

Semiconductors, Electronic Components, and Semiconductor Manufacturing Equipment: 2005

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(Formerly MA334Q, Semiconductors, Printed Circuit Boards, Other Electronic Components)

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SUMMARY OF FINDINGS

During 2005, the total value of shipments of semiconductors, electronic components and semiconductor manufacturing equipment was \$120.1 billion. Since this is the first year the

Census Bureau is collecting semiconductor machinery, there will be no current year to prior year comparison at the aggregate level. The semiconductor machinery totaled \$8.0 billion. For 2005, shipments of electron tubes and parts decreased 23.3 percent to \$1.4 billion; bare printed circuit boards increased 1.8 percent to \$4.8 billion; semiconductors and related devices increased 5.8 percent to \$72.3 billion; capacitors for electronic circuitry decreased 12.9 percent to \$1.0 billion; resistors for electronic circuitry decreased 12.7 percent to \$649.5 million; electronic coils, transformers, and other inductors increased to 7.7 percent to \$1.2 billion; connectors for electronic circuitry decreased 4.3 percent to \$3.3 billion; printed circuit assemblies, loaded boards and modules decreased 2.1 percent to \$19.2 billion; and other electronic components increased 0.3 percent to \$8.4 billion.

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, Electronic Components, and Semiconductor Manufacturing Equipment by Product Class
Code: 2000 to 2005
[Value in million of dollars]

Product class code	Product description	2005	2004	2003	2002	2001	2000
3332950	Semiconductor machinery.....	7,968.5	(NA)	(NA)	(NA)	(NA)	(NA)
3344111	Transmittal, industrial, and special-purpose electron tubes (except X-ray).....	652.3	641.4	628.8	584.2	700.2	702.8
3344114	Receiving type electron tubes, including cathode ray (new and rebuilt).....	620.8	1,049.0	1,508.0	2,486.0	2,846.5	3,457.5
3344117	Electron tube parts.....	83.6	r/ 77.8	63.4	91.0	124.5	143.5
3344120	Bare printed circuit boards.....	4,794.1	r/ 4,708.8	4,871.1	5,763.5	8,910.9	11,891.8
3344131	Integrated microcircuits, including semiconductor networks, microprocessors, and MOS memories.....	62,983.7	r/ 60,097.3	54,830.4	49,726.3	46,337.1	73,663.7
3344134	Transistors.....	598.4	656.0	607.8	818.2	913.4	1,569.3
3344137	Diodes and rectifiers.....	323.4	r/ 304.9	391.2	370.1	402.6	620.6
334413A	Other semiconductor devices, including semiconductor parts such as chips, wafers, and heat sinks.....	8,389.5	7,247.4	6,519.2	6,632.3	7,631.9	9,757.0
3344140	Capacitors for electronic circuitry.....	1,031.1	1,184.1	1,191.6	1,338.0	1,733.9	2,786.1
3344150	Resistors for electronic circuitry.....	649.5	743.9	636.3	652.6	775.9	981.7
3344160	Electronic coil, transformer, and other inductor manufacturing.....	1,201.7	r/ 1,115.7	956.5	1,154.4	1,362.4	1,718.8
3344171	Coaxial (RF) connectors for electronic circuitry.....	376.1	402.6	402.3	464.1	505.6	805.0
3344174	Cylindrical connectors for electronic circuitry.....	505.7	631.0	563.4	527.8	687.8	725.3
3344177	Rack and panel (rectangular) connectors for electronic circuitry.....	304.0	290.5	268.1	264.3	359.2	531.7
334417A	Printed circuit connectors for electronic circuitry.....	938.5	1,012.9	833.7	776.4	1,147.3	1,810.8
334417D	Other connectors for electronic circuitry, including parts.....	1,144.7	1,078.9	1,418.4	1,435.7	2,051.9	2,058.9
334418B	Printed circuit assemblies, loaded boards and modules (printed circuit boards with inserted electronic components).....	19,151.2	19,565.6	19,714.7	23,170.8	31,214.0	37,272.5
3344191	Crystals, filters, piezoelectric, and other related electronic devices (except microwave filters).....	771.1	r/ 654.0	600.5	726.1	984.0	1,167.9
3344194	All other miscellaneous transducers, including electrical-electronic input/output transducers.....	1,519.1	1,494.8	1,218.5	1,203.3	1,330.5	1,519.3
3344197	Switches, mechanical, for electronic circuitry.....	741.7	715.8	739.1	835.6	827.7	902.6
334419A	Microwave components and devices, except antennae, tubes, and semiconductors.....	1,157.9	1,326.0	1,414.8	1,510.6	1,847.8	2,435.1
334419E	All other miscellaneous electronic components.....	4,182.8	4,158.3	4,060.4	4,365.8	6,173.1	8,331.6

