

# Semiconductors, Printed Circuit Boards, Other Electronic Components: 2003

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### SUMMARY OF FINDINGS

During 2003, the total value of shipments of semiconductors, printed circuit boards, and

other electronic components was \$103.0 billion. This represents a 1.8-percent decrease from the revised 2002 total of \$104.9 billion. The 2003 data include electron tubes and parts, \$2.2 billion, a decrease of 31.5 percent from 2002; printed circuit boards, \$5.0 billion, a decrease of 13.2 percent from 2002; semiconductors and related devices, \$62.2 billion, an increase of 8.0 percent over the revised total from 2002. Capacitors decreased 10.4 percent to \$1.2 billion; resistors decreased by 0.8 percent \$647.6 million; coils and transformers had a 16.5-percent decrease to \$963.7 million; electronic connectors had \$3.5 billion in 2003, compared to \$3.5 billion in 2002, an increase of 0.9 percent; and other electronic components decreased to \$27.4 billion from a revised 2002 total of \$31.8 billion, a decrease of 14.0 percent.

For general CIR information, explanation of general terms and historical note, see the appendix.

Address inquiries concerning these data to Investment Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call Philippe S.J. Morris, 301-763-4819.

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# U S C E N S U S B U R E A U

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Table 1. Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components by Class of Product: 1998 to 2003  
[Value in million of dollars]

Product class code	Product description	2003	2002	2001	2000	1999	1998
3344111	Transmittal, industrial, and special-purpose electron tubes (except X-ray).....	631.3	584.2	700.2	702.8	672.9	629.5
3344114	Receiving type electron tubes and cathode ray picture tubes.....	1,459.4	r/ 2,486.0	2,846.5	3,457.5	3,578.5	3,367.1
3344117	Electron tube parts.....	74.6	r/ 91.0	124.5	143.5	136.4	146.6
3344120	Printed circuit boards.....	5,004.9	5,763.5	8,910.9	11,891.8	9,149.9	8,473.2
3344131	Integrated microcircuits (semiconductor networks).....	54,587.8	r/ 49,726.3	46,337.1	73,663.7	62,868.4	57,643.5
3344134	Transistors.....	648.5	r/ 818.2	913.4	1,569.3	993.7	887.0
3344137	Diodes and rectifiers.....	392.4	r/ 370.1	402.6	620.6	1,038.3	907.6
334413A	Other semiconductor devices.....	6,533.5	6,632.3	7,631.9	9,757.0	11,745.4	11,055.8
3344140	Capacitors for electronic applications.....	1,198.6	1,338.0	1,733.9	2,786.1	2,035.1	1,946.9
3344150	Resistors.....	647.6	652.6	775.9	981.7	970.6	944.6
3344160	Coils, transformers, reactors, and chokes for electronic applications.....	963.7	1,154.4	1,362.4	1,718.8	1,422.5	1,368.3
3344171	Coaxial connectors.....	429.6	r/ 464.1	505.6	805.0	630.5	590.3
3344174	Cylindrical connectors.....	562.6	r/ 527.8	687.8	725.3	549.5	579.5
3344177	Rack and panel connectors.....	274.0	r/ 264.2	359.2	531.7	391.4	745.6
334417A	Printed circuit connectors.....	817.7	776.4	1,147.3	1,810.8	1,375.8	1,124.8
334417D	Other connectors, including parts.....	1,414.7	r/ 1,435.7	2,051.9	2,058.9	2,041.2	1,973.1
3344191	Filters (except microwave) and piezoelectric devices.....	585.3	726.1	984.0	1,167.9	857.5	797.5
3344194	Transducers, electrical/electronic input or output.....	1,247.2	1,203.3	1,330.5	1,519.3	1,330.7	1,372.7
3344197	Switches, mechanical types for electronic circuitry.....	769.3	835.6	827.7	902.6	883.4	882.5
334418B	Printed circuit assemblies.....	19,231.0	23,170.8	31,214.0	37,272.5	30,090.9	26,046.5
334419A	Microwave components and devices.....	1,395.9	r/ 1,510.6	1,847.8	2,435.1	1,621.6	1,580.7
334419E	All other electronic components, n.e.c. ....	4,131.2	r/ 4,365.8	6,173.1	8,331.6	7,275.7	7,322.4

n.e.c. Not elsewhere classified. r/Revised by 5 percent or more from previously published data.

Table 2. Quantity and Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2003 and 2002  
[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2003		2002	
			Quantity	Value	Quantity	Value
334411	Electron tubes.....	(NA)	(X)	2,165,389	(X)	3,161,136
3344111	Transmittal, industrial, and special-purpose electron tubes (except X-ray).....	28	(X)	631,346	(X)	584,167
	Power and special-purpose tubes:					
3344111105	High vacuum tubes, including triodes, multigrid external and internal anodes, diodes, and other.....	6	65	68,660	72	67,499
3344111110	Gas and vapor tubes, including ignitrona, gas duplexers, spark gaps and others.....	8	406	31,193	472	28,728
3344111115	Klystrons, including amplifier, reflex, and other.....	5	(D)	(D)	(D)	(D)
3344111120	Magnetrons, including pulsed, fixed, tunable, cross-field, continuous wave and other.....	4	9	49,888	9	45,217
	Traveling wave tubes (TWT):					
	Forward wave:					
3344111222	Continuous wave (CW).....	4	823	109,667	1,031	104,775
3344111232	Pulsed power.....	5	836	105,368	983	97,328
3344111265	Backward wave.....	-	-	-	(D)	(D)
3344111340	Light sensing tubes.....	5	(D)	(D)	(D)	(D)
3344111360	Light emitting devices, including storage tubes all sizes, cathode ray tubes, color and monochrome (industrial and military), special display devices, including alphanumeric readout tubes, figure indicating tubes, and other.....	7	644	44,088 r/	590 r/	44,481
3344111370	Miscellaneous special-purpose tubes (reference cavities, radiation detection (geiger, neutron counters, etc.), beam deflection, decade counters, orbital beam, vacuum gauges, vacuum capacitors, switches, relays, etc.).....	7	(X)	69,715		75,572
3344114	Receiving type electron tubes and cathode ray picture tubes.....	(NA)	(X)	1,459,424	r/	2,485,964
3344114105	Receiving type electron tubes, all types, including rebuilt.....	-	-	-	139	58,179
	Television tubes, including any defective tube that has been rebuilt:					
	Color having a video display diagonal of:					
3344114110	50 cm and under (20 inches and under).....	5	9,583	359,010	(D)	(D)
3344114115	Over 50 cm but not exceeding 63 cm (21 through 25 inches).....	3	(D)	(D) r/	2,655 r/	279,897
3344114120	Exceeding 63 cm (26 inches and over).....	6	4,398	946,973 r/	10,865 r/	1,601,157
3344114125	Other, including rebuilt color and new and rebuilt black and white.....	3	(D)	(D)	(D)	(D)
3344117130	Electron tube parts (except glass blanks): bases, getters, cathodes, headers, guns.....	14	(X)	74,619	(X) r/	91,005
334412	Printed-circuit (wiring) boards.....	430	(X)	5,004,892	(X)	5,763,469
3344120105	Single-sided glass printed.....	212	(X)	143,999	(X) r/	144,518
3344120210	Double-sided glass printed.....	281	(X)	713,871	(X)	884,428
3344120315	Multilayer glass printed.....	279	(X)	2,608,628	(X) r/	2,839,529
3344120420	Single-sided flex printed.....	41	(X)	477,649	(X)	437,289
3344120425	Double-sided flex printed.....	44	(X)	140,435	(X) r/	99,133
3344120430	Multilayer flex and rigid/flex printed.....	49	(X)	172,816	(X)	173,666
3344120432	Back-bared flex printed boards.....	1	(X)	(D)	(X)	-
3344120433	Sculptured flex printed boards.....	1	(X)	(D)	(X)	-
3344120435	All paper/mat/composite printed boards.....	12	(X)	(D)	(X)	21,895
3344120440	Other substitute printed boards.....	52	(X)	473,140	(X) r/	584,153
3344120545	Receipts for contract work on printed circuit boards (etching, dip-soldering, imprinting, etc.), but not printed board assembly.....	57	(X)	252,307	(X)	578,858
334413	Semiconductors and related devices.....	(NA)	(X)	62,162,246	(X)	57,546,938
3344131	Monolithic integrated circuits.....	167	(X)	54,587,839	(X) r/	49,726,344
	Monolithic integrated circuits, digital, nonsilicon (e.g., gallium arsenide):					
3344131136	Memory .....	3	(D)	(D)	(D)	(D)
3344131148	Logic and other.....	9	156,670	344,832	130,801 r/	1,372,192
	Monolithic integrated circuits, digital, silicon:					
	Bipolar transistors, memory:					
3344131115	Static read-write random access (SRAM).....	8	(D)	(D)	(D)	(D)
3344131121	Other memory.....	4	(D)	(D)	(D)	(D)
	Other bipolar transistors, including logic:					
3344131124	Transistor-transistor logic (TTL).....	11	(D)	(D)	(D)	(D)
3344131132	Other, including emitter couple logic (ECL).....	9	1,812,915	1,477,570	1,809,359 r/	1,492,481
	Metal oxide semiconductor (MOS) field effect transistors:					
	Volatile memory DRAMS (dynamic read-write random access):					
3344131168	Not over 3 MB 1/.....	5	(D)	(D)	(D)	(D)

