0.2	0.2
OPTi	167	119	68	0.2	0.1	0
Paradigm	55	23	11	0	0	0
PMC Sierra Semiconductor	47	87	98	0	0	0
Q Logic	61	67	73	0	0	0
Quality Semiconductor	46	45	47	0	0	0
QuickLogic	16	25	29	0	0	0
Ramtron	25	14	15	0	0	0
Raytheon	0	7	28	0	0	0
Rockwell	744	1,230	1,356	0.7	1.2	1.3
S3	315	464	437	0.3	0.5	0.4
Seeq Technology	27	12	19	0	0	0
Silicon Storage Technology	35	91	75	0	0	0
Standard Microsystems	150	153	175	0.1	0.1	0.2
Sun Microsystems	0	170	550	0	0.2	0.5
Supertex	6	5	5	0	0	0
Symbios	293	458	418	0.3	0.4	0.4

**Table 2-4 (Continued)**  
**Each Company's Vendor Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Symphony Laboratories	15	17	19	0	0	0
Texas Instruments	6,325	4,950	4,804	5.7	4.8	4.6
Trident Microsystems	139	180	144	0.1	0.2	0.1
Tseng Labs	105	26	8	0	0	0
Vitesse	0	0	53	0	0	0
VLSI Technology	672	672	713	0.6	0.7	0.7
WaferScale Integration	36	48	50	0	0	0
Xicor	114	123	122	0.1	0.1	0.1
Xilinx	520	566	612	0.5	0.6	0.6
Zilog	265	286	262	0.2	0.3	0.3
Zoran	0	29	34	0	0	0
Other Americas Companies	0	40	53	0	0	0
<b>Japanese Companies</b>	<b>41,677</b>	<b>33,361</b>	<b>30,597</b>	<b>37.7</b>	<b>32.6</b>	<b>29.2</b>
Fuji Electric	46	41	37	0	0	0
Fujitsu	4,417	3,471	3,745	4	3.4	3.6
Hitachi	7,228	5,995	4,595	6.5	5.9	4.4
Matsushita	1,679	1,422	1,308	1.5	1.4	1.2
Mitsubishi	3,954	2,895	2,812	3.6	2.8	2.7
NEC	9,401	8,515	8,320	8.5	8.3	7.9
New JRC	40	28	29	0	0	0
Nippon Steel Semiconductor	549	198	145	0.5	0.2	0.1
Okii	1,911	1,103	998	1.7	1.1	1
Ricoh	175	118	103	0.2	0.1	0
Rohm	376	327	334	0.3	0.3	0.3
SANYO	972	945	968	0.9	0.9	0.9
Seiko Epson	297	242	191	0.3	0.2	0.2
Sharp	1,851	1,415	1,332	1.7	1.4	1.3
Sony	1,303	1,050	1,028	1.2	1	1
Toshiba	6,920	5,186	4,288	6.3	5.1	4.1
Yamaha	416	289	237	0.4	0.3	0.2
Other Japanese Companies	142	121	127	0.1	0.1	0.1
<b>European Companies</b>	<b>4,931</b>	<b>5,596</b>	<b>5,645</b>	<b>4.5</b>	<b>5.5</b>	<b>5.4</b>
Alcatel Microelectronics	35	179	204	0	0.2	0.2
Austria Mikro Systeme	68	133	124	0	0.1	0.1
Elmos	19	7	9	0	0	0
EM Microelectronics Marin	2	29	30	0	0	0
Ericsson	19	19	30	0	0	0
GEC Plessey	164	196	197	0.1	0.2	0.2



**Table 2-4 (Continued)**  
**Each Company's Vendor Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Melexis	23	22	16	0	0	0
Micronas	0	33	220	0	0	0.2
Philips	1,418	1,858	1,619	1.3	1.8	1.5
Robert Bosch	0	0	15	0	0	0
SGS-Thomson	1,318	1,651	1,556	1.2	1.6	1.5
Siemens	1,591	1,226	1,384	1.4	1.2	1.3
TCS	41	49	68	0	0	0
TEMIC	165	194	171	0.1	0.2	0.2
Zetex	0	0	2	0	0	0
<b>Asia/Pacific Companies</b>	<b>16,823</b>	<b>12,531</b>	<b>11,024</b>	<b>15.2</b>	<b>12.3</b>	<b>10.5</b>
Acer	80	50	115	0	0	0.1
Daewoo	27	21	21	0	0	0
Holtek	87	99	117	0	0	0.1
Hualon Microelectronics Corp.	98	43	41	0	0	0
Hyundai	4,130	2,246	1,936	3.7	2.2	1.8
LG Semicon	2,807	2,193	1,736	2.5	2.1	1.7
Macronix	271	354	365	0.2	0.3	0.3
Mosel Vitelic	502	398	296	0.5	0.4	0.3
Samsung	7,775	5,889	5,167	7	5.8	4.9
Silicon Integrated Systems	127	127	110	0.1	0.1	0.1
United Microelectronics	477	492	378	0.4	0.5	0.4
Vanguard	0	225	334	0	0.2	0.3
VIA	0	110	151	0	0.1	0.1
Winbond Electronics	442	284	257	0.4	0.3	0.2

Source: Dataquest (April 1998)

**Table 2-5**  
**Each Company's Vendor Revenue from Shipments of MOS Memory Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>55,287</b>	<b>38,064</b>	<b>30,978</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>13,641</b>	<b>9,656</b>	<b>8,375</b>	<b>24.7</b>	<b>25.4</b>	<b>27</b>
Advanced Micro Devices	719	711	708	1.3	1.9	2.3
Alliance Semiconductor	210	66	111	0.4	0.2	0.4
Atmel	478	793	670	0.9	2.1	2.2
Catalyst	48	54	70	0	0.1	0.2
Cypress Semiconductor	424	382	314	0.8	1	1
Dallas Semiconductor	56	0	0	0.1	0	0
Electronic Designs	43	51	10	0	0.1	0
Fairchild	0	0	80	0	0	0.3
G-Link USA	14	15	34	0	0	0.1
Harris Semiconductor	18	9	17	0	0	0
IBM	2,100	1,253	990	3.8	3.3	3.2
Integrated Device Technology	444	378	365	0.8	1	1.2
Integrated Silicon Solution	158	111	125	0.3	0.3	0.4
Intel	766	950	850	1.4	2.5	2.7
Logic Devices	5	2	2	0	0	0
Lucent Technologies	3	0	0	0	0	0
Microchip Technology	102	117	126	0.2	0.3	0.4
Micron Technology	2,601	1,558	1,704	4.7	4.1	5.5
Motorola	1,237	827	435	2.2	2.2	1.4
National Semiconductor	188	127	2	0.3	0.3	0
Paradigm	55	23	11	0	0	0
Quality Semiconductor	14	1	2	0	0	0
Ramtron	25	14	15	0	0	0
Seeq Technology	6	0	0	0	0	0
Silicon Storage Technology	35	91	75	0	0.2	0.2
Texas Instruments	3,754	1,984	1,524	6.8	5.2	4.9
WaferScale Integration	17	16	3	0	0	0
Xicor	114	123	122	0.2	0.3	0.4
Other Americas Companies	0	0	10	0	0	0
<b>Japanese Companies</b>	<b>24,062</b>	<b>15,708</b>	<b>11,827</b>	<b>43.5</b>	<b>41.3</b>	<b>38.2</b>
Fujitsu	2,589	1,656	1,508	4.7	4.4	4.9
Hitachi	5,132	3,514	2,209	9.3	9.2	7.1
Matsushita	492	300	315	0.9	0.8	1
Mitsubishi	2,547	1,614	1,435	4.6	4.2	4.6
NEC	5,353	3,913	3,215	9.7	10.3	10.4
Nippon Steel Semiconductor	549	198	145	1	0.5	0.5

**Table 2-5 (Continued)**  
**Each Company's Vendor Revenue from Shipments of MOS Memory Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Okii	1,228	541	448	2.2	1.4	1.4
Ricoh	6	3	8	0	0	0
Rohm	61	51	48	0.1	0.1	0.2
SANYO	257	302	162	0.5	0.8	0.5
Seiko Epson	41	19	15	0	0	0
Sharp	1,030	727	624	1.9	1.9	2
Sony	489	330	193	0.9	0.9	0.6
Toshiba	4,264	2,513	1,485	7.7	6.6	4.8
Yamaha	1	1	1	0	0	0
Other Japanese Companies	23	26	16	0	0	0
<b>European Companies</b>	<b>2,023</b>	<b>1,669</b>	<b>1,621</b>	<b>3.7</b>	<b>4.4</b>	<b>5.2</b>
Philips	0	0	73	0	0	0.2
SGS-Thomson	646	738	502	1.2	1.9	1.6
Siemens	1,353	911	1,028	2.4	2.4	3.3
TEMIC	24	20	18	0	0	0
<b>Asia/Pacific Companies</b>	<b>15,561</b>	<b>11,031</b>	<b>9,155</b>	<b>28.1</b>	<b>29</b>	<b>29.6</b>
Holtek	0	2	5	0	0	0
Hualon Microelectronics Corp.	54	23	20	0	0	0
Hyundai	4,116	2,236	1,931	7.4	5.9	6.2
LG Semicon	2,635	2,021	1,489	4.8	5.3	4.8
Macronix	236	288	300	0.4	0.8	1
Mosel Vitelic	502	398	296	0.9	1	1
Samsung	7,498	5,501	4,623	13.6	14.5	14.9
United Microelectronics	203	177	22	0.4	0.5	0
Vanguard	0	225	334	0	0.6	1.1
Winbond Electronics	317	160	135	0.6	0.4	0.4