r/Revised by 5 percent or more from previously published data. NA Not available.

Table 2. Quantity and Value of Shipments of Semiconductors, Electronic Components, and Semiconductor Manufacturing Equipment: 2005 and 2004
 [Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2005		2004	
			Quantity	Value	Quantity	Value
3332950	Semiconductor Machinery.....	79	(X)	7,968,494	(X)	(NA)
3332950106	Semiconductor wafer processing equipment: thin layer chemical vapor deposition.....	11	(X)	1,274,437	(X)	(NA)
3332950211	Semiconductor wafer processing equipment: thin layer physical vapor deposition.....	7	(X)	(D)	(X)	(NA)
3332950326	Semiconductor wafer processing equipment: plasma etch.....	6	(X)	900,501	(X)	(NA)
3332950401	Microlithography, including aligners.....	10	(X)	178,736	(X)	(NA)
3332950416	Semiconductor wafer processing equipment: thin layer epitaxial growth deposition.....	4	(X)	(D)	(X)	(NA)
3332950421	Semiconductor wafer processing equipment: wet etch.....	7	(X)	44,600	(X)	(NA)
3332950441	Ion implantation, including current and voltage ion implanters.....	3	(X)	682,947	(X)	(NA)
3332950456	Wafer processing equipment: pattern generating apparatus.....	1	(X)	(D)	(X)	(NA)
3332950461	Other semiconductor wafer processing equipment.....	23	(X)	(D)	(X)	(NA)
3332950500	Parts for semiconductor manufacturing machinery, including packaging equipment.....	37	(X)	623,261	(X)	(NA)
3344111	Transmittal, industrial, and special-purpose electron tubes (except X-ray).....	24	(X)	652,291	(X)	641,427
	Power and special-purpose tubes:					
3344111130	Power and special-purpose electron tubes, except forward wave tubes.....	14	(X)	281,211	(X)	(D)
3344111210	Forward wave transmitting and industrial electron tubes (excluding X-ray).....	5	(D)	(D)	(D)	228,649
3344111310	All other transmitting, industrial, and special-purpose electron tubes, (excluding X-ray), including light sensing, light emitting devices, and miscellaneous special-purpose tubes.....	13	(X)	(D)	(X)	(D)
3344114	Receiving type electron tubes, including cathode ray (new and rebuilt).....	7	(X)	620,800	(X)	1,049,032
3344117	Electron tube parts.....	13	(X)	83,567	(X) r/	77,843
3344120	Bare printed circuit boards.....	374	(X)	4,794,061	(X) r/	4,708,796
3344120105	Single-sided glass printed.....	190	(X)	78,329	(X) r/	85,867
3344120110	Double-sided glass printed.....	246	(X)	544,936	(X) r/	616,295
3344120115	Multilayer glass printed.....	238	(X)	2,581,346	(X)	2,354,199
3344120120	Single-sided flex printed.....	43	(X)	435,340	(X)	469,765
3344120125	Double-sided flex printed.....	47	(X)	125,251	(X)	(D)