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Product code	Product description	No. of cos.	2003		2002	
			Quantity	Value	Quantity	Value
3344131170	Over 3 MB but not over 15 MB 1/.....	3	(D)	(D) r/	(D) r/	(D)
3344131172	Over 15 MB 1/.....	8	1,671,469	5,660,456	1,022,380	4,680,097
	Volatile memory SRAMS (static read-write random access):					
3344131182	Not over 40 k.....	2	(D)	(D)	(D)	(D)
3344131184	Over 40 k but not over 80 k.....	1	(D)	(D)	(D)	(D)
3344131186	Over 80 k.....	14	97,492	505,951 r/	89,153	562,177
	Nonvolatile EEPROMs (electrically erasable programmable read-only memory):					
3344131192	Not over 80 k 2/.....	6	(D)	(D)	(D)	(D)
3344131194	Over 80 k 2/.....	10	1,992,580	1,007,612	1,543,712 r/	1,440,839
3344131179	Nonvolatile EPROMs (erasable, except electrically, programmable read-only memory).....	8	35,935	59,363 r/	42,446 r/	65,083
3344131180	Other nonvolatile memory.....	8	439,773	864,655 r/	374,373 r/	874,060
	Other, including microprocessors, controllers, application specific integrated circuits (ASIC's), and programmable logic arrays (PLA's):					
3344131154	Microprocessors having an internal data bus of 8 bits or less.....	14	991,063	901,786	882,417 r/	1,007,642
3344131157	Microprocessors having an internal data bus of 16 bits 3/.....	10	(D)	(D)	(D)	(D)
3344131160	Microprocessors having an internal data bus of 32 bits or more 3/.....	13	272,923	21,535,936 r/	293,671 r/	15,843,167
3344131133	Other (microcontrollers, ASICs, PLA's, etc.).....	27	1,463,731	6,837,196	1,346,360	5,655,925
	Other digital, silicon, including bipolar combined with MOS:					
3344131139	Complementary BiMOS (BiCMOS) 4/.....	4	(D)	(D)	(D)	(D)
3344131142	Other complementary BiMOS(BiCMOS), including logic 4/..	7	6,409,956	1,123,031	360,481 r/	924,257
3344131145	Other digital silicon ICs.....	21	1,761,624	4,860,365	(D) r/	(D)
	Nondigital silicon monolithic integrated circuits (e.g., linear, analog):					
3344131162	Radio frequency.....	8	151,704	352,365	189,662	471,346
3344131103	Other, analog.....	21	2,373,943	1,553,893	2,405,594	1,533,441
3344131106	Other, including mixed signal (analog and digital), logic.....	14	464,821	748,187 r/	445,446 r/	749,801
3344131109	Other, including mixed signal (analog and digital), other.....	19	1,260,047	2,878,359	1,031,090	2,825,522
	Hybrid integrated circuits:					
3344131118	Radio frequency.....	27	106,468	178,118	136,351	226,181
3344131151	Other.....	42	129,842	716,204	100,846 r/	631,175
3344131112	Other.....	41	1,126,604	1,910,086	663,565	1,802,557
3344134	Transistors.....	33	(X)	648,541	(X) r/	818,175
3344134105	Signal (less than 1 watt dissipation).....	18	(X)	75,438	(X) r/	166,845
3344134110	Power (1 watt or greater dissipation).....	28	(X)	573,103	(X)	651,330
3344137	Diodes and rectifiers.....	50	300,776	392,369	287,021 r/	370,091
3344137110	Signal diodes and assemblies thereof (maximum current 0.5 amps).....	19	33,494	53,848 r/	41,633 r/	55,588
3344137115	Semiconductor rectifiers/power diodes and assemblies thereof (current rating greater than 0.5 amps).....	29	152,433	157,081	140,919 r/	143,008
3344137125	Zener diodes (voltage regulator and voltage reference diodes) 5/.....	21	(D)	(D) r/	(D) r/	(D)
3344137105	Selenium rectifiers 5/.....	5	39,967	55,953 r/	32,794 r/	50,607
3344137120	Microwave diodes (mixers, detectors, varactors, parametric, harmonic generators, etc.).....	10	74,882	125,487 r/	71,675 r/	120,888
334413A	Other semiconductor devices.....	145	(X)	6,533,497	(X)	6,632,328
334413A105	Solar cells.....	10	(X)	80,884	(X)	133,029
334413A110	Photovoltaic modules.....	9	(X)	178,063	(X)	162,868
	Light-emitting diodes (LEDs):					
334413A115	Discrete, infrared and laser.....	16	(X)	325,732	(X) r/	308,962
334413A120	Alpha or numeric displays.....	5	(X)	(D)	(X)	(D)
334413A125	Photodiodes, including infrared detectors.....	14	(X)	89,331	(X)	151,307
334413A130	Optical coupled isolators, including sensors and emitters.....	2	(X)	(D)	(X)	(D)
334413A135	Other light sensitive and light-emitting devices, including photovoltaic devices and photoelectric-magnetic devices.....	8	(X)	107,527	(X)	145,368
	Other semiconductor devices:					
334413A140	Thyristors (SCR's, triacs, PNP diodes).....	8	(X)	101,334	(X)	96,309
334413A150	All other semiconductor devices (tunnel diodes, thermoelectric semiconductor junctions, metal-oxide varistors, solidstate transducers, and special semiconductor devices, n.e.c.).....	16	(X)	362,155	(X)	286,785
	Semiconductor parts:					
	Chips and wafers:					
334413A155	For integrated circuits (IC's).....	37	(X)	3,678,858	(X)	3,424,871