Source: Dataquest (April 1998)

**Table 2-6**  
**Each Company's Vendor Revenue from Shipments of MOS Microcomponents**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>34,504</b>	<b>41,469</b>	<b>48,945</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>24,204</b>	<b>30,450</b>	<b>36,974</b>	<b>70.1</b>	<b>73.4</b>	<b>75.5</b>
8x8	44	51	60	0.1	0.1	0.1
ACC Microelectronics	40	45	50	0.1	0.1	0.1
Adaptec	124	214	238	0.4	0.5	0.5
Advanced Micro Devices	925	624	1,106	2.7	1.5	2.3
Alliance Semiconductor	10	10	9	0	0	0
Analog Devices	116	258	287	0.3	0.6	0.6
Appian Technology	9	10	11	0	0	0
ATI Technologies	0	130	260	0	0.3	0.5
Atmel	28	49	65	0	0.1	0.1
C-Cube	0	150	171	0	0.4	0.3
California Micro Devices	6	5	1	0	0	0
Chips & Technologies	138	150	131	0.4	0.4	0.3
Cirrus Logic	887	741	604	2.6	1.8	1.2
Cypress Semiconductor	50	64	6	0.1	0.2	0
Dallas Semiconductor	35	113	126	0.1	0.3	0.3
Digital	0	271	359	0	0.7	0.7
DSP Group	60	67	76	0.2	0.2	0.2
ESS	0	0	240	0	0	0.5
Harris Semiconductor	67	49	46	0.2	0.1	0
Hughes	3	3	0	0	0	0
IBM	703	889	803	2	2.1	1.6
IMP	1	0	0	0	0	0
Integrated Device Technology	63	70	64	0.2	0.2	0.1
Intel	12,397	16,831	20,896	35.9	40.6	42.7
LSI Logic	107	103	108	0.3	0.2	0.2
Lucent Technologies	510	635	888	1.5	1.5	1.8
Microchip Technology	169	213	296	0.5	0.5	0.6
Motorola	2,987	3,153	3,530	8.7	7.6	7.2
National Semiconductor	542	627	1,101	1.6	1.5	2.2
NeoMagic	0	0	120	0	0	0.2
Oak Technology	84	172	163	0.2	0.4	0.3
OPTi	167	119	68	0.5	0.3	0.1
PMC Sierra Semiconductor	47	62	70	0.1	0.1	0.1
Q Logic	61	67	73	0.2	0.2	0.1
Rockwell	738	1,226	1,351	2.1	3	2.8
S3	315	464	437	0.9	1.1	0.9

**Table 2-6 (Continued)**  
**Each Company's Vendor Revenue from Shipments of MOS Microcomponents**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Seeq Technology	21	12	19	0	0	0
Standard Microsystems	150	153	175	0.4	0.4	0.4
Sun Microsystems	0	170	550	0	0.4	1.1
Supertex	1	0	0	0	0	0
Symbios	85	102	129	0.2	0.2	0.3
Symphony Laboratories	15	17	19	0	0	0
Texas Instruments	1,254	1,550	1,728	3.6	3.7	3.5
Trident Microsystems	139	180	144	0.4	0.4	0.3
Tseng Labs	105	26	8	0.3	0	0
VLSI Technology	193	57	46	0.6	0.1	0
WaferScale Integration	18	30	46	0	0	0
Zilog	265	286	262	0.8	0.7	0.5
Zoran	0	29	34	0	0	0
<b>Japanese Companies</b>	<b>8,093</b>	<b>8,115</b>	<b>8,817</b>	<b>23.5</b>	<b>19.6</b>	<b>18</b>
Fuji Electric	3	3	3	0	0	0
Fujitsu	650	677	967	1.9	1.6	2
Hitachi	1,441	1,629	1,683	4.2	3.9	3.4
Matsushita	555	534	457	1.6	1.3	0.9
Mitsubishi	982	901	936	2.8	2.2	1.9
NEC	2,061	2,179	2,404	6	5.3	4.9
New JRC	4	5	5	0	0	0
Oki	233	175	164	0.7	0.4	0.3
Ricoh	75	76	75	0.2	0.2	0.2
Rohm	71	66	22	0.2	0.2	0
SANYO	187	164	229	0.5	0.4	0.5
Seiko Epson	28	22	24	0	0	0
Sharp	221	184	207	0.6	0.4	0.4
Sony	233	189	173	0.7	0.5	0.4
Toshiba	1,094	1,197	1,336	3.2	2.9	2.7
Yamaha	245	107	123	0.7	0.3	0.3
Other Japanese Companies	10	7	9	0	0	0
<b>European Companies</b>	<b>1,433</b>	<b>1,977</b>	<b>1,899</b>	<b>4.2</b>	<b>4.8</b>	<b>3.9</b>
EM Microelectronics Marin	2	4	4	0	0	0
GEC Plessey	10	10	11	0	0	0
Melexis	23	13	7	0	0	0
Micronas	0	0	50	0	0	0.1
Philips	662	1,085	791	1.9	2.6	1.6
SGS-Thomson	437	482	616	1.3	1.2	1.3

**Table 2-6 (Continued)**  
**Each Company's Vendor Revenue from Shipments of MOS Microcomponents**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Siemens	209	284	333	0.6	0.7	0.7
TCS	22	21	28	0	0	0
TEMIC	68	78	59	0.2	0.2	0.1
<b>Asia/Pacific Companies</b>	<b>774</b>	<b>927</b>	<b>1,255</b>	<b>2.2</b>	<b>2.2</b>	<b>2.6</b>
Acer	77	50	115	0.2	0.1	0.2
Daewoo	23	18	18	0	0	0
Holtek	34	44	24	0	0.1	0
Hyundai	1	1	1	0	0	0
LG Semicon	56	59	121	0.2	0.1	0.2
Macronix	35	20	29	0.1	0	0
Samsung	87	99	237	0.3	0.2	0.5
Silicon Integrated Systems	127	127	110	0.4	0.3	0.2
United Microelectronics	274	315	356	0.8	0.8	0.7
VIA	0	110	151	0	0.3	0.3
Winbond Electronics	60	84	93	0.2	0.2	0.2

Source: Dataquest (April 1998)

**Table 2-7**  
**Each Company's Vendor Revenue from Shipments of MOS Digital Logic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>20,619</b>	<b>22,676</b>	<b>24,757</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>9,134</b>	<b>10,615</b>	<b>12,065</b>	<b>44.3</b>	<b>46.8</b>	<b>48.7</b>
Actel	109	149	156	0.5	0.7	0.6
Advanced Micro Devices	420	435	309	2	1.9	1.2
Allegro MicroSystems	0	7	9	0	0	0
Altera	402	497	631	1.9	2.2	2.5
Analog Devices	0	14	19	0	0	0
Applied Micro Circuits Corp.	25	23	33	0.1	0.1	0.1
Atmel	67	182	184	0.3	0.8	0.7
Cherry Semiconductor	0	0	11	0	0	0
Chip Express	0	25	31	0	0.1	0.1
Crosspoint Solutions	2	2	1	0	0	0
Cypress Semiconductor	79	70	176	0.4	0.3	0.7
Dallas Semiconductor	137	117	125	0.7	0.5	0.5
Eteq Microsystems	7	4	4	0	0	0
Exar	16	24	33	0	0.1	0.1
Fairchild	0	0	227	0	0	0.9
Gennum	0	0	9	0	0	0
Gould AMI	72	95	194	0.3	0.4	0.8
Harris Semiconductor	108	140	146	0.5	0.6	0.6
Hewlett-Packard	342	380	466	1.7	1.7	1.9
Hughes	17	36	38	0	0.2	0.2
ISD	0	0	48	0	0	0.2
IBM	719	1,058	1,598	3.5	4.7	6.5
IMI	30	39	36	0.1	0.2	0.1
IMP	11	5	0	0	0	0
Integrated Circuit Systems	52	63	77	0.3	0.3	0.3
Integrated Device Technology	110	106	107	0.5	0.5	0.4
International CMOS Technology	16	12	5	0	0	0
Lattice	186	200	242	0.9	0.9	1
Logic Devices	12	12	12	0	0	0
LSI Logic	1,162	1,136	1,182	5.6	5	4.8
Lucent Technologies	687	1,080	1,486	3.3	4.8	6
Micrel	7	6	0	0	0	0
Micro Linear	0	3	11	0	0	0
Mitel	0	24	15	0	0.1	0
Motorola	1,386	1,133	938	6.7	5	3.8
National Semiconductor	263	293	149	1.3	1.3	0.6