3344120130	Multilayer flex and rigid/flex printed.....	48	(X)	183,207	(X) r/	218,020
3344120139	Other.....	62	(X)	651,106	(X)	(D)
3344120145	Receipts for contract work on printed circuit boards (etching, dip-soldering, imprinting, etc.), but not printed board assembly.....	51	(X)	194,546	(X) r/	222,418
3344131	Integrated microcircuits, including semiconductor networks, microprocessors, and MOS memories.....	154	(X)	62,983,727	(X) r/	60,097,303
3344131150	Monolithic integrated circuits, digital, nonsilicon.....	9	(X)	856,519	(X)	911,407
3344131152	Monolithic integrated circuits, digital, silicon.....	15	(X)	2,767,721	(X)	(D)
	Metal oxide semiconductor (MOS) field effect transistors:					
	Volatile memory DRAMs (dynamic read-write random access):					
3344131174	16 megabit and less.....	7	(D)	(D)	(D)	(D)
3344131175	Greater than 16 Mb, but less than 64 Mb.....	3	(D)	(D)	(NA)	(NA)
3344131176	64 Mb, but less than 128 Mb.....	3	(D)	(D)	(NA)	(NA)
3344131177	Greater than 128 Mb, but less than 256 Mb.....	4	(D)	(D)	(NA)	(NA)
3344131178	Greater than 256 Mb.....	5	(D)	(D)	(NA)	(NA)
	Volatile memory SRAMs (static read-write random access):					
3344131183	2 Mb and less.....	3	(D)	244,946	(NA)	(NA)
3344131187	Greater than 2 Mb.....	3	(D)	(D)	(NA)	(NA)
	Nonvolatile EEPROMs (electrically erasable programmable read-only memory):					
3344131188	Nonvolatile EEPROM.....	3	(D)	(D)	(NA)	(NA)
3344131181	NAND type flash EEPROM.....	4	(D)	478,215	(NA)	(NA)
3344131193	NOR type flash EEPROM.....	4	(D)	1,160,097	(NA)	(NA)
3344131153	Dual core processors.....	1	(D)	(D)	(NA)	(NA)
	Other, including microprocessors, microcontrollers, application specific integrated circuits (ASIC's), and programmable logic arrays (PLA's):					
3344131155	Microprocessors (MPU) operating with an external data bus of 8 bits or less.....	9	1,129,098	1,226,398	1,125,305	1,116,283
3344131158	Microprocessors (MPU) operating with an external data bus of 16 bits.....	8	(D)	(D)	(D)	(D)
3344131161	Microprocessors (MPU) operating with an external data bus of 32 bits or more.....	6	(D)	(D)	(D)	(D)
3344131134	Microcontrollers (MCU) operating with an external data bus of 8 bits or less.....	-	-	-	(NA)	(NA)
3344131135	Microcontrollers (MCU) operating with an external data bus of 16 bits.....	17	2,027,634	6,000,399	1,998,031	6,542,760
3344131136	Microcontrollers (MCU) operating with an external data bus of 32 bits or more.....	1	(D)	(D)	(NA)	(NA)
	Other digital, silicon, including bipolar combined with MOS:					
3344131143	Complementary BiMOS.....	8	(D)	537,367	(D)	1,032,192
3344131145	Other digital silicon ICs.....	19	750,467	3,722,645	404,765	2,774,925