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Product code	Product description	No. of cos.	2003		2002	
			Quantity	Value	Quantity	Value
334413A160	For discrete semiconductors.....	27	(X)	312,517	(X)	315,487
334413A165	All other semiconductor parts (headers, packages, heat sinks, other accessories, etc.).....	41	(X)	1,232,376	(X) r/	1,537,889
334414	Capacitors.....	88	(X)	1,198,602	(X)	1,338,031
	Paper, plastic (film), metalized, and dual (film/paper) dielectric capacitors, fixed:					
	Ac types:					
3344140103	Less than 300 volts.....	17	9,495	19,946	14,704	27,420
3344140106	300 volts to 599 volts.....	18	31,835	73,748	33,009	70,105
3344140109	600 volts to 999 volts.....	11	4,255	19,490 r/	3,823 r/	19,356
3344140112	1,000 volts or over.....	7	877	6,198 r/	566 r/	3,457
	Capacitors having a reactive power handling capacity of 0.5 kVAR or less:					
	Dc types/other:					
3344140215	Axial lead.....	17	13,754	33,532	19,605	32,892
3344140218	Radial lead .....	7	53,105	21,426	55,854	19,099
3344140221	Chips and other leaded devices.....	-	-	-	(D)	(D)
3344140331	Tantalum electrolytic.....	10	(D)	(D)	(D)	(D)
3344140333	Other leaded (molded axial and molded radial).....	3	(D)	(D)	(D)	(D)
	Aluminum electrolytic:					
3344140436	Less than 18 mm through 35 mm.....	5	(D)	(D)	(D)	(D)
3344140439	Small can style (over 35mm through 51 mm) .....	5	388	1,642	407	1,832
3344140442	Other can style (over 51 mm) .....	6	(D)	(D)	(D)	(D)
3344140445	Ac motor start.....	1	(D)	(D)	(D)	(D)
3344140550	Ceramic dielectric, single layer.....	7	46,535	9,147	(D)	(D)
	Ceramic dielectric, multilayer:					
3344140555	Axial leads and radial leads.....	9	59,848	32,805	(D)	(D)
3344140560	Chips.....	17	38,921,181	396,501	35,814,183	455,661
	Other:					
3344140663	Mica dielectric.....	7	9,647	7,746	8,852	7,262
3344140666	All other fixed.....	19	82,759	65,338 r/	82,365 r/	73,065
	Variable:					
3344140769	Mica, ceramic or glass dielectric 6/.....	3	(D)	(D)	(D)	(D)
3344140772	Other 6/.....	7	25,461	73,712 r/	17,793 r/	61,694
3344140875	Parts of capacitors, including unfinished chips for further finishing and assembly.....	12	(X)	260,976	(X)	(D)
334415	Resistors.....	86	(X)	647,583	(X)	652,617
3344150104	Fixed carbon resistors, composition or film types.....	12	47,029	17,492	41,544	16,532
	Other fixed resistors (power capacity 20W or less):					
	Surface mounted, having two terminals:					
3344150208	Flat resistor chips.....	19	165,220	47,937	171,402	50,238
3344150212	Cylindrical leadless resistors, including metal film, metal oxide, and thick cermet film.....	6	102,082	9,889	131,034	13,578
	Surface mounted, having more than two terminals (resistor networks):					
3344150216	Dual-in-line package.....	6	18,968	8,207	44,331	12,262
3344150220	Other, including flat packs.....	10	3,389	5,244	2,516	5,866
	Resistors, having two leads:					
3344150224	Wirewound.....	17	55,190	47,617	52,722	47,859
3344150228	Other, including metal film, metal oxide, and thick cermet film.....	12	221,454	56,912	231,852	60,085
	Resistor networks, having more than two leads:					
3344150232	Single-in-line.....	15	4,088	7,232	37,882	16,622
3344150236	Dual-in-line.....	7	(D)	(D)	18,707	7,519
3344150240	Other.....	8	12,762	16,658 r/	12,979 r/	22,542
	Variable, nonwirewound:					
	Trimmers:					
3344150344	Single-turn, carbon and other film.....	6	8,308	7,690	(D)	(D)
3344150348	Multiturn, carbon and other film.....	4	(D)	(D)	(D)	(D)
3344150359	Potentiometers, precision and panel type.....	11	10,408	71,190 r/	10,204 r/	68,740
	Variable, wirewound:					
3344150468	Variable wirewound (except potentiometers), including nonprecision and trimmers.....	3	(D)	(D)	(D)	(D)
3344150469	Potentiometers, precision and panel type.....	10	2,189	27,273	2,136	27,041
	Miscellaneous:					
3344150576	Varistors.....	6	(D)	(D)	(D)	(D)
3344150580	Thermistors, bead type, disc, rod.....	14	136,943	71,490	193,222 r/	78,766
3344150684	Parts for resistors.....	13	(X)	207,847	(X) r/	177,904

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[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2003		2002	
			Quantity	Value	Quantity	Value
334416	Coils, transformers, reactors, and chokes for electronic applications.....	215	(X)	963,727	(X)	1,154,370
3344160120	Audio frequency (AF) transformers.....	70	6,202	58,396	10,645	61,779
3344160125	Low frequency (LF) chokes.....	81	14,811	54,432	14,545	59,847
3344160130	Plate and filament transformers, including autotransformers (except toroidal).....	51	11,955	96,588	11,071	91,756
3344160135	Pulse transformers, computer, and other types.....	73	14,365	67,681	14,147	71,845
3344160105	Radio frequency (RF) chokes.....	35	32,695	22,394	28,076	21,848
3344160110	Radio frequency (RF) coils.....	37	146,554	50,799	137,448	57,508
3344160115	Intermediate frequency (IF) transformers.....	33	4,608	26,042	16,864	31,973
3344160140	Television transformers and reactors (horizontal output, vertical deflection, focus coils, deflection yokes, etc.).....	17	10,035	65,203	14,159	99,516
3344160145	Toroidal windings (transformers and reactors) (except complete magnetics amplifiers).....	97	16,154	110,008	233,599	126,817
3344160150	Other (balun coils, permeability tuning devices, etc.).....	84	(X)	412,184	(X) r/	531,481
334417	Electronic connectors.....	(NA)	(X)	3,498,560	(X) r/	3,468,166
3344171	Coaxial (RF) connectors.....	58	371,329	429,568	408,705 r/	464,118
3344171105	Miniature (BNC, PNC, MHB).....	24	32,819	34,446 r/	36,468 r/	39,227
3344171110	Subminiature (SMA, SMB, SMC).....	26	42,160	63,146 r/	45,254 r/	66,708
3344171115	Other standard and precision.....	51	296,350	331,976 r/	326,983 r/	358,183
3344174	Cylindrical connectors.....	43	129,367	562,644	121,678 r/	527,789
3344174105	Heavy duty and standard.....	28	88,349	341,803 r/	78,745 r/	303,373
3344174110	Miniature.....	14	12,333	82,942	11,192	71,558
3344174115	Subminiature.....	17	28,685	137,899 r/	31,741 r/	152,858
3344177	Rack and panel (rectangular) connectors.....	43	654,554	273,989	634,424 r/	264,245
3344177105	Integral shell, Mil-C-22857 (8434) and similar types.....	23	385,931	81,758 r/	372,102 r/	80,759
	Subminiature:					
3344177110	Ribbon, including planar cable type 7/.....	7	(D)	(D)	(D)	(D)
3344177115	D-Subminiature, including planar cable type 7/.....	19	245,783	96,111	240,030	92,388
3344177120	Microminiatures.....	14	22,840	96,120 r/	22,292 r/	91,098
334417A	Printed circuit connectors.....	53	3,936,789	817,662	3,972,643	776,364
334417A105	Card insertion types.....	27	70,035	69,604	78,963	69,022
	Two-piece types:					
334417A110	Post, header and receptacle type.....	32	3,452,815	318,848	3,482,863	326,520
334417A115	Other two-piece types.....	27	413,939	429,210	410,817 r/	380,822
334417D	Other connectors, including parts.....	99	(X)	1,414,697	(X) r/	1,435,650
334417D105	Hermetic sealed (except single-contact and coaxial types).....	18	176,478	150,238	159,220	127,572
334417D110	Plate module types.....	6	8,387	41,290	(D)	(D)
334417D115	Fiber optic connectors.....	14	73,328	231,994	87,094	262,366
334417D130	Other planar cable (flat conductor or ribbon cable), excluding rack and panel (rectangular types).....	25	197,237	78,766	(D)	(D)
334417D120	Miscellaneous special purpose.....	56	821,688	722,259 r/	866,152	720,777
334417D125	Parts for connectors (connectors shipped but still requiring further manufacture).....	24	(X)	190,150	(X) r/	200,478
334419	Electronic components and subassemblies, n.e.c. ....	(NA)	(X)	27,359,813	(X)	31,812,190
3344191	Filters (except microwave) and piezoelectric devices.....	108	388,597	585,254	291,326	726,052
33441911	Filters (except microwave).....	(NA)	68,214	164,187	61,067	208,604
3344191105	Mechanical, excluding optical lenses (germanium silicon, fused quartz, rock salt, and other).....	6	2,434	35,149 r/	2,403 r/	34,374
	Radio frequency interference/electro magnetic interference (RFI/EMI) control filters:					
3344191110	Ceramic dielectric.....	14	58,480	84,835	44,377	66,895
3344191115	Combination or other dielectric.....	18	4,744	23,078	13,535 r/	60,273
3344191120	Electronic wave filters (LC band and high pass).....	17	2,556	21,125	2,803 r/	25,334
33441912	Piezoelectric devices.....	(NA)	320,383	421,067	230,259	517,448
	Oscillator crystals:					
3344191225	AT-cut.....	23	2,359	18,052	1,880	15,392
3344191230	Other.....	9	42,367	57,733	43,120 r/	57,171
	Crystal oscillators:					
3344191235	Oven.....	5	(D)	(D)	(D)	(D)
3344191240	TCXO/VCXO.....	11	3,385	41,697	2,463	34,963
3344191245	Hybrid.....	12	2,256	45,458	3,440	47,526
3344191250	Other.....	12	4,858	52,439 r/	3,980 r/	46,990
	Crystal filters:					
3344191255	Monolithic, including filter crystals and/or monolithic filter units not assembled into filters.....	4	(D)	(D)	(D)	(D)
3344191260	Packaged AT-cut, including monolithic, tandem monolithic, and resonator filter assemblies.....	4	26	1,147	30	1,677
3344191265	Other.....	8	248,508	72,617	138,923 r/	72,697