**Table 2-7 (Continued)**  
**Each Company's Vendor Revenue from Shipments of MOS Digital Logic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
PMC Sierra Semiconductor	0	25	28	0	0.1	0.1
Quality Semiconductor	32	44	45	0.2	0.2	0.2
QuickLogic	16	25	29	0	0.1	0.1
Raytheon	0	7	28	0	0	0.1
Rockwell	6	4	5	0	0	0
Supertex	5	5	5	0	0	0
Symbios	208	356	289	1	1.6	1.2
Texas Instruments	1,317	1,416	1,552	6.4	6.2	6.3
Vitesse	0	0	53	0	0	0.2
VLSI Technology	479	615	667	2.3	2.7	2.7
WaferScale Integration	1	2	1	0	0	0
Xilinx	520	566	612	2.5	2.5	2.5
Other Americas Companies	0	40	43	0	0.2	0.2
<b>Japanese Companies</b>	<b>9,522</b>	<b>9,538</b>	<b>9,953</b>	<b>46.2</b>	<b>42.1</b>	<b>40.2</b>
Fuji Electric	43	38	34	0.2	0.2	0.1
Fujitsu	1,178	1,138	1,270	5.7	5	5.1
Hitachi	655	852	703	3.2	3.8	2.8
Matsushita	632	588	536	3.1	2.6	2.2
Mitsubishi	425	380	441	2.1	1.7	1.8
NEC	1,987	2,423	2,701	9.6	10.7	10.9
New JRC	36	23	24	0.2	0.1	0
Oki	450	387	386	2.2	1.7	1.6
Ricoh	94	39	20	0.5	0.2	0
Rohm	244	210	264	1.2	0.9	1.1
SANYO	528	479	577	2.6	2.1	2.3
Seiko Epson	228	201	152	1.1	0.9	0.6
Sharp	600	504	501	2.9	2.2	2
Sony	581	531	662	2.8	2.3	2.7
Toshiba	1,562	1,476	1,467	7.6	6.5	5.9
Yamaha	170	181	113	0.8	0.8	0.5
Other Japanese Companies	109	88	102	0.5	0.4	0.4
<b>European Companies</b>	<b>1,475</b>	<b>1,950</b>	<b>2,125</b>	<b>7.2</b>	<b>8.6</b>	<b>8.6</b>
Alcatel Microelectronics	35	179	204	0.2	0.8	0.8
Austria Mikro Systeme	68	133	124	0.3	0.6	0.5
Elmos	19	7	9	0	0	0
EM Microelectronics Marin	0	25	26	0	0.1	0.1
Ericsson	19	19	30	0	0	0.1
GEC Plessey	154	186	186	0.7	0.8	0.8



**Table 2-7 (Continued)**  
**Each Company's Vendor Revenue from Shipments of MOS Digital Logic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Melexis	0	9	9	0	0	0
Micronas	0	33	170	0	0.1	0.7
Philips	756	773	755	3.7	3.4	3
Robert Bosch	0	0	15	0	0	0
SGS-Thomson	235	431	438	1.1	1.9	1.8
Siemens	29	31	23	0.1	0.1	0
TCS	19	28	40	0	0.1	0.2
TEMIC	73	96	94	0.4	0.4	0.4
Zetex	0	0	2	0	0	0
<b>Asia/Pacific Companies</b>	<b>488</b>	<b>573</b>	<b>614</b>	<b>2.4</b>	<b>2.5</b>	<b>2.5</b>
Acer	3	0	0	0	0	0
Daewoo	4	3	3	0	0	0
Holtek	53	53	88	0.3	0.2	0.4
Hualon Microelectronics Corp.	44	20	21	0.2	0	0
Hyundai	13	9	4	0	0	0
LG Semicon	116	113	126	0.6	0.5	0.5
Macronix	0	46	36	0	0.2	0.1
Samsung	190	289	307	0.9	1.3	1.2
Winbond Electronics	65	40	29	0.3	0.2	0.1

Source: Dataquest (April 1998)

**Table 2-8**  
**Each Company's Vendor Revenue from Shipments of Analog-Monolithic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>17,616</b>	<b>18,235</b>	<b>21,652</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>7,294</b>	<b>8,013</b>	<b>9,929</b>	<b>41.4</b>	<b>43.9</b>	<b>45.9</b>
Advanced Micro Devices	173	115	190	1	0.6	0.9
Allegro MicroSystems	144	159	144	0.8	0.9	0.7
Anadigics	0	0	97	0	0	0.4
Analog Devices	809	946	1,064	4.6	5.2	4.9
Applied Micro Circuits Corp.	5	3	3	0	0	0
Atmel	16	0	31	0	0	0.1
Burr-Brown	126	157	165	0.7	0.9	0.8
California Micro Devices	7	3	0	0	0	0
Cherry Semiconductor	87	100	101	0.5	0.5	0.5
Cirrus Logic	116	150	276	0.7	0.8	1.3
Dallas Semiconductor	0	47	53	0	0.3	0.2
Elantec	22	32	36	0.1	0.2	0.2
ESS	0	0	5	0	0	0
Exar	131	72	69	0.7	0.4	0.3
Gennum	32	37	30	0.2	0.2	0.1
Harris Semiconductor	260	195	258	1.5	1.1	1.2
Honeywell	27	30	30	0.2	0.2	0.1
Hughes	16	0	0	0	0	0
IMI	5	0	0	0	0	0
IMP	42	30	19	0.2	0.2	0
Integrated Circuit Systems	45	16	18	0.3	0	0
Intel	9	0	0	0	0	0
International Rectifier	18	27	31	0.1	0.1	0.1
Level One Communications	78	112	127	0.4	0.6	0.6
Linear Technology	305	365	419	1.7	2	1.9
Linfinitiy	47	48	53	0.3	0.3	0.2
Lucent Technologies	284	235	105	1.6	1.3	0.5
Maxim	185	383	463	1.1	2.1	2.1
Micrel	19	18	104	0.1	0	0.5
Micro Linear	54	51	51	0.3	0.3	0.2
Mitel	68	83	128	0.4	0.5	0.6
Motorola	1,031	1,200	1,418	5.9	6.6	6.5
National Semiconductor	1,034	1,015	1,358	5.9	5.6	6.3
Optek	8	9	20	0	0	0
PMC Sierra Semiconductor	96	101	116	0.5	0.6	0.5
Raytheon	93	96	85	0.5	0.5	0.4

**Table 2-8 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Analog-Monolithic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Rockwell	0	121	131	0	0.7	0.6
Seeq Technology	0	20	12	0	0.1	0
Semtech	19	42	90	0.1	0.2	0.4
Solitron	0	1	1	0	0	0
Supertex	13	12	12	0	0	0
Symbios	102	0	0	0.6	0	0
Telcom-	17	18	56	0	0	0.3
Texas Instruments	934	1,684	2,195	5.3	9.2	10.1
TriQuint	0	0	72	0	0	0.3
Unitrode	103	98	118	0.6	0.5	0.5
Vitesse	0	0	65	0	0	0.3
VTC	155	172	110	0.9	0.9	0.5
<b>Japanese Companies</b>	<b>5,704</b>	<b>5,210</b>	<b>5,800</b>	<b>32.4</b>	<b>28.6</b>	<b>26.8</b>
Fuji Electric	29	23	24	0.2	0.1	0.1
Fujitsu	315	291	327	1.8	1.6	1.5
Hitachi	355	409	376	2	2.2	1.7
Matsushita	639	547	555	3.6	3	2.6
Mitsubishi	455	397	444	2.6	2.2	2.1
NEC	641	624	612	3.6	3.4	2.8
New JRC	183	160	198	1	0.9	0.9
Oki	28	18	17	0.2	0	0
Ricoh	38	50	60	0.2	0.3	0.3
Rohm	423	357	535	2.4	2	2.5
Sanken	0	0	70	0	0	0.3
SANYO	894	780	850	5.1	4.3	3.9
Seiko Epson	16	14	14	0	0	0
Sharp	105	92	98	0.6	0.5	0.5
Sony	554	452	513	3.1	2.5	2.4
Toshiba	915	909	1,020	5.2	5	4.7
Yamaha	28	6	2	0.2	0	0
Other Japanese Companies	49	50	85	0.3	0.3	0.4
<b>European Companies</b>	<b>4,213</b>	<b>4,577</b>	<b>5,390</b>	<b>23.9</b>	<b>25.1</b>	<b>24.9</b>
Alcatel Microelectronics	144	11	11	0.8	0	0
Austria Mikro Systeme	81	7	6	0.5	0	0
EM Microelectronics Marin	75	56	59	0.4	0.3	0.3
Ericsson	50	87	100	0.3	0.5	0.5
GEC Plessey	155	95	71	0.9	0.5	0.3
Melexis	8	12	6	0	0	0