Table 2. Quantity and Value of Shipments of Semiconductors, Electronic Components, and Semiconductor Manufacturing Equipment: 2005 and 2004
 [Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2005		2004	
			Quantity	Value	Quantity	Value
	Nondigital silicon monolithic integrated circuits (e.g., linear, analog):					
3344131162	Radio frequency.....	7	160,227	378,093	186,362	383,886
3344131103	Other, analog.....	15	3,908,232	2,461,431	3,401,480	1,963,916
3344131107	Other.....	19	1,563,274	3,881,822	r/ 1,599,099	3,835,426
	Hybrid integrated circuits:					
3344131118	Radio frequency.....	22	21,921	133,105	r/ 27,731	r/ 220,583
3344131151	Other.....	37	113,876	717,854	129,557	691,674
3344131112	Other.....	33	(X)	2,391,371	1,609,030	2,040,736
3344134	Transistors.....	26	(X)	598,370	(X)	656,025
3344137	Diodes and rectifiers.....	40	(X)	323,356	(X) r/	304,941
334413A	Other semiconductor devices, including semiconductor parts such as chips, wafers, and heat sinks.....					
334413A105	Solar cells.....	138	(X)	8,389,541	(X)	7,247,435
334413A110	Photovoltaic modules.....	8	(X)	143,441	(X)	78,485
334413A123	Light-emitting diodes (LEDs).....	9	(X)	201,983	(X)	182,583
334413A137	Other light sensitive and light-emitting devices.....	23	(X)	657,820	(X)	(D)
334413A140	Other semiconductor devices:	20	(X)	853,265	(X)	(D)
	Thyristors (SCR's, triacs, PNP diodes).....	6	(X)	78,353	(X)	73,873
334413A150	All other semiconductor devices (tunnel diodes, thermo-electric semiconductor junctions, metal-oxide varistors, solid-state transducers, and special semiconductor devices).....	15	(X)	492,670	(X)	428,188
	Semiconductor parts:					
	Chips and wafers:					
334413A155	For integrated circuits (IC's).....	39	(X)	4,474,509	(X)	3,895,634
334413A160	For discrete semiconductors.....	33	(X)	617,667	(X)	489,317
334413A165	All other semiconductor parts (headers, packages, heat sinks, other accessories, etc.).....	31	(X)	869,833	(X) r/	1,175,224
3344140	Capacitors for electronic circuitry.....	63	(X)	1,031,111	(X)	1,184,111
3344140173	Capacitors.....	59	23,283,771	796,444	31,439,522	920,631
3344140175	Parts for capacitors, including unfinished chips for further finishing and assembly.....	7	(X)	234,667	(X)	263,480
3344150	Resistors for electronic circuitry.....	69	(X)	649,458	(X)	743,859
3344150182	Resistors.....	63	2,809,882	474,662	2,345,644	r/ 552,158
3344150184	Parts for resistors.....	9	(X)	174,796	(X)	191,701
3344160	Electronic coils, transformers, and other inductors.....	191	(X)	1,201,665	(X) r/	1,115,654
3344171	Coaxial (RF) connectors for electronic circuitry.....	42	344,562	376,100	376,888	402,605
3344174	Cylindrical connectors for electronic circuitry.....	33	116,656	505,710	138,576	630,978
3344177	Rack and panel (rectangular) connectors for electronic circuitry.....	32	608,238	303,987	(D)	290,460
334417A	Printed circuit connectors for electronic circuitry.....	39	(D)	938,542	(D)	1,012,926
334417D	Other connectors for electronic circuitry, including parts.....	77	(X)	1,144,718	(X)	1,078,868
334417D117	Other connectors.....	67	1,814,090	937,934	1,516,223	911,402
334417D125	Parts for connectors (connectors shipped but still requiring further manufacture).....	22	(X)	206,784	(X)	167,466
334418B	Printed circuit assemblies, loaded boards and modules (printed circuit boards with inserted electronic components).....					
334418B105	Computer and peripheral printed board assemblies.....	615	(X)	19,151,179	(X)	19,565,615
334418B110	Communications printed board assemblies.....	187	(X)	7,371,684	(X) r/	7,949,406
334418B115	Industrial process control board assemblies.....	177	(X)	4,438,551	(X)	4,434,874
334418B120	Instrumentation printed board assemblies (except industrial process).....	208	(X)	1,214,104	(X)	1,219,799
334418B125	Search and detection printed board assemblies.....	166	(X)	1,344,299	(X) r/	1,421,142
334418B130	Consumer electronics, printed board assemblies.....	67	(X)	262,510	(X)	182,602
334418B137	Other printed board assemblies, subassemblies and modules, including office equipment, point of sales and plotter controllers.....	105	(X)	452,246	(X) r/	407,901
3344191	Crystals, filters, piezoelectric, and other related electronic devices (except microwave filters).....					
3344191127	Filters (except microwave).....	90	524,055	771,129	394,607	r/ 654,003
3344191180	Piezoelectric devices.....	48	76,006	290,427	r/ 62,291	r/ 186,678
3344194	All other miscellaneous transducers, including electrical-electronic input/output transducers.....					
3344194105	Electro acoustic (sonar, ultrasonic, vibration*, etc.).....	53	448,049	480,702	332,316	467,325
	Electromechanical:					
3344194110	Accelerometers*.....	75	225,750	1,519,099	(D)	1,494,814
3344194115	Pressure*.....	13	(D)	302,080	(D)	275,649
3344194120	Strain gauges and other mechanical*.....	7	(D)	182,365	(D) r/	185,890
3344194135	Other.....	31	76,393	466,595	81,593	455,647
		15	1,067	122,094	1,522	114,943
		31	47,241	445,965	r/ 36,675	r/ 462,685