Table 2. Quantity and Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2003 and 2002  
[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2003		2002	
			Quantity	Value	Quantity	Value
	Crystal blanks:					
3344191270	AT-cut.....	6	3,795	6,196	4,278 r/	5,578
3344191275	Other.....	14	12,144	100,025 r/	31,527 r/	204,349
3344194	Transducers, electrical/electronic I/O, n.e.c. ....	85	145,067	1,247,217	130,687	1,203,332
3344194105	Electroacoustic (sonar, ultrasonic, vibration*, etc.).....	15	23,211	139,948 r/	24,121	137,392
	Electromechanical:					
3344194110	Accelerometers*.....	9	10,291	171,931	8,513	146,833
3344194115	Pressure*.....	33	65,739	403,351	56,898 r/	420,280
3344194120	Strain gauges and other mechanical*.....	18	1,288	88,136 r/	1,254 r/	90,861
3344194125	Thermoelectric (pyrometers, thermocouples*, etc.).....	7	2,252	72,428 r/	2,094	68,294
3344194130	Other (optical, chemical, magnetic, nuclear*, etc.).....	27	42,286	371,423 r/	37,807 r/	339,672
3344197	Switches, mechanical types for electronic circuitry.....	75	(X)	769,268	(X)	835,639
3344197120	Slide, including rocker, miniature and subminiature*.....	10	(X)	22,025	(X)	20,286
3344197125	Rotary selector, including lever and jog-lever, miniature and subminiature*.....	17	(X)	52,423	(X)	55,562
3344197130	Keyboard* 8/.....	7	(X)	(D)	(X)	(D)
3344197135	Pushbutton*.....	19	(X)	58,976	(X)	58,228
3344197140	Snap-action*.....	11	(X)	31,121	(X)	30,841
3344197145	Thumbwheel* 8/.....	2	(X)	(D)	(X)	(D)
3344197115	Membrane.....	16	(X)	63,800	(X) r/	73,420
3344197105	Toggle standard type 8/.....	7	(X)	(D)	(X)	21,810
3344197110	Toggle miniature and subminiature 8/.....	5	(X)	(D)	(X)	(D)
3344197150	DIP 8/.....	5	(X)	114,941	(X)	88,654
3344197155	Other.....	41	(X)	425,982	(X)	486,838
334418B	Printed circuit assemblies (loaded boards, subassemblies and modules) 9/.....	618	(X)	19,231,021	(X)	23,170,766
334418B105	Computer and peripheral printed board assemblies 9/.....	227	(X)	7,651,834	(X)	7,953,415
334418B110	Communications printed board assemblies 9/.....	196	(X)	4,775,139	(X)	6,287,799
334418B115	Industrial process control board assemblies 9/10/ .....	207	(X)	(D)	(X) r/	1,000,282
334418B120	Instrumentation printed board assemblies (except industrial process) 9/.....	165	(X)	1,249,789	(X)	1,766,507
334418B125	Search and detection printed board assemblies 9/.....	60	(X)	173,418	(X) r/	135,357
334418B130	Consumer electronics, printed board assemblies 9/.....	108	(X)	783,278	(X)	714,387
334418B132	Plotter controllers 9/10/.....	2	(X)	905,054	(X)	(NA)
334418B135	Other electronics, printed board assemblies, including office equipment and point of sales 9/.....	280	(X)	3,692,509	(X)	5,313,019
334419A	Microwave components and devices (except antenna), tubes, and semiconductors.....	104	(X)	1,395,853	(X) r/	1,510,602
334419A105	Ferrite, including yttrium garnets, microwave components (circulators, isolators, phase shifters, attenuators, equalizers, limiters, mixers, etc.).....	30	(X)	139,949	(X) r/	112,294
334419A110	Microwave devices, other than ferrite and solid state:					
	Attenuators (dummy loads, high and low-power terminations, etc.).....	32	(X)	93,647	(X) r/	122,215
334419A115	Cavities (amplifier cavities, coaxial tuned cavities, etc.).....	12	(X)	41,482	(X) r/	38,096
334419A120	Couplers (directional couplers, hybrid junctions, etc.).....	25	(X)	47,346	(X)	50,074
334419A125	Reactive microwave components, n.e.c. ....	33	(X)	386,829	(X)	440,666
334419A130	Switches, coaxial and waveguide.....	27	(X)	79,749	(X) r/	106,654
334419A135	Rigid waveguide and fittings (bend and twists, couplings, flanges, other simple waveguide components, n.e.c.).....	18	(X)	49,935	(X)	66,591
334419A140	Flexible waveguides and fittings.....	8	(X)	28,330	(X)	29,473
334419A145	Other microwave components (except ferrite devices) (coaxial to waveguide and other transitions, duplexers and diplexers, holders and mounts, linear and circular polarizers, magnetron test plumbing, rotary joints and sector scan joints, mixer arrays, shutters, tuners, windows, etc.).....	32	(X)	221,295	(X)	245,800
334419A150	Microwave subassemblies, including parametric amplifiers and other solid-state assemblies.....	21	(X)	307,291	(X) r/	298,739
334419E	Electronic components and subassemblies, n.e.c. ....	447	(X)	4,131,200	(X) r/	4,365,799
334419E102	Magnetic recording and reproducing heads, including audio, video, digital and instrumentation.....	6	1,399	22,069 r/	1,713 r/	28,687
334419E120	Delay lines (distributed constant, lumped constant, magnetostrictive, ultrasonic, etc.).....	11	2,498	15,175	1,157	14,300
334419E125	Oscillators (except instrumentation and crystal types).....	19	1,743	79,946	9,166 r/	125,193
	Static power supply converters for electronic applications, sold separately:					
334419E130	Regulated.....	50	11,507	630,330 r/	24,032 r/	657,623
334419E135	Other (unregulated, variable frequency, ac, dc, converters and inverters, vibrator, etc.).....	32	(X)	264,929	(X) r/	279,681
334419E140	Electronic cable harnesses and cable assemblies.....	231	(X)	1,517,527	(X) r/	1,650,659

Table 2. Quantity and Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2003 and 2002  
[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2003		2002	
			Quantity	Value	Quantity	Value
334419E145	Cryogenic cooling devices (cryostats, etc.) for infrared detectors, masers.....	3	(X)	13,468	(X)	11,534
334419E150	Liquid crystal displays (LCD) and other liquid devices.....	16	(X)	56,101	(X) r/	56,956
334419E155	Magnetic cores.....	12	(X)	121,392	(X)	136,239
	Electronic parts, n.e.c. and specialized electronic hardware: Sockets for electronic component insertion:					
334419E165	Integrated circuit sockets.....	17	(X)	45,817	(X)	45,236
334419E160	Other, including tube, relay, discrete semiconductors, ac and dc converters and inverters, etc. ....	13	(X)	34,777	(X)	32,814
336322C119	Electronic control modular chips for motor vehicles 11/.....	3	(X)	(D)	(X)	(D)
334419E170	All other electronic parts and specialized electronic hardware, n.e.c. 11/.....	120	(X)	1,329,669	(X) r/	1,326,877
	Electronic research, development, testing, and evaluation (receipts or billings, not reported as shipments of specific products):					
9998042	Systems.....	12	(X)	25,844	(X)	21,685
9998043	Equipment and subassemblies.....	22	(X)	140,211	(X)	59,583
9998044	Component parts.....	15	(X)	9,640	(X)	18,711
9998046	Basic scientific electronic research.....	14	(X)	63,553	(X)	81,475
9998047	Design and engineering services.....	61	(X)	631,304	(X)	(D)
9998048	Software.....	5	(X)	(D)	(X)	(D)
9998049	Testing.....	12	(X)	10,716	(X) r/	8,580
9998050	Supplies and accessories sold with components.....	7	(X)	722	(X)	620

\*Similar products are collected on Current Industrial Report series MA335A, "Switchgear and Industrial Controls" and MA335K, "Wiring Devices and Supplies." - Represents zero. D Withheld to avoid disclosing data for individual companies. NA Not available. n.e.c. Not elsewhere classified. r/Revised by 5 percent or more from previously published data. X Not applicable.