**Table 2-8 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Analog-Monolithic Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
Micronas	33	0	10	0.2	0	0
Philips	1,257	1,291	1,717	7.1	7.1	7.9
Robert Bosch	0	0	140	0	0	0.6
SGS-Thomson	1,483	1,875	1,891	8.4	10.3	8.7
Siemens	692	980	1,082	3.9	5.4	5
TCS	24	9	2	0.1	0	0
TEMIC	177	153	290	1	0.8	1.3
Zetex	4	1	5	0	0	0
<b>Asia/Pacific Companies</b>	<b>405</b>	<b>435</b>	<b>533</b>	<b>2.3</b>	<b>2.4</b>	<b>2.5</b>
Daewoo	22	24	29	0.1	0.1	0.1
Hualon Microelectronics Corp.	9	4	5	0	0	0
Hyundai	2	1	3	0	0	0
Korean Electronic Co.	45	51	60	0.3	0.3	0.3
LG Semicon	42	40	48	0.2	0.2	0.2
Samsung	236	260	322	1.3	1.4	1.5
Winbond Electronics	49	55	66	0.3	0.3	0.3

Source: Dataquest (April 1998)

**Table 2-9**  
**Each Company's Vendor Revenue from Shipments of Total Discrete Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>14,314</b>	<b>13,474</b>	<b>14,255</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>3,720</b>	<b>3,416</b>	<b>3,391</b>	<b>26</b>	<b>25.4</b>	<b>23.8</b>
Allegro MicroSystems	29	19	2	0.2	0.1	0
Fairchild	0	0	141	0	0	1
General Semiconductor	413	362	370	2.9	2.7	2.6
Harris Semiconductor	228	232	230	1.6	1.7	1.6
Hewlett-Packard	146	140	126	1	1	0.9
International Rectifier	468	493	480	3.3	3.7	3.4
Ixys	65	66	69	0.5	0.5	0.5
Microsemi	118	146	156	0.8	1.1	1.1
Motorola	1,650	1,452	1,446	11.5	10.8	10.1
National Semiconductor	164	157	135	1.1	1.2	0.9
Optek	1	1	0	0	0	0
Powerex	98	98	98	0.7	0.7	0.7
Raytheon	13	13	14	0	0	0
Semtech	29	24	10	0.2	0.2	0
Solitron	6	5	5	0	0	0
Supertex	16	16	17	0.1	0.1	0.1
Teccor Electronics	68	83	92	0.5	0.6	0.6
Texas Instruments	16	28	0	0.1	0.2	0
<b>Japanese Companies</b>	<b>7,142</b>	<b>6,774</b>	<b>7,187</b>	<b>49.9</b>	<b>50.3</b>	<b>50.4</b>
Fuji Electric	468	401	356	3.3	3	2.5
Fujitsu	283	290	319	2	2.2	2.2
Hitachi	889	977	949	6.2	7.3	6.7
Matsushita	631	565	577	4.4	4.2	4
Mitsubishi	479	452	460	3.3	3.4	3.2
NEC	831	818	885	5.8	6.1	6.2
New JRC	2	3	3	0	0	0
Oki	12	11	12	0	0	0
Rohm	771	681	827	5.4	5.1	5.8
Sanken	398	328	434	2.8	2.4	3
SANYO	488	441	478	3.4	3.3	3.4
Shindengen Electric	301	277	266	2.1	2.1	1.9
Sony	53	43	39	0.4	0.3	0.3
Toshiba	1,428	1,390	1,484	10	10.3	10.4
Other Japanese Companies	40	42	98	0.3	0.3	0.7

**Table 2-9 (Continued)**  
**Each Company's Vendor Revenue from Shipments of Total Discrete Worldwide**  
**(Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>European Companies</b>	<b>2,915</b>	<b>2,784</b>	<b>3,102</b>	<b>20.4</b>	<b>20.7</b>	<b>21.8</b>
Ericsson	20	28	30	0.1	0.2	0.2
Eupec	120	160	111	0.8	1.2	0.8
Fagor	38	0	32	0.3	0	0.2
GEC Plessey	36	35	27	0.3	0.3	0.2
Melexis	2	0	0	0	0	0
Micronas	0	0	55	0	0	0.4
Philips	1,056	941	1,024	7.4	7	7.2
Power Innovations	0	0	29	0	0	0.2
Robert Bosch	0	0	85	0	0	0.6
Semikron	125	109	116	0.9	0.8	0.8
SGS-Thomson	591	586	572	4.1	4.3	4
Siemens	435	452	554	3	3.4	3.9
TCS	1	0	31	0	0	0.2
TEMIC	321	353	281	2.2	2.6	2
Zetex	51	52	86	0.4	0.4	0.6
Other European Companies	65	68	69	0.5	0.5	0.5
<b>Asia/Pacific Companies</b>	<b>537</b>	<b>500</b>	<b>575</b>	<b>3.8</b>	<b>3.7</b>	<b>4</b>
Korean Electronic Co.	220	193	220	1.5	1.4	1.5
Samsung	317	307	355	2.2	2.3	2.5

Source: Dataquest (April 1998)

**Table 2-10**  
**Each Company's Vendor Revenue from Shipments of Total Optical Semiconductors**  
**Worldwide (Millions of U.S. Dollars)**

	Revenue			Market Share (%)		
	1995	1996	1997	1995	1996	1997
<b>Worldwide Companies</b>	<b>4,812</b>	<b>4,915</b>	<b>5,339</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Americas Companies</b>	<b>547</b>	<b>824</b>	<b>996</b>	<b>11.4</b>	<b>16.8</b>	<b>18.7</b>
CID Technologies	5	6	6	0.1	0.1	0.1
Eastman Kodak	3	3	3	0	0	0
Hewlett-Packard	160	425	433	3.3	8.6	8.1
Honeywell	37	41	38	0.8	0.8	0.7
IC Sensors	6	7	7	0.1	0.1	0.1
Lucent Technologies	81	90	273	1.7	1.8	5.1
Mitel	0	22	16	0	0.4	0.3
Motorola	50	40	36	1	0.8	0.7
Optek	53	59	53	1.1	1.2	1
Quality Technologies	61	52	54	1.3	1.1	1
Spectra Diode Labs	15	17	17	0.3	0.3	0.3
Texas Instruments	43	62	60	0.9	1.3	1.1
Other Americas Companies	33	0	0	0.7	0	0
<b>Japanese Companies</b>	<b>3,735</b>	<b>3,542</b>	<b>3,756</b>	<b>77.6</b>	<b>72.1</b>	<b>70.4</b>
Fujitsu	168	151	168	3.5	3.1	3.1
Hitachi	84	121	116	1.7	2.5	2.2
Matsushita	496	450	388	10.3	9.2	7.3
Mitsubishi	151	144	185	3.1	2.9	3.5
NEC	202	256	323	4.2	5.2	6
New JRC	12	9	0	0.2	0.2	0
Oki	28	28	32	0.6	0.6	0.6
Rohm	286	293	357	5.9	6	6.7
Sanken	52	40	36	1.1	0.8	0.7
SANYO	167	148	175	3.5	3	3.3
Sharp	636	617	715	13.2	12.6	13.4
Sony	382	373	394	7.9	7.6	7.4
Stanley	301	0	294	6.3	0	5.5
Toshiba	623	471	429	12.9	9.6	8
Other Japanese Companies	147	441	144	3.1	9	2.7
<b>European Companies</b>	<b>504</b>	<b>517</b>	<b>555</b>	<b>10.5</b>	<b>10.5</b>	<b>10.4</b>
Ericsson	16	23	20	0.3	0.5	0.4
Siemens	314	339	384	6.5	6.9	7.2
TCS	34	25	22	0.7	0.5	0.4
TEMIC	110	113	114	2.3	2.3	2.1
Zetex	1	1	0	0	0	0
Other European Companies	15	16	15	0.3	0.3	0.3
<b>Asia/Pacific Companies</b>	<b>26</b>	<b>32</b>	<b>32</b>	<b>0.5</b>	<b>0.7</b>	<b>0.6</b>
Korean Electronic Co.	22	24	20	0.5	0.5	0.4
Samsung	4	8	12	0	0.2	0.2

Source: Dataquest (April 1998)