Table 2. Quantity and Value of Shipments of Semiconductors, Electronic Components, and Semiconductor Manufacturing Equipment: 2005 and 2004
 [Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2005		2004	
			Quantity	Value	Quantity	Value
3344197	Switches, mechanical, for electronic circuitry*	57	(X)	741,710	(X)	715,775
334419A	Microwave components and devices, except antennae, tubes, and semiconductors	94	(X)	1,157,943	(X)	1,325,988
334419A105	Ferrite, including yttrium garnets, microwave components (circulators, isolators, phase shifters, attenuators, equalizers, limiters, mixers, etc.)	33	(X)	119,597	(X)	147,255
334419A110	Microwave devices, other than ferrite and solid state: Attenuators (dummy loads, high and low-power terminations, etc.)	29	(X)	137,963	(X) r/	133,027
334419A125	Reactive microwave components	30	(X)	152,298	(X)	203,159
334419A130	Switches, coaxial and waveguide	26	(X)	94,110	(X)	88,724
334419A147	Other microwave devices	48	(X)	365,592		453,459
334419A150	Microwave subassemblies, including parametric amplifiers and other solid-state assemblies	23	(X)	288,383	(X)	300,364
334419E	All other miscellaneous electronic components	427	(X)	4,182,751	(X)	4,158,319
334419E125	Oscillators (except instrumentation and crystal types)	16	5,181	109,984	r/ 3,022 r/	95,006
334419E130	Static power supply converters for electronic applications, sold separately: Regulated	46	8,124	514,884	r/ 8,207	628,474
334419E135	Other (unregulated, variable frequency, ac, dc, converters and inverters, vibrator, etc.)	31	(X)	296,680	(X)	291,327
334419E140	Electronic cable harnesses and cable assemblies	218	(X)	1,768,137	(X)	1,728,416
334419E155	Magnetic cores	10	(X)	137,586	(X)	139,795
334419E180	Electronic parts, n.e.c. and specialized electronic hardware: Sockets for electronic component insertion: All other specialized electronic hardware	149	(X)	1,355,480	(X)	1,275,301