- 1/Product code 3344131168 and 3344131170 are combined with product code 3344131172 to avoid disclosing data for individual companies.
- 2/Product code 3344131192 is combined with product code 3344131194 to avoid disclosing data for individual companies.
- 3/Product code 3344131157 is combined with product code 3344131160 to avoid disclosing data for individual companies.
- 4/Product code 3344131139 is combined with product code 3344131142 to avoid disclosing data for individual companies.
- 5/Product code 3344137125 is combined with product code 3344137105 to avoid disclosing data for individual companies.
- 6/Product code 3344140769 is combined with product code 3344140772 to avoid disclosing data for individual companies.
- 7/Product code 3344177110 is combined with product code 3344177115 to avoid disclosing data for individual companies.
- 8/Value of shipments for product codes 3344197130, 3344197145, 3344197105, and 3344197110 are combined with product code 3344197150 to avoid disclosing data for individual companies.
- 9/These data are collected on two Current Industrial Report forms, MA334R, "Computers and Office and Accounting Machines," and MA334Q, "Semiconductors, Printed Circuit Boards, and Other Electronic Components."
- 10/Value of shipments for product code 334418B115 is combined with product code 334418B132 to avoid disclosing data for individual companies.
- 11/Product code 336322C119 is combined with product code 334419E170 to avoid disclosing data for individual companies.



Table 3. Shipments, Exports, and Imports of Semiconductors, Printed Circuit Boards, and Other Electronics Components: 2003  
[Values in Thousands]

Product code	Product description	Manufactures' shipments (value, f.o.b. plant)	Exports of domestic merchandise (value at port) 1/	Imports for consumption 2/3/
3344111105	High vacuum tubes.....	68,660	37,004	12,075
3344111110	Gas and vapor tubes.....	31,193	5,831	1,244
3344111115	Klystrons, including amplifier, reflex and other.....	(D)	46,989	49,127
3344111120	Magnetrons, including pulsed, fixed, tunable, cross-field, continuous wave and other.....	49,888	8,339	18,896
3344111340	Light sensing tubes.....	(D)	44,976	87,087
3344114105	Receiving type electron tubes, including rebuilt.....	-	13,849	9,822
3344114110, 115, 120, 125	Television tubes, color, and black and white new and rebuilt.....	(D)	1,043,226	370,249
3344117130	Electron tube parts (except glass blanks).....	74,619	97,284	180,375
3344120105, 210, 315, 420, 425, 430, 432, 433, 435, 440	Printed circuit boards.....	4,752,585	1,741,715	1,526,147
3344131136, 148	Monolithic integrated circuits, digital, memory (except silicon).....	(D)	358,435	80,554
3344131124, 132, 133, 142, 145	Monolithic integrated circuits, digital, silicon, (except memory, n.e.c.).....	(D)	2,725,117	2,143,935
3344131168, 170, 172	Monolithic integrated circuits, digital, silicon: With volatile memory (DRAM).....	5,660,456	1,428,530	2,333,242
3344131115, 182, 184, 186	With volatile memory (SRAM).....	(D)	210,043	408,886
3344131192, 194	Except volatile memory, electrically (EEPROM).....	1,007,612	205,810	1,703,621
3344131179	Except volatile memory (except electrically (EPROM)).....	59,363	88,779	76,520
3344131121, 139, 180	Except volatile memory, n.e.c. ....	(D)	250,606	228,508
	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except memory type):			
3344131154	Microprocessors 8 bits or less.....	901,786	163,602	846,191
3344131157	Microprocessors 16 bits 4/.....	(D)	150,912	411,990
3344131160	Microprocessors 32 bits or more 4/.....	21,535,936	1,504,449	2,481,010
3344131162, 103, 106, 109	Monolithic integrated circuits, nondigital, silicon, including linear, analog, radio frequency, etc. ....	5,532,804	1,791,804	4,098,594
3344131118, 151	Hybrid integrated circuits.....	894,322	485,996	408,019
3344140331	Capacitors, fixed, tantalum electrolytic, metal case, dipped, chips, including foil and wet .....	(D)	48,065	173,303
3344140333	Capacitors, fixed, tantalum electrolytic, n.e.c., including leaded.....	(D)	85,244	88,382
3344140436	Capacitors, fixed, aluminum electrolytic, not exceeding 35 mm.....	(D)	47,946	203,396
3344140439, 442, 445	Capacitors, fixed, aluminum electrolytic, over 35 mm.....	(D)	18,818	29,679
3344140550	Capacitors, fixed, ceramic dielectric, single layer.....	9,147	33,556	31,908
3344140555	Capacitors, fixed, ceramic dielectric, multilayer, axial leads and radial leads.....	32,805	66,062	67,279
3344140560	Capacitors, fixed, ceramic dielectric, multilayer, chips.....	396,501	286,235	473,734
3344140663	Capacitors, fixed, mica dielectric.....	7,746	3,691	2,519
3344140666	Capacitors, fixed, n.e.c. ....	65,338	90,155	50,755
3344140769	Capacitors, variable, mica/ceramic/glass dielectric 5/.....	(D)	200,981	3,365
3344140772	Capacitors, variable, n.e.c. 5/.....	73,712	30,626	17,293
3344140875	Capacitors, parts, including unfinished chips for further finishing... ..	260,976	199,754	33,643
3344140103	Capacitors, fixed, ac type, less than 300 volts.....	19,946	4,052	14,967
3344140106	Capacitors, fixed, ac type, 300-599 volts.....	73,748	2,710	23,123
3344140109	Capacitors, fixed, ac type, 600-999 volts.....	19,490	531	1,041
3344140112	Capacitors, fixed, ac type, 1,000 volts or more.....	6,198	14,951	620
3344140215	Capacitors, fixed, dc type, axial.....	33,532	853	1,400
3344140218	Capacitors, fixed, dc type, radial.....	21,426	2,121	35,859
3344140221	Capacitors, fixed, dc type, chips and other leaded.....	-	7,635	14,978
3344134105	Transistors, signal, less than 1 watt dissipation.....	75,438	129,805	188,154
3344134110	Transistors, signal, 1 watt or greater dissipation.....	573,103	220,099	709,134
3344137110	Signal diodes and assemblies.....	53,848	25,389	27,870
3344137125	Zener diodes.....	(D)	40,497	80,007
3344137115, 105	Diodes and rectifiers, n.e.c. ....	(D)	195,491	437,260
3344137120	Microwave diodes.....	125,487	60,812	90,273
334413A105	Solar cell.....	80,884	198,400	128,802
334413A115, 120	Light-emitting diodes.....	(D)	414,340	539,388
334413A130	Optical coupled isolators.....	(D)	39,257	173,169
334413A135	Other light-sensitive and light-emitting devices.....	107,527	94,919	118,467
334413A140	Thyristors, SCR's, triacs, and PNP diodes.....	101,334	57,937	169,836
334413A155	Chips and wafers for integrated circuits.....	3,678,858	22,849,038	3,031,607

Continued

Table 3. Shipments, Exports, and Imports of Semiconductors, Printed Circuit Boards, and Other Electronics Components: 2003  
[Values in Thousands]