**Table 2-11**  
**Top 40 Total Market Vendor Revenue from Shipments of Total Semiconductors**  
**Worldwide (Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
1	1	Intel	17,781	21,746	22.3	14.8
2	2	NEC	10,428	10,222	-2	6.9
3	3	Motorola	8,076	8,067	-0.1	5.5
6	4	Texas Instruments	7,064	7,352	4.1	5
5	5	Toshiba	8,065	7,253	-10.1	4.9
4	6	Hitachi	8,071	6,298	-22	4.3
7	7	Samsung	6,464	5,856	-9.4	4
8	8	Fujitsu	4,427	4,622	4.4	3.1
9	9	Philips	4,220	4,440	5.2	3
10	10	SGS-Thomson	4,112	4,019	-2.3	2.7
11	11	Mitsubishi	4,100	3,925	-4.3	2.7
13	12	Siemens	3,029	3,441	13.6	2.3
12	13	IBM	3,200	3,391	6	2.3
14	14	Matsushita	3,003	2,847	-5.2	1.9
20	15	Lucent Technologies	2,110	2,762	30.9	1.9
16	16	National Semiconductor	2,380	2,759	15.9	1.9
15	17	SANYO	2,491	2,471	-0.8	1.7
22	18	Advanced Micro Devices	1,947	2,341	20.2	1.6
19	19	Sharp	2,124	2,145	1	1.5
23	20	Rohm	1,731	2,053	18.6	1.4
21	21	Sony	1,983	1,974	-0.5	1.3
17	22	Hyundai	2,247	1,939	-13.7	1.3
18	23	LG Semicon	2,243	1,792	-20.1	1.2
24	24	Micron Technology	1,558	1,704	9.4	1.2
25	25	Rockwell	1,351	1,487	10.1	1
26	26	Analog Devices	1,260	1,370	8.7	0.9
27	27	LSI Logic	1,239	1,290	4.1	0.9
28	28	Oki	1,177	1,062	-9.8	0.7
30	29	Hewlett-Packard	945	1,025	8.5	0.7
29	30	Atmel	1,024	950	-7.2	0.6
31	31	Cirrus Logic	891	880	-1.2	0.6
32	32	TEMIC	813	856	5.3	0.6
33	33	VLSI Technology	672	713	6.1	0.5
34	34	Harris Semiconductor	629	697	10.8	0.5
40	35	Altera	497	631	27	0.4
36	36	Xilinx	566	612	8.1	0.4
73	37	Sun Microsystems	170	550	223.5	0.4
35	38	Sanken	622	540	-13.2	0.4



**Table 2-11 (Continued)**  
**Top 40 Total Market Vendor Revenue from Shipments of Total Semiconductors**  
**Worldwide (Millions of U.S. Dollars)**

<b>1996 Rank</b>	<b>1997 Rank</b>		<b>1996 Revenue</b>	<b>1997 Revenue</b>	<b>Percentage Change</b>	<b>1997 Market Share (%)</b>
37	39	Integrated Device Technology	554	536	-3.2	0.4
38	40	International Rectifier	520	511	-1.7	0.3
		All Others	16,366	18,036	10.2	12.3
		<b>Americas Companies</b>	<b>64,076</b>	<b>72,339</b>	<b>12.9</b>	<b>49.2</b>
		<b>Japanese Companies</b>	<b>50,884</b>	<b>47,825</b>	<b>-6</b>	<b>32.5</b>
		<b>European Companies</b>	<b>13,682</b>	<b>14,809</b>	<b>8.2</b>	<b>10.1</b>
		<b>Asia/Pacific Companies</b>	<b>13,508</b>	<b>12,192</b>	<b>-9.7</b>	<b>8.3</b>
		<b>Total Market</b>	<b>142,150</b>	<b>147,165</b>	<b>3.5</b>	<b>100</b>

Source: Dataquest (April 1998)

**Table 2-12**  
**Top 40 Total Market Vendor Revenue from Shipments of Total ICs Worldwide**  
**(Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
1	1	Intel	17,781	21,746	22.3	17
2	2	NEC	9,354	9,014	-3.6	7.1
3	3	Texas Instruments	6,974	7,292	4.6	5.7
5	4	Motorola	6,584	6,585	0	5.2
7	5	Samsung	6,149	5,489	-10.7	4.3
6	6	Toshiba	6,204	5,340	-13.9	4.2
4	7	Hitachi	6,973	5,233	-25	4.1
8	8	Fujitsu	3,986	4,135	3.7	3.2
9	9	SGS-Thomson	3,526	3,447	-2.2	2.7
11	10	Philips	3,279	3,416	4.2	2.7
12	11	IBM	3,200	3,391	6	2.7
10	12	Mitsubishi	3,504	3,280	-6.4	2.6
16	13	National Semiconductor	2,223	2,624	18	2.1
15	14	Siemens	2,238	2,503	11.8	2
17	15	Lucent Technologies	2,020	2,489	23.2	2
19	16	Advanced Micro Devices	1,947	2,341	20.2	1.8
13	17	Hyundai	2,247	1,939	-13.7	1.5
18	18	Matsushita	1,988	1,882	-5.3	1.5
20	19	SANYO	1,902	1,818	-4.4	1.4
14	20	LG Semicon	2,243	1,792	-20.1	1.4
22	21	Micron Technology	1,558	1,704	9.4	1.3
21	22	Sony	1,567	1,541	-1.7	1.2
24	23	Rockwell	1,351	1,487	10.1	1.2
23	24	Sharp	1,507	1,430	-5.1	1.1
25	25	Analog Devices	1,260	1,370	8.7	1.1
26	26	LSI Logic	1,239	1,290	4.1	1
27	27	Oki	1,138	1,018	-10.5	0.8
28	28	Atmel	1,024	950	-7.2	0.7
29	29	Cirrus Logic	891	880	-1.2	0.7
30	30	Rohm	757	869	14.8	0.7
31	31	VLSI Technology	672	713	6.1	0.6
35	32	Altera	497	631	27	0.5
32	33	Xilinx	566	612	8.1	0.5
68	34	Sun Microsystems	170	550	223.5	0.4
33	35	Integrated Device Technology	554	536	-3.2	0.4
34	36	Cypress Semiconductor	516	496	-3.9	0.4
40	37	Harris Semiconductor	397	467	17.6	0.4
42	38	Hewlett-Packard	380	466	22.6	0.4

**Table 2-12 (Continued)****Top 40 Total Market Vendor Revenue from Shipments of Total ICs Worldwide  
(Millions of U.S. Dollars)**

<b>1996 Rank</b>	<b>1997 Rank</b>		<b>1996 Revenue</b>	<b>1997 Revenue</b>	<b>Percentage Change</b>	<b>1997 Market Share (%)</b>
41	39	Maxim	387	463	19.6	0.4
45	40	TEMIC	347	461	32.9	0.4
		All Others	12,661	13,881	9.6	10.9
		Americas Companies	59,836	67,952	13.6	53.3
		Japanese Companies	40,568	36,882	-9.1	28.9
		European Companies	10,381	11,152	7.4	8.7
		Asia/Pacific Companies	12,976	11,585	-10.7	9.1
		Total Market	123,761	127,571	3.1	100

Source: Dataquest (April 1998)

**Table 2-13**  
**Top 20 Total Market Vendor Revenue from Shipments of Bipolar Digital Worldwide**  
**(Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
2	1	Texas Instruments	340	293	-13.8	23.6
3	2	Motorola	271	264	-2.6	21.3
1	3	Hitachi	451	262	-41.9	21.1
5	4	NEC	90	82	-8.9	6.6
7	5	Philips	90	80	-11.1	6.5
6	6	Fujitsu	90	63	-30	5.1
11	7	Siemens	32	37	15.6	3
8	8	Toshiba	73	32	-56.2	2.6
10	9	Advanced Micro Devices	62	28	-54.8	2.3
13	10	Mitsubishi	25	24	-4	1.9
NA	11	Mosel Vitelic	0	20	NA	1.6
14	12	Matsushita	19	19	0	1.5
4	13	National Semiconductor	161	14	-91.3	1.1
9	14	Lucent Technologies	70	10	-85.7	0.8
17	15	LG Semicon	10	8	-20	0.6
18	16	Oki	4	3	-25	0.2
12	17	Applied Micro Circuits Corp.	30	0	-100	0
15	18	Raytheon	15	0	-100	0
16	19	GEC Plessey	12	0	-100	0
19	20	Harris Semiconductor	4	0	-100	0
		All Others	-	-	NA	0
		<b>Americas Companies</b>	<b>953</b>	<b>609</b>	<b>-36.1</b>	<b>49.2</b>
		<b>Japanese Companies</b>	<b>752</b>	<b>485</b>	<b>-35.5</b>	<b>39.1</b>
		<b>European Companies</b>	<b>134</b>	<b>117</b>	<b>-12.7</b>	<b>9.4</b>
		<b>Asia/Pacific Companies</b>	<b>10</b>	<b>28</b>	<b>180</b>	<b>2.3</b>
		<b>Total Market</b>	<b>1,849</b>	<b>1,239</b>	<b>-33</b>	<b>100</b>

NA = Not available

Source: Dataquest (April 1998)

**Table 2-14**  
**Top 40 Total Market Vendor Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
1	1	Intel	17,781	21,746	22.3	20.8
2	2	NEC	8,515	8,320	-2.3	7.9
4	3	Samsung	5,889	5,167	-12.3	4.9
6	4	Motorola	5,113	4,903	-4.1	4.7
7	5	Texas Instruments	4,950	4,804	-2.9	4.6
3	6	Hitachi	5,995	4,595	-23.4	4.4
5	7	Toshiba	5,186	4,288	-17.3	4.1
8	8	Fujitsu	3,471	3,745	7.9	3.6
9	9	IBM	3,200	3,391	6	3.2
10	10	Mitsubishi	2,895	2,812	-2.9	2.7
15	11	Lucent Technologies	1,715	2,374	38.4	2.3
14	12	Advanced Micro Devices	1,770	2,123	19.9	2
11	13	Hyundai	2,246	1,936	-13.8	1.8
12	14	LG Semicon	2,193	1,736	-20.8	1.7
17	15	Micron Technology	1,558	1,704	9.4	1.6
13	16	Philips	1,858	1,619	-12.9	1.5
16	17	SGS-Thomson	1,651	1,556	-5.8	1.5
22	18	Siemens	1,226	1,384	12.9	1.3
21	19	Rockwell	1,230	1,356	10.2	1.3
19	20	Sharp	1,415	1,332	-5.9	1.3
18	21	Matsushita	1,422	1,308	-8	1.2
20	22	LSI Logic	1,239	1,290	4.1	1.2
25	23	National Semiconductor	1,047	1,252	19.6	1.2
24	24	Sony	1,050	1,028	-2.1	1
23	25	Oki	1,103	998	-9.5	1
27	26	SANYO	945	968	2.4	0.9
26	27	Atmel	1,024	919	-10.3	0.9
29	28	VLSI Technology	672	713	6.1	0.7
33	29	Altera	497	631	27	0.6
30	30	Xilinx	566	612	8.1	0.6
28	31	Cirrus Logic	741	604	-18.5	0.6
60	32	Sun Microsystems	170	550	223.5	0.5
31	33	Integrated Device Technology	554	536	-3.2	0.5
32	34	Cypress Semiconductor	516	496	-3.9	0.5
38	35	Hewlett-Packard	380	466	22.6	0.4
35	36	S3	464	437	-5.8	0.4
40	37	Microchip Technology	330	422	27.9	0.4
36	38	Symbios	458	418	-8.7	0.4

**Table 2-14 (Continued)**  
**Top 40 Total Market Vendor Revenue from Shipments of MOS Digital ICs Worldwide**  
**(Millions of U.S. Dollars)**

<b>1996 Rank</b>	<b>1997 Rank</b>		<b>1996 Revenue</b>	<b>1997 Revenue</b>	<b>Percentage Change</b>	<b>1997 Market Share (%)</b>
34	39	United Microelectronics	492	378	-23.2	0.4
39	40	Macronix	354	365	3.1	0.3
		All Others	8,328	9,398	12.8	9
		<b>Americas Companies</b>	<b>50,721</b>	<b>57,414</b>	<b>13.2</b>	<b>54.8</b>
		<b>Japanese Companies</b>	<b>33,361</b>	<b>30,597</b>	<b>-8.3</b>	<b>29.2</b>
		<b>European Companies</b>	<b>5,596</b>	<b>5,645</b>	<b>0.9</b>	<b>5.4</b>
		<b>Asia/Pacific Companies</b>	<b>12,531</b>	<b>11,024</b>	<b>-12</b>	<b>10.5</b>
		<b>Total Market</b>	<b>102,209</b>	<b>104,680</b>	<b>2.4</b>	<b>100</b>

Source: Dataquest (April 1998)

**Table 2-15**  
**Top 40 Total Market Vendor Revenue from Shipments of MOS Memory Worldwide**  
**(Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
1	1	Samsung	5,501	4,623	-16	14.9
2	2	NEC	3,913	3,215	-17.8	10.4
3	3	Hitachi	3,514	2,209	-37.1	7.1
5	4	Hyundai	2,236	1,931	-13.6	6.2
10	5	Micron Technology	1,558	1,704	9.4	5.5
7	6	Texas Instruments	1,984	1,524	-23.2	4.9
8	7	Fujitsu	1,656	1,508	-8.9	4.9
6	8	LG Semicon	2,021	1,489	-26.3	4.8
4	9	Toshiba	2,513	1,485	-40.9	4.8
9	10	Mitsubishi	1,614	1,435	-11.1	4.6
13	11	Siemens	911	1,028	12.8	3.3
11	12	IBM	1,253	990	-21	3.2
12	13	Intel	950	850	-10.5	2.7
18	14	Advanced Micro Devices	711	708	-0.4	2.3
15	15	Atmel	793	670	-15.5	2.2
17	16	Sharp	727	624	-14.2	2
16	17	SGS-Thomson	738	502	-32	1.6
19	18	Oki	541	448	-17.2	1.4
14	19	Motorola	827	435	-47.4	1.4
22	20	Integrated Device Technology	378	365	-3.4	1.2
27	21	Vanguard	225	334	48.4	1.1
25	22	Matsushita	300	315	5	1
21	23	Cypress Semiconductor	382	314	-17.8	1
26	24	Macronix	288	300	4.2	1
20	25	Mosel Vitelic	398	296	-25.6	1
23	26	Sony	330	193	-41.5	0.6
24	27	SANYO	302	162	-46.4	0.5
28	28	Nippon Steel Semiconductor	198	145	-26.8	0.5
30	29	Winbond Electronics	160	135	-15.6	0.4
33	30	Microchip Technology	117	126	7.7	0.4
34	31	Integrated Silicon Solution	111	125	12.6	0.4
32	32	Xicor	123	122	-0.8	0.4
36	33	Alliance Semiconductor	66	111	68.2	0.4
NA	34	Fairchild	0	80	NA	0.3
35	35	Silicon Storage Technology	91	75	-17.6	0.2
NA	36	Philips	0	73	NA	0.2
37	37	Catalyst	54	70	29.6	0.2
38	38	Rohm	51	48	-5.9	0.2

**Table 2-15 (Continued)****Top 40 Total Market Vendor Revenue from Shipments of MOS Memory Worldwide  
(Millions of U.S. Dollars)**

<b>1996 Rank</b>	<b>1997 Rank</b>		<b>1996 Revenue</b>	<b>1997 Revenue</b>	<b>Percentage Change</b>	<b>1997 Market Share (%)</b>
45	39	G-Link USA	15	34	126.7	0.1
29	40	United Microelectronics	177	22	-87.6	0
		All Others	337	155	-54	0.5
		<b>Americas Companies</b>	<b>9,656</b>	<b>8,375</b>	<b>-13.3</b>	<b>27</b>
		<b>Japanese Companies</b>	<b>15,708</b>	<b>11,827</b>	<b>-24.7</b>	<b>38.2</b>
		<b>European Companies</b>	<b>1,669</b>	<b>1,621</b>	<b>-2.9</b>	<b>5.2</b>
		<b>Asia/Pacific Companies</b>	<b>11,031</b>	<b>9,155</b>	<b>-17</b>	<b>29.6</b>
		<b>Total Market</b>	<b>38,064</b>	<b>30,978</b>	<b>-18.6</b>	<b>100</b>

NA = Not available

Source: Dataquest (April 1998)



**Table 2-16**  
**Top 40 Total Market Vendor Revenue from Shipments of MOS Microcomponents**  
**Worldwide (Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
1	1	Intel	16,831	20,896	24.2	42.7
2	2	Motorola	3,153	3,530	12	7.2
3	3	NEC	2,179	2,404	10.3	4.9
5	4	Texas Instruments	1,550	1,728	11.5	3.5
4	5	Hitachi	1,629	1,683	3.3	3.4
6	6	Rockwell	1,226	1,351	10.2	2.8
7	7	Toshiba	1,197	1,336	11.6	2.7
15	8	Advanced Micro Devices	624	1,106	77.2	2.3
14	9	National Semiconductor	627	1,101	75.6	2.2
12	10	Fujitsu	677	967	42.8	2
9	11	Mitsubishi	901	936	3.9	1.9
13	12	Lucent Technologies	635	888	39.8	1.8
10	13	IBM	899	803	-9.7	1.6
8	14	Philips	1,085	791	-27.1	1.6
17	15	SGS-Thomson	482	616	27.8	1.3
11	16	Cirrus Logic	741	604	-18.5	1.2
31	17	Sun Microsystems	170	550	223.5	1.1
16	18	Matsushita	534	457	-14.4	0.9
18	19	S3	464	437	-5.8	0.9
22	20	Digital	271	359	32.5	0.7
19	21	United Microelectronics	315	356	13	0.7
21	22	Siemens	284	333	17.3	0.7
25	23	Microchip Technology	213	296	39	0.6
23	24	Analog Devices	258	287	11.2	0.6
20	25	Zilog	286	262	-8.4	0.5
37	26	ATI Technologies	130	260	100	0.5
NA	27	ESS	0	240	NA	0.5
24	28	Adaptec	214	238	11.2	0.5
45	29	Samsung	99	237	139.4	0.5
32	30	SANYO	164	229	39.6	0.5
27	31	Sharp	184	207	12.5	0.4
34	32	Standard Microsystems	153	175	14.4	0.4
26	33	Sony	189	173	-8.5	0.4
35	34	C-Cube	150	171	14	0.3
29	35	OkI	175	164	-6.3	0.3
30	36	Oak Technology	172	163	-5.2	0.3
41	37	VIA	110	151	37.3	0.3
28	38	Trident Microsystems	180	144	-20	0.3