Product code	Product description	Manufactures' shipments (value, f.o.b. plant)	Exports of domestic merchandise (value at port) 1/	Imports for consumption 2/3/
334413A160	Chips and wafers for discrete semiconductors.....	312,517	1,468,486	246,289
334413A165	Other semiconductor parts.....	1,232,376	204,942	124,944
3344150104	Carbon resistors, fixed, composition or film types, designed for surface mounting (SMD) by contact, having two terminals, cylindrical leadless having two leads, carbon composition, and carbon film.....	17,492	21,153	16,201
3344150208, 212	Carbon resistors, fixed, with a power capacity of 20 watts or less, surface mounted (SMD), having two terminals, flat resistor chips, and cylindrical leadless resistors.....	57,826	18,342	99,167
3344150216, 220	Carbon resistors, fixed, with a power capacity of 20 watts or less, surface mounted (SMD), having more than two terminals, resistor, resistor-capacitor networks.....	13,451	13,445	16,421
3344150224	Resistors, fixed, with a power capacity of 20 watts or less, wire-bound, having two leads.....	47,617	8,058	31,197
3344150228	Resistors, fixed, with a power capacity of 20 watts or less, other than wirebound, having two leads.....	56,912	39,406	44,793
3344150232, 236, 240	Resistors, fixed, with a power capacity of 20 watts or less, resistor networks, having more than two leads.....	(D)	18,000	21,269
3344150468, 469	Resistors, variable, wirewound, including rheostats and potentiometers, for a power handling capacity not exceeding 20 watts.....	(D)	17,307	21,669
3344150344, 348, 359, 576, 580	Resistors, variable, n.e.c. ....	(D)	176,846	291,614
3344150684	Resistors, parts .....	207,847	54,833	12,901
3344191225, 230, 235, 240, 245, 250, 255, 260, 265	Piezoelectric devices (except crystal blanks).....	(D)	136,413	348,107
3344191270, 275	Piezoelectric devices, crystal blanks.....	106,221	10,427	2,082
3344160140	Television transformers and reactors.....	65,203	11,255	69,644
3344160120, 130, 135, 110, 115, 145, 150	Coils, transformers, reactors, and chokes for electronic applications, n.e.c. ....	821,698	203,211	580,608
3344171100	Connectors, coaxial.....	429,568	107,806	165,778
3344174100	Connectors, cylindrical .....	562,644	31,944	141,198
3344177100	Connectors, rack and panel .....	273,989	44,678	65,449
334417A100	Connectors, printed circuit .....	817,662	323,952	301,900
334419E102	Magnetic recording and reproducing heads.....	22,069	14,298	7,391
3344197125	Switches, rotary selector.....	52,423	83,117	98,158
3344197135	Switches, pushbutton.....	58,976	65,243	146,766
3344197120	Switches, slide, including rocker, miniature and subminiature.....	22,025	16,955	24,145
3344197140	Switches, snap-action.....	31,121	16,058	107,396
3344197130, 145, 115, 105, 110, 150, 155	Switches, other.....	604,723	607,576	1,072,813

- Represents zero. D Withheld to avoid disclosing data for individual companies. n.e.c. Not elsewhere classified.

1/Source: Census Bureau report EM 545, U.S. Exports.

2/Source: Census Bureau report IM 145, General Imports for Consumption.

3/Value represents the c.i.f. (cost, insurance, and freight) value at first port of entry in the United States plus import duties.

4/Manufacturers' shipments for product codes 3344131157 and 3344131160 are combined to avoid disclosing data for individual companies.

5/Manufacturers' shipments for product codes 3344140769 and 3344140772 are combined to avoid disclosing data for individual companies.

Note: For comparison of the North American Industry Classification System (NAICS)-based product codes with Schedule B export codes and HTSUSA import codes, see Table 4.

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Numbers, and HTSUSA Import Numbers: 2003

Product code	Product description	Export numbers 1/	Import numbers 2/
3344111105	High vacuum tubes, including triodes, multigrid external and internal anodes, diodes and others.....	8540.89.0040 8540.89.0080	8540.89.0040 8540.89.0080
3344111110	Gas and vapor tubes.....	8540.89.0020	8540.89.0020
3344111115	Klystrons, including amplifier, reflex and other.....	8540.72.0000 8540.79.0000	8540.72.0000 8540.79.0000
3344111120	Magnetrons, including pulsed, fixed, tunable, cross-field, continuous wave and other.....	8540.71.2000 8540.71.4000	8540.71.2000 8540.71.4000
3344111340	Light sensing tubes.....	8540.20.2000 8540.20.4000 8540.89.0060	8540.20.2040 8540.20.2080 8540.20.4000 8540.89.0060
3344114105	Receiving type electron tubes, including rebuilt.....	8540.81.0000	8540.81.0000
3344114110, 115, 120, 125	Television tubes, color, and black and white new and rebuilt.....	8540.11.0035 8540.11.0070 8540.11.0080 8540.12.0000	8540.11.1030 8540.11.1040 8540.11.1050 8540.11.1055 8540.11.1065 8540.11.1080 8540.11.2401 8540.11.2801 8540.11.3000 8540.11.4401 8540.11.4801 8540.11.5000 8540.12.1040 8540.12.2000 8540.12.5040 8540.12.5080 8540.12.7000
3344117130	Electron tube parts (except glass blanks).....	8540.91.2000 8540.91.4000 8540.99.0000	8540.91.1500 8540.91.2000 8540.91.5000 8540.99.8000
3344120105, 210, 315, 420, 425, 430, 432, 433, 435, 440	Printed circuit boards.....	8534.00.0020 8534.00.0040 8534.00.0050 8534.00.0070 8534.00.0080 8534.00.0085 8534.00.0095	8534.00.0020 8534.00.0040 8534.00.0050 8534.00.0070 8534.00.0080 8534.00.0085 8534.00.0095
3344131136	Monolithic integrated circuits, digital, memory (except silicon).....	8542.21.8091	8542.21.8091
3344131148	Monolithic integrated circuits, digital (except memory and silicon).....	8542.21.8099	8542.21.8099
3344131124, 132, 133, 142, 145	Monolithic integrated circuits, digital, silicon, (except memory, n.e.c.).....	8542.21.8088	8542.21.8081 8542.21.8082
3344131168, 170, 172	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) effect transistors volatile memory, (DRAM).....	8542.21.8021 8542.21.8028	8542.21.8021 8542.21.8022 8542.21.8023 8542.21.8024 8542.21.8025 8542.21.8029
3344131115, 182, 184, 186	Monolithic integrated circuits, digital, silicon, memory (SRAM).....	8542.21.8031 8542.21.8038	8542.21.8031 8542.21.8032 8542.21.8039

Continued

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Numbers, and HTSUSA Import Numbers: 2003

Product code	Product description	Export numbers 1/	Import numbers 2/
3344131192, 194	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except volatile memory (EEPROM)).....	8542.21.8048	8542.21.8041 8542.21.8042 8542.21.8049
3344131179	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except volatile memory (EPROM)).....	8542.21.8058	8542.21.8051 8542.21.8052 8542.21.8059
3344131121, 139, 180	Monolithic integrated circuits, digital, silicon, memory, n.e.c. ....	8542.21.8060	8542.21.8060
3344131154	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors, except memory type, including microprocessors having an internal data bus of 8 bits or less.....	8542.21.8071	8542.21.8071
3344131157	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors, except memory type, including microprocessors having an internal data bus of 16 bits.....	8542.21.8072	8542.21.8072
3344131160	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors, except memory type, including microprocessors having an internal data bus of 32 bits or more.....	8542.21.8079	8542.21.8079
3344131162, 103, 106, 109	Monolithic integrated circuits, nondigital, including linear, analog, radio frequency, etc. ....	8542.29.0020 8542.29.0030 8542.29.0040 8542.29.0050	8542.29.0020 8542.29.0030 8542.29.0040 8542.29.0050
3344131118, 151	Hybrid integrated circuits.....	8542.60.0075 8542.60.0095	8542.60.0075 8542.60.0095
3344140331	Capacitors, fixed, tantalum electrolytic, metal case, including foil and wet, dipped and chips .....	8532.21.0020 8532.21.0040 8532.21.0050	8532.21.0020 8532.21.0040 8532.21.0050
3344140333	Capacitors, fixed, tantalum electrolytic, n.e.c., including leaded (molded axial and molded radial).....	8532.21.0080	8532.21.0080
3344140436	Capacitors, fixed, aluminum electrolytic, not exceeding 35 mm.....	8532.22.0020 8532.22.0040	8532.22.0020 8532.22.0040
3344140439, 442, 445	Capacitors, fixed, aluminum electrolytic, over 35 mm.....	8532.22.0055 8532.22.0085	8532.22.0055 8532.22.0085
3344140550	Capacitors, fixed, ceramic dielectric, single layer.....	8532.23.0020 8532.23.0040 8532.23.0060	8532.23.0020 8532.23.0040 8532.23.0060
3344140555	Capacitors, fixed, ceramic dielectric, multilayer, axial leads and radial leads.....	8532.24.0040 8532.24.0060	8532.24.0040 8532.24.0060
3344140560	Capacitors, fixed, ceramic dielectric, multilayer, chips.....	8532.24.0020	8532.24.0020
3344140663	Capacitors, fixed, mica dielectric .....	8532.29.0020	8532.29.0020
3344140666	Capacitors, fixed, n.e.c. ....	8532.29.0040	8532.29.0040
3344140769	Capacitors, variable, mica/ceramic/glass dielectric.....	8532.30.0010	8532.30.0010
3344140772	Capacitors, variable, n.e.c. ....	8532.30.0090	8532.30.0090
3344140875	Capacitors, parts, including unfinished chips for further finishing and assembly...	8532.90.0000	8532.90.0000
3344140103	Capacitors, fixed, paper, plastic (film), metalized, and dual film/paper dielectric, ac types, less than 300 volts.....	8532.25.0010	8532.25.0010