**Table 2-16 (Continued)**  
**Top 40 Total Market Vendor Revenue from Shipments of MOS Microcomponents**  
**Worldwide (Millions of U.S. Dollars)**

<b>1996 Rank</b>	<b>1997 Rank</b>		<b>1996 Revenue</b>	<b>1997 Revenue</b>	<b>Percentage Change</b>	<b>1997 Market Share (%)</b>
36	39	Chips & Technologies	150	131	-12.7	0.3
44	40	Symbios	102	129	26.5	0.3
		All Others	2,076	2,056	-1	4.2
		<b>Americas Companies</b>	<b>30,450</b>	<b>36,974</b>	<b>21.4</b>	<b>75.5</b>
		<b>Japanese Companies</b>	<b>8,115</b>	<b>8,817</b>	<b>8.7</b>	<b>18</b>
		<b>European Companies</b>	<b>1,977</b>	<b>1,899</b>	<b>-3.9</b>	<b>3.9</b>
		<b>Asia/Pacific Companies</b>	<b>927</b>	<b>1,255</b>	<b>35.4</b>	<b>2.6</b>
		<b>Total Market</b>	<b>41,469</b>	<b>48,945</b>	<b>18</b>	<b>100</b>

NA = Not available

Source: Dataquest (April 1998)

**Table 2-17**  
**Top 40 Total Market Vendor Revenue from Shipments of MOS Digital Logic Worldwide**  
**(Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
1	1	NEC	2,423	2,701	11.5	10.9
8	2	IBM	1,058	1,598	51	6.5
3	3	Texas Instruments	1,416	1,552	9.6	6.3
7	4	Lucent Technologies	1,080	1,486	37.6	6
2	5	Toshiba	1,476	1,467	-0.6	5.9
4	6	Fujitsu	1,138	1,270	11.6	5.1
5	7	LSI Logic	1,136	1,182	4	4.8
6	8	Motorola	1,133	938	-17.2	3.8
10	9	Philips	773	755	-2.3	3
9	10	Hitachi	852	703	-17.5	2.8
11	11	VLSI Technology	615	667	8.5	2.7
14	12	Sony	531	662	24.7	2.7
16	13	Altera	497	631	27	2.5
13	14	Xilinx	566	612	8.1	2.5
17	15	SANYO	479	577	20.5	2.3
12	16	Matsushita	588	536	-8.8	2.2
15	17	Sharp	504	501	-0.6	2
22	18	Hewlett-Packard	380	466	22.6	1.9
21	19	Mitsubishi	380	441	16.1	1.8
19	20	SGS-Thomson	431	438	1.6	1.8
20	21	Oki	387	386	-0.3	1.6
18	22	Advanced Micro Devices	435	309	-29	1.2
25	23	Samsung	289	307	6.2	1.2
23	24	Symbios	356	289	-18.8	1.2
26	25	Rohm	210	264	25.7	1.1
28	26	Lattice	200	242	21	1
NA	27	Fairchild	0	227	NA	0.9
32	28	Alcatel Microelectronics	179	204	14	0.8
41	29	Gould AMI	95	194	104.2	0.8
29	30	GEC Plessey	186	186	0	0.8
30	31	Atmel	182	184	1.1	0.7
42	32	Cypress Semiconductor	70	176	151.4	0.7
52	33	Micronas	33	170	415.2	0.7
33	34	Actel	149	156	4.7	0.6
27	35	Seiko Epson	201	152	-24.4	0.6
24	36	National Semiconductor	293	149	-49.1	0.6
34	37	Harris Semiconductor	140	146	4.3	0.6
38	38	LG Semicon	113	126	11.5	0.5

Table 2-17 (Continued)

**Top 40 Total Market Vendor Revenue from Shipments of MOS Digital Logic Worldwide  
(Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
37	39	Dallas Semiconductor	117	125	6.8	0.5
36	40	Austria Mikro Systeme	133	124	-6.8	0.5
		All Others	1,452	1,458	0.4	5.9
		<b>Americas Companies</b>	<b>10,615</b>	<b>12,065</b>	<b>13.7</b>	<b>48.7</b>
		<b>Japanese Companies</b>	<b>9,538</b>	<b>9,953</b>	<b>4.4</b>	<b>40.2</b>
		<b>European Companies</b>	<b>1,950</b>	<b>2,125</b>	<b>9</b>	<b>8.6</b>
		<b>Asia/Pacific Companies</b>	<b>573</b>	<b>614</b>	<b>7.2</b>	<b>2.5</b>
		<b>Total Market</b>	<b>22,676</b>	<b>24,757</b>	<b>9.2</b>	<b>100</b>

NA = Not available

Source: Dataquest (April 1998)

**Table 2-18**  
**Top 40 Total Market Vendor Revenue from Shipments of Analog-Monolithic Worldwide**  
**(Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
2	1	Texas Instruments	1,684	2,195	30.3	10.1
1	2	SGS-Thomson	1,875	1,891	0.9	8.7
3	3	Philips	1,291	1,717	33	7.9
4	4	Motorola	1,200	1,418	18.2	6.5
5	5	National Semiconductor	1,015	1,358	33.8	6.3
6	6	Siemens	980	1,082	10.4	5
7	7	Analog Devices	946	1,064	12.5	4.9
8	8	Toshiba	909	1,020	12.2	4.7
9	9	SANYO	780	850	9	3.9
10	10	NEC	624	612	-1.9	2.8
11	11	Matsushita	547	555	1.5	2.6
17	12	Rohm	357	535	49.9	2.5
12	13	Sony	452	513	13.5	2.4
15	14	Maxim	383	463	20.9	2.1
14	15	Mitsubishi	397	444	11.8	2.1
16	16	Linear Technology	365	419	14.8	1.9
13	17	Hitachi	409	376	-8.1	1.7
18	18	Fujitsu	291	327	12.4	1.5
19	19	Samsung	260	322	23.8	1.5
26	20	TEMIC	153	290	89.5	1.3
27	21	Cirrus Logic	150	276	84	1.3
21	22	Harris Semiconductor	195	258	32.3	1.2
23	23	New JRC	160	198	23.8	0.9
29	24	Advanced Micro Devices	115	190	65.2	0.9
25	25	Burr-Brown	157	165	5.1	0.8
24	26	Allegro MicroSystems	159	144	-9.4	0.7
NA	27	Robert Bosch	0	140	NA	0.6
28	28	Rockwell	121	131	8.3	0.6
38	29	Mitel	83	128	54.2	0.6
30	30	Level One Communications	112	127	13.4	0.6
33	31	Unitrode	98	118	20.4	0.5
31	32	PMC Sierra Semiconductor	101	116	14.9	0.5
22	33	VTC	172	110	-36	0.5
20	34	Lucent Technologies	235	105	-55.3	0.5
59	35	Micrel	18	104	477.8	0.5
32	36	Cherry Semiconductor	100	101	1	0.5
37	37	Ericsson	87	100	14.9	0.5
36	38	Sharp	92	98	6.5	0.5

**Table 2-18 (Continued)**  
**Top 40 Total Market Vendor Revenue from Shipments of Analog-Monolithic Worldwide**  
**(Millions of U.S. Dollars)**

<b>1996 Rank</b>	<b>1997 Rank</b>		<b>1996 Revenue</b>	<b>1997 Revenue</b>	<b>Percentage Change</b>	<b>1997 Market Share (%)</b>
NA	39	Anadigics	0	97	NA	0.4
47	40	Semtech	42	90	114.3	0.4
		All Others	1,120	1,405	25.4	6.5
		<b>Americas Companies</b>	<b>8,013</b>	<b>9,929</b>	<b>23.9</b>	<b>45.9</b>
		<b>Japanese Companies</b>	<b>5,210</b>	<b>5,800</b>	<b>11.3</b>	<b>26.8</b>
		<b>European Companies</b>	<b>4,577</b>	<b>5,390</b>	<b>17.8</b>	<b>24.9</b>
		<b>Asia/Pacific Companies</b>	<b>435</b>	<b>533</b>	<b>22.5</b>	<b>2.5</b>
		<b>Total Market</b>	<b>18,235</b>	<b>21,652</b>	<b>18.7</b>	<b>100</b>

NA = Not available

Source: Dataquest (April 1998)