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Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Numbers, and HTSUSA Import Numbers: 2003

Product code	Product description	Export numbers 1/	Import numbers 2/
3344140106	Capacitors, fixed, paper, plastic (film), metalized, and dual film/paper dielectric, ac types, 300 volts to 599 volts.....	8532.25.0020	8532.25.0020
3344140109	Capacitors, fixed, paper, plastic (film), metalized, and dual film/paper dielectric, ac types, 600 volts to 999 volts.....	8532.25.0030	8532.25.0030
3344140112	Capacitors, fixed, paper, plastic (film), metalized, and dual film/paper dielectric, ac types, 1,000 volts or over.....	8532.25.0040	8532.25.0040
3344140215	Capacitors, fixed, paper, plastic (film), metalized, and dual film/paper dielectric, dc types, axial lead .....	8532.25.0060	8532.25.0060
3344140218	Capacitors, fixed, paper, plastic (film), metalized, and dual film/paper dielectric, dc types, radial lead .....	8532.25.0070	8532.25.0070
3344140221	Capacitors, fixed, paper, plastic (film), metalized, and dual film/paper dielectric, dc types, chips and other leaded devices .....	8532.25.0080	8532.25.0080
3344134105	Transistors, signal, less than 1 watt dissipation.....	8541.21.0080	8541.21.0075 8541.21.0095
3344134110	Transistors, signal, 1 watt or greater dissipation.....	8541.29.0080	8541.29.0075 8541.29.0095
3344137110	Signal diodes and assemblies.....	8541.10.0070 8541.10.0080	8541.10.0070 8541.10.0080
3344137125	Zener diodes.....	8541.10.0050	8541.10.0050
3344137115, 105	Diodes and rectifiers, n.e.c. ....	8541.40.6050	8541.40.6050
3344137120	Microwave diodes.....	8541.10.0060	8541.10.0060
334413A105	Solar cell.....	8541.40.6020 8541.40.6030	8541.40.6020 8541.40.6030
334413A115, 120	Light-emitting diodes.....	8541.40.2000	8541.40.2000
334413A130	Optical coupled isolators, including sensors and emitters.....	8541.40.8000	8541.40.8000
334413A135	Other light-sensitive and light-emitting devices.....	8541.40.7080 8541.40.9500	8541.40.7080 8541.40.9500
334413A140	Thyristors, SCR's, triacs, and PNP diodes.....	8541.30.0080	8541.30.0080
334413A155	Chips and wafers for integrated circuits.....	8542.10.0000 8542.21.8005 8542.21.8010 8542.29.0010 8542.90.0000	8542.10.0000 8542.21.8005 8542.21.8010 8542.29.0010 8542.90.0000
334413A160	Chips and wafers for discrete semiconductors.....	8541.10.0040 8541.21.0040 8541.29.0040 8541.30.0040 8541.40.6010 8541.40.7040 8541.50.0040 8541.50.0080	8541.10.0040 8541.21.0040 8541.29.0040 8541.30.0040 8541.40.6010 8541.40.7040 8541.50.0040 8541.50.0080
334413A165	Semiconductor parts, n.e.c., including headers, packages, and heat sinks, accessories, etc. ....	8541.90.0000	8541.90.0000
3344150104	Resistors, fixed, carbon, composition or film types, designed for surface mounting (SMD) by contact, having two terminals, cylindrical leadless having two leads, carbon composition, and carbon film.....	8533.10.0042 8533.10.0070	8533.10.0042 8533.10.0060 8533.10.0065

Continued

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Numbers, and HTSUSA Import Numbers: 2003

Product code	Product description	Export numbers 1/	Import numbers 2/
3344150208, 212	Resistors, fixed, with a power capacity of 20 watts or less, surface mounted (SMD), having two terminals, including both flat resistor chips and cylindrical leadless resistors.....	8533.21.0045	8533.21.0030 8533.21.0040
3344150216, 220	Resistors, fixed, with a power capacity of 20 watts or less, surface mounted (SMD), having more than two terminals: flat resistor, resistor-capacitor neetworks.....	8533.21.0025	8533.21.0010 8533.21.0020
3344150224	Resistors, fixed, with a power capacity of 20 watts or less, wire-bound, having two leads.....	8533.21.0080	8533.21.0080
3344150228	Resistors, fixed, with a power capacity of 20 watts or less, other than wirebound, having two leads.....	8533.21.0090	8533.21.0090
3344150232, 236, 240	Resistors, fixed, with a power capacity of 20 watts or less, resistor networks, having more than two leads.....	8533.10.0020 8533.10.0057 8533.21.0075	8533.10.0020 8533.10.0057 8533.21.0050 8533.21.0060 8533.21.0070
3344150468, 469	Resistors, variable, wirewound, including rheostats and potentiometers, for a power handling capacity not exceeding 20 watts.....	8533.31.0000	8533.31.0000
3344150344, 348, 359, 576, 580	Resistors, variable, n.e.c. ....	8533.39.0080 8533.40.0080	8533.39.0080 8533.40.8050 8533.40.8060 8533.40.8070
3344150684	Resistors, parts .....	8533.90.0000	8533.90.4000 8533.90.8000
3344191225, 230, 235, 240, 245, 250, 255, 260, 265	Piezoelectric devices (except crystal blanks).....	8541.60.0025 8541.60.0060 8541.60.0080	8541.60.0010 8541.60.0020 8541.60.0030 8541.60.0050 8541.60.0060 8541.60.0080
3344191270, 275	Piezoelectric devices, crystal blanks.....	7104.10.0000	7104.10.0000
3344160140	Television transformers and reactors (horizontal) output, vertical deflection, focus coils, deflection yokes, etc. ....	8529.90.3540 8540.91.2000	8529.90.3300 8529.90.3600 8540.91.2000
3344160120, 130, 135, 110, 115, 145, 150	Coils, transformers, reactors, and chokes for electronic applications, n.e.c. ....	8504.31.2000 8504.31.4035 8504.31.4065 8504.31.6000 8504.32.0000 8504.33.0020 8504.33.0040 8504.34.0000	8504.31.2000 8504.31.4035 8504.31.4065 8504.31.6000 8504.32.0000 8504.33.0020 8504.33.0040 8504.34.0000
3344171100	Connectors coaxial.....	8536.69.4010	8536.69.4010
3344174100	Connectors, cylindrical .....	8536.69.4020	8536.69.4020
3344177100	Connectors, rack and panel .....	8536.69.4030	8536.69.4030
334417A100	Connectors, printed circuit .....	8536.69.4040	8536.69.4040
334419E102	Magnetic recording and reproducing heads, including audio, video, digital and instrumentation.....	8522.90.0010	8522.90.5540 8522.90.7540

Continued

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Numbers, and HTSUSA Import Numbers: 2003

Product code	Product description	Export numbers 1/	Import numbers 2/
3344197125	Rotary selector switches for electronic circuitry, including lever and jog-levers, miniature and subminiature.....	8536.50.7000 8536.50.9020 8536.50.9025	8536.50.7000 8536.50.9020 8536.50.9025
3344197135	Pushbutton switches for electronic circuitry.....	8536.50.9030 8536.50.9035	8536.50.9031 8536.50.9032 8536.50.9033 8536.50.9035
3344197120	Slide switches, including rocker for electronic circuitry, both miniature and subminiature.....	8536.50.9050	8536.50.9050 **
3344197140	Snap-action switches for electronic circuitry.....	8536.50.9040	8536.50.9040 **
3344197130, 145, 115, 105, 110, 150, 155	Switches for electronic circuitry, n.e.c. ....	8536.50.9045 8536.50.9055 8536.50.9065	8536.50.9045 ** 8536.50.9055 8536.50.9065

\*\* HS codes include switches of product class 36433. n.e.c. Not elsewhere classified.