**Table 2-19**  
**Top 40 Total Market Vendor Revenue from Shipments of Total Discrete Worldwide**  
**(Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
2	1	Toshiba	1,390	1,484	6.8	10.4
1	2	Motorola	1,452	1,446	-0.4	10.1
4	3	Philips	941	1,024	8.8	7.2
3	4	Hitachi	977	949	-2.9	6.7
5	5	NEC	818	885	8.2	6.2
6	6	Rohm	681	827	21.4	5.8
8	7	Matsushita	565	577	2.1	4
7	8	SGS-Thomson	586	572	-2.4	4
10	9	Siemens	452	554	22.6	3.9
9	10	International Rectifier	493	480	-2.6	3.4
12	11	SANYO	441	478	8.4	3.4
11	12	Mitsubishi	452	460	1.8	3.2
16	13	Sanken	328	434	32.3	3
14	14	General Semiconductor	362	370	2.2	2.6
13	15	Fuji Electric	401	356	-11.2	2.5
17	16	Samsung	307	355	15.6	2.5
18	17	Fujitsu	290	319	10	2.2
15	18	TEMIC	353	281	-20.4	2
19	19	Shindengen Electric	277	266	-4	1.9
20	20	Harris Semiconductor	232	230	-0.9	1.6
21	21	Korean Electronic Co.	193	220	14	1.5
24	22	Microsemi	146	156	6.8	1.1
NA	23	Fairchild	0	141	NA	1
23	24	National Semiconductor	157	135	-14	0.9
25	25	Hewlett-Packard	140	126	-10	0.9
26	26	Semikron	109	116	6.4	0.8
22	27	Eupec	160	111	-30.6	0.8
27	28	Powerex	98	98	0	0.7
28	29	Teccor Electronics	83	92	10.8	0.6
32	30	Zetex	52	86	65.4	0.6
NA	31	Robert Bosch	0	85	NA	0.6
30	32	Ixys	66	69	4.5	0.5
NA	33	Micronas	0	55	NA	0.4
33	34	Sony	43	39	-9.3	0.3
NA	35	Fagor	0	32	NA	0.2
NA	36	TCS	0	31	NA	0.2
36	37	Ericsson	28	30	7.1	0.2
NA	38	Power Innovations	0	29	NA	0.2

**Table 2-19 (Continued)**  
**Top 40 Total Market Vendor Revenue from Shipments of Total Discrete Worldwide**  
**(Millions of U.S. Dollars)**

<b>1996 Rank</b>	<b>1997 Rank</b>		<b>1996 Revenue</b>	<b>1997 Revenue</b>	<b>Percentage Change</b>	<b>1997 Market Share (%)</b>
34	39	GEC Plessey	35	27	-22.9	0.2
39	40	Supertex	16	17	6.3	0.1
		All Others	350	213	-39.1	1.5
		Americas Companies	3,416	3,391	-0.7	23.8
		Japanese Companies	6,774	7,187	6.1	50.4
		European Companies	2,784	3,102	11.4	21.8
		Asia/Pacific Companies	500	575	15	4
		<b>Total Market</b>	<b>13,474</b>	<b>14,255</b>	<b>5.8</b>	<b>100</b>

NA = Not available

Source: Dataquest (April 1998)



**Table 2-20**  
**Top 33 Total Market Vendor Revenue from Shipments of Total Optical Semiconductors**  
**Worldwide (Millions of U.S. Dollars)**

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	Percentage Change	1997 Market Share (%)
1	1	Sharp	617	715	15.9	13.4
4	2	Hewlett-Packard	425	433	1.9	8.1
2	3	Toshiba	471	429	-8.9	8
5	4	Sony	373	394	5.6	7.4
3	5	Matsushita	450	388	-13.8	7.3
6	6	Siemens	339	384	13.3	7.2
7	7	Rohm	293	357	21.8	6.7
8	8	NEC	256	323	26.2	6
NA	9	Stanley	0	294	NA	5.5
14	10	Lucent Technologies	90	273	203.3	5.1
11	11	Mitsubishi	144	185	28.5	3.5
10	12	SANYO	148	175	18.2	3.3
9	13	Fujitsu	151	168	11.3	3.1
12	14	Hitachi	121	116	-4.1	2.2
13	15	TEMIC	113	114	0.9	2.1
15	16	Texas Instruments	62	60	-3.2	1.1
17	17	Quality Technologies	52	54	3.8	1
16	18	Optek	59	53	-10.2	1
18	19	Honeywell	41	38	-7.3	0.7
19	20	Motorola	40	36	-10	0.7
20	21	Sanken	40	36	-10	0.7
21	22	Oki	28	32	14.3	0.6
22	23	TCS	25	22	-12	0.4
23	24	Korean Electronic Co.	24	20	-16.7	0.4
24	25	Ericsson	23	20	-13	0.4
26	26	Spectra Diode Labs	17	17	0	0.3
25	27	Mitel	22	16	-27.3	0.3
28	28	Samsung	8	12	50	0.2
29	29	IC Sensors	7	7	0	0.1
30	30	CID Technologies	6	6	0	0.1
31	31	Eastman Kodak	3	3	0	0
27	32	New JRC	9	0	-100	0
32	33	Zetex	1	0	-100	0
		All Others	457	159	-65.2	3
		<b>Americas Companies</b>	<b>824</b>	<b>996</b>	<b>20.9</b>	<b>18.7</b>
		<b>Japanese Companies</b>	<b>3,542</b>	<b>3,756</b>	<b>6</b>	<b>70.4</b>
		<b>European Companies</b>	<b>517</b>	<b>555</b>	<b>7.4</b>	<b>10.4</b>
		<b>Asia/Pacific Companies</b>	<b>32</b>	<b>32</b>	<b>0</b>	<b>0.6</b>
		<b>Total Market</b>	<b>4,915</b>	<b>5,339</b>	<b>8.6</b>	<b>100</b>

NA = Not available

Source: Dataquest (April 1998)

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**For More Information...**

**Inquiry Hotline**

+1-408-468-8423

**Internet address**

[scndinquiry@dataquest.com](mailto:scndinquiry@dataquest.com)

**Via fax**

+1-408-954-1780

**Dataquest Interactive**

<http://www.dataquest.com>

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## **DATAQUEST WORLDWIDE OFFICES**

### **NORTH AMERICA**

#### **Worldwide Headquarters**

251 River Oaks Parkway  
San Jose, California 95134-1913  
United States  
Phone: 1-408-468-8000  
Facsimile: 1-408-954-1780

#### **East Coast Research Center**

Nine Technology Drive  
P.O. Box 5093  
Westborough, Massachusetts 01581-5093  
United States  
Phone: 1-508-871-5555  
Facsimile: 1-508-871-6262

#### **Dataquest Global Events**

3990 Westerly Place, Suite 100  
Newport Beach, California 92660  
United States  
Phone: 1-714-476-9117  
Facsimile: 1-714-476-9969

### **EUROPE**

#### **European Headquarters**

Tarnesis, The Glanty  
Egham, Surrey TW20 9AW  
United Kingdom  
Phone: +44 1784 431 611  
Facsimile: +44 1784 488 980

#### **Dataquest France**

Immeuble Défense Bergères  
345, avenue Georges Clémenceau  
TSA 40002  
92882 - Nanterre CTC Cedex 9  
France  
Phone: +33 1 41 35 13 00  
Facsimile: +33 1 41 35 13 13

#### **Dataquest Germany**

Martin-Kollar-Strasse 15  
D-81829 München  
Germany  
Phone: +49 89 42 70 4-0  
Facsimile: +49 89 42 70 4-270

### **JAPAN**

#### **Japan Headquarters**

Aobadai Hills 4-7-7  
Aobadai  
Meguro-ku, Tokyo 153  
Japan  
Phone: 81-3-3481-3670  
Facsimile: 81-3-3481-3644

### **ASIA/PACIFIC**

#### **Asia/Pacific Headquarters**

Suite 5904-7, Central Plaza  
18 Harbour Road, Wanchai  
Hong Kong  
Phone: 852-2824-6168  
Facsimile: 852-2824-6138

#### **Dataquest Korea**

Suite 2407, Trade Tower  
159 Samsung-dong, Kangnam-gu  
Seoul 135-729  
Korea  
Phone: 822-551-1331  
Facsimile: 822-551-1330

#### **Dataquest Taiwan**

11F-2, No. 188, Section 5  
Nan King East Road  
Taipei  
Taiwan, R.O.C.  
Phone: 8862-2756-0389  
Facsimile: 8862-2756-0663

#### **Dataquest Singapore**

6 Temasek Boulevard, #26-02/03  
Suntec City Tower 4  
Singapore 038986  
Phone: 65-333-6773  
Facsimile: 65-333-6768

#### **Dataquest Thailand**

12/F, Vanissa Building  
29 Soi Chidlom  
Ploenchit Road  
Patumwan, Bangkok 10330  
Thailand  
Phone: 662-655-0577  
Facsimile: 662-655-0576

#### **Dataquest Australia**

80 Alfred Street  
Milsons Point NSW 2061  
Australia  
Phone: 61-2-9941-4860  
Facsimile: 61-2-9941-4868

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