1/Source: 2003 edition, Harmonized System-based Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States.

2/Source: Harmonized Tariff Schedule of the United States, Annotated (2003).

# Appendix.

## General CIR Survey Information, Explanation of General Terms and Historical Note

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### GENERAL

The CIR program has been providing monthly, quarterly, and annual measures of industrial activity for many years. Since 1904, with its cotton and fats and oils surveys, the CIR program has formed an essential part of an integrated statistical system involving the quinquennial economic census, manufacturing sector, and the annual survey of manufactures. The CIR surveys, however, provide current statistics at a more detailed product level than either of the other two statistical programs.

The primary objective of the CIR program is to produce timely, accurate data on production and shipments of selected products. The data are used to satisfy economic policy needs and for market analysis, forecasting, and decision making in the private sector. The product-level data generated by these surveys are used extensively by individual firms, trade associations, and market analysts in planning or recommending marketing and legislative strategies, particularly if their industry is significantly affected by foreign trade. Although production and shipments information are the two most common data items collected, the CIR program collects other measures also such as inventories, orders, and consumption. These surveys measure manufacturing activity in important commodity areas such as textiles and apparel, chemicals, primary metals, computer and electronic components, industrial equipment, aerospace equipment, and consumer goods.

The CIR program uses a unified data collection, processing, and publication system. The U.S. Census Bureau updates the survey panels for most reports annually and reconciles the estimates to the results of the broader-based annual survey of manufactures and the economic census, manufacturing sector. The manufacturing sector provides a complete list of all producers of the products covered by the CIR program and serves as the primary source for CIR sampling. Where a small number of producers exist, CIR surveys cover all known producers of a product. However, when the number of producers is too large, cutoff and random sampling techniques are used. Surveys are continually reviewed and modified to provide the most up-to-date information on products produced. The CIR program includes a group of mandatory and voluntary surveys. Typically the monthly and quarterly surveys are conducted on a voluntary basis. Those companies that choose not to respond to the voluntary surveys are required to submit a mandatory annual counterpart corresponding to the more frequent survey.

### NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS), 1997

The adoption of the North American Industry Classification System (NAICS) in the 1997 Economic Census has had a major impact on the comparability of current and historic data. Approximately half of the industries in the manufacturing sector of NAICS do not have comparable industries in the Standard Industrial Classification (SIC) system that was used in the past.

While most of the change affecting the manufacturing sector was change within the sector, some industries left manufacturing and others came into manufacturing. Prominent among those that left manufacturing are logging and portions of publishing. Prominent among the industries that came into the manufacturing sector are bakeries, candy stores where candy is made on the premises, custom tailors, makers of custom draperies, and tire retreading. The net effect of the classification changes are such that if the 1997 value of shipments data for all manufacturers were tabulated on an SIC basis, it would be approximately 3 percent higher.

Listed below are the NAICS sectors:

- 21 Mining
- 22 Utilities
- 23 Construction
- 31-33 Manufacturing
- 42 Wholesale Trade
- 44-45 Retail Trade
- 48-49 Transportation and Warehousing
- 51 Information
- 52 Finance and Insurance
- 53 Real Estate and Rental and Leasing
- 54 Professional, Scientific, and Technical Services
- 55 Management of Companies and Enterprises
- 56 Administrative and Support and Waste Management and Remediation Services
- 61 Educational Services
- 62 Health Care and Social Assistance
- 71 Arts, Entertainment, and Recreation
- 72 Accommodation and Food Services
- 81 Other Services (except Public Administration)

(Not listed above are the Agriculture, Forestry, Fishing, and Hunting sector (NAICS 11), partially covered by the census of agriculture conducted by the U.S. Department of Agriculture, and the Public Administration sector (NAICS 92), covered by the census of governments conducted by the Census Bureau.)



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The 20 NAICS sectors are subdivided into 96 subsectors (three-digit codes), 313 industry groups (four-digit codes), and, as implemented in the United States, 1170 industries (five- and six-digit codes).

## FUNDING

The Census Bureau funds most of the surveys. However, a number of surveys are paid for either fully or partially by other Federal Government agencies or private trade associations. A few surveys are mandated, but all are authorized by Title 13 of the United States Code.

## RELIABILITY OF DATA

Survey error may result from several sources including the inability to obtain information about all cases in the survey, response errors, definitional difficulties, differences in the interpretation of questions, mistakes in recording or coding the reported data, and other errors of collection, response, coverage, and estimation. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to these nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is the imputing of data for nonrespondents, for late reporters, and for data that fail logic edits. Missing figures are imputed based on period-to-period movements shown by reporting firms. A figure is considered to be an impute if the value was not directly reported on the questionnaire, directly derived from other reported items, directly available from supplemental sources, or obtained from the respondent during the analytical review phase. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are suppressed or footnoted. The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

## DATA REVISIONS

Statistics for previous years may be revised as the result of corrected figures from respondents, late reports for which imputations were originally made, or other corrections. Data that have been revised by more than 5 percent from previously published data are indicated by footnotes.

## DISCLOSURE

The Census Bureau collects the CIR data under the authority of Title 13, United States Code, which specifies that the information can only be used for statistical purposes and cannot be published or released in any manner that would identify a person, household, or establishment. "D" indicates that data in the cell have been suppressed to avoid disclosure of information pertaining to individual companies.

## EXPLANATION OF GENERAL TERMS

**Capacity.** The maximum quantity of a product that can be produced in a plant in 1 day if operating for 24 hours. Includes the capacity of idle plants until the plant is reported to be destroyed, dismantled, or abandoned.

**Consumption.** Materials used in producing or processing a product or otherwise removing the product from the inventory.

**Exports.** Includes all types of products shipped to foreign countries, or to agents or exporters for reshipment to foreign countries.

**Gross shipments.** The quantity or value of physical shipments from domestic establishments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale or use. Shipments of products purchased for resale are omitted. Shipments of products made under toll arrangements are included.

**Interplant transfers.** Shipments to other domestic plants within a company for further assembly, fabrication, or manufacture.

**Inventories.** The quantity or value of finished goods, work in progress, and materials on hand.

**Machinery in place.** The number of machines of a particular type in place as of a particular date whether the machinery was used for production, prototype, or sampling, or was idle. Machinery in place includes all machinery set up in operating positions.

**Net receipts.** Derived by subtracting the materials held at the end of the previous month from the sum of materials used during the current month.

**Production.** The total volume of products produced, including: products sold; products transferred or added to inventory after adjustments for breakage, shrinkage, and obsolescence, plus any other inventory adjustment; and products that undergo further manufacture at the same establishment.

**Quantities produced and consumed.** Quantities of each type of product produced by a company for internal consumption within that same company.

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**Quantity and value of new orders.** The sales value of orders received during the current reporting period for products and services to be delivered immediately or at some future date. Also represents the net sales value of contract change documents that increase or decrease the sales value of the orders to which they are related, when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those that are supported by binding legal documents such as signed contracts or letter contracts.

**Quantity and value of shipments.** The figures on quantity and value of shipments represent physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and returns. Shipments to a company's own branches are assigned the same value as comparable appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

**Stocks.** Total quantity of ending finished inventory.

**Unfilled orders (backlog).** Calculated by adding net new orders and subtracting net sales from the backlog at the end of the preceding year.

#### **HISTORICAL NOTE**

Data on selected electronic and associated products have been collected by the Census Bureau since 1961 on survey MA36N, Selected Electronics and Associated Products. In 1985, survey MA36N was divided into three annual surveys which are presently collected as: MA334P, Communication Equipment, Including Telephone, Telegraph, and Other Electronic Systems and Equipment; MA334Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components; and MA334S, Electromedical Equipment and Irradiation Equipment (Including X-Ray). Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library.