*Similar products are collected on Current Industrial Report series MA334C, "Control Instruments" and MA335K, "Wiring Devices and Supplies." - Represents zero. D Withheld to avoid disclosing data for individual companies. NA Not available. r/Revised by 5 percent or more from previously published data. X Not applicable.

Table 3. Shipments, Exports, and Imports of Semiconductors, Electronics Components, and Semiconductor Manufacturing Equipment: 2005
 [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/
3332950106	Semiconductor wafer processing equipment: thin layer chemical vapor deposition.....	1,274,437	1,883,457	113,770
3332950211	Semiconductor wafer processing equipment: thin layer physical vapor deposition.....	(D)	734,016	28,188
3332950401	Micro lithography, including aligners.....	178,736	29,311	951,608
3332950416	Semiconductor wafer processing equipment: thin layer epitaxial growth deposition.....	(D)	4,691	28,151
3332950421	Semiconductor wafer processing equipment: wet etch.....	44,600	29,642	88,911
3332950441	Ion implantation, including current and voltage ion implanters.....	682,947	439,216	86,954
3332950456	Wafer processing equipment: pattern generating apparatus.....	(D)	1,684,323	292,253
3332950461	Other semiconductor wafer processing equipment.....	(D)	1,152,523	813,216
3332950500	Parts for semiconductor manufacturing machinery, including packaging equipment.....	623,261	261,926	538,316
3344111130	Power and special-purpose electron tubes, except forward wave tubes.....	281,211	117,711	100,032
33441114	Receiving type electron tubes, including cathode ray (new and rebuilt).....	620,800	529,858	433,744
33441117	Electron tube parts.....	83,567	60,085	98,479
3344120105, 110, 115, 120, 125, 130, 139	Bare printed circuit boards.....	4,599,515	1,780,710	1,785,145
3344131150	Monolithic integrated circuits, digital, nonsilicon.....	856,519	430,041	112,517
3344131143, 145, 152	Monolithic integrated circuits, digital, silicon.....	7,027,733	1,180,253	5,361,837
3344131174, 175, 176, 177, 178	Metal oxide (MOS) semiconductor, field effect transistors: Volatile memory DRAMs.....	(D)	934,264	2,989,330
3344131183, 187	Metal oxide (MOS) semiconductor, field effect transistors: Volatile memory SRAMs.....	(D)	442,861	42,653
3344131181, 188, 193	Metal oxide (MOS) semiconductor, field effect transistors: Nonvolatile EEPROMs.....	(D)	362,022	1,485,629
3344131155	Metal oxide (MOS) semiconductor, field effect transistors: Microprocessors (MPU) operating with an external data bus of 8 bits or less.....	1,226,398	81,715	457,065
3344131158	Metal oxide (MOS) semiconductor, field effect transistors: Microprocessors (MPU) operating with an external data bus of 16 bits.....	(D)	89,758	344,040
3344131161	Metal oxide (MOS) semiconductor, field effect transistors: Microprocessors (MPU) operating with an external data bus of 32 bits or more.....	(D)	975,227	2,521,565
3344131103, 107, 162	Nondigital silicon monolithic integrated circuits, including linear, analog, radio frequency, etc.....	6,721,346	1,824,210	4,516,249
3344131118, 151	Hybrid integrated circuits.....	850,959	388,843	562,897
3344134	Transistors.....	598,370	405,002	1,074,246
3344137	Diodes and rectifiers.....	323,356	423,463	597,484
334413A105	Solar cells.....	143,441	379,538	233,783
334413A123	Light-emitting diodes (LEDs).....	657,820	541,929	673,918
334413A137	Other light-sensitive and light-emitting devices.....	853,265	140,253	335,871
334413A140	Thyristors, SCR's, triacs, and PNP diodes.....	78,353	35,446	213,737
334413A155	Chips and wafers for integrated circuits.....	4,474,509	22,948,877	2,940,654
334413A160	Chips and wafers for discrete semiconductors.....	617,667	1,316,976	350,071
334413A165	All other semiconductor parts (headers, packages, heat sinks, other accessories, etc.....	869,833	306,849	142,278
3344140173	Capacitors.....	796,444	699,675	1,384,524
3344140175	Parts for capacitors, including unfinished chips for further finishing and assembly.....	234,667	103,017	28,358
3344150182	Resistors.....	474,662	280,420	600,690
3344150184	Parts for resistors.....	174,796	67,334	32,486
3344160	Electronic coils, transformers, and other inductors.....	1,201,665	224,326	842,662
3344171	Coaxial (RF) connectors for electronic circuitry.....	376,100	180,631	257,946
3344174	Cylindrical connectors for electronic circuitry.....	505,710	69,687	234,943
3344177	Rack and panel (rectangular) connectors for electronic circuitry.....	303,987	55,681	59,832
334417A	Printed circuit connectors for electronic circuitry.....	938,542	388,584	464,888
3344191180	Piezoelectric devices.....	480,702	207,586	348,746
3344197	Switches, mechanical, for electronic circuitry.....	741,710	759,783	1,854,421

D Withheld to avoid disclosing data for individual companies.

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 port of entry in the United States plus import duties.

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 Codes and HTSUSA Import Codes: 2005

Product code	Product description	Export code 1/	Import code 2/
3332950106	Semiconductor wafer processing equipment: thin layer chemical vapor deposition.....	8479.89.8476	8479.89.8476
3332950211	Semiconductor wafer processing equipment: thin layer physical vapor deposition.....	8543.89.1000	8543.89.1000
3332950401	Micro lithography, including aligners.....	9010.42.0000	9010.42.0000
3332950416	Semiconductor wafer processing equipment: thin layer epitaxial growth deposition.....	8479.89.8472	8479.89.8472
3332950421	Semiconductor wafer processing equipment: wet etch.....	8464.90.1040 8464.90.6000	8464.90.1040 8464.90.6000
3332950441	Ion implantation, including current and voltage ion implanters.....	8543.11.0000	8543.11.0000
3332950456	Wafer processing equipment: pattern generating apparatus.....	8456.91.0000 9010.41.0000	8456.10.6000 8456.91.0000 9010.41.0040 9010.41.0080
3332950461	Other semiconductor wafer processing equipment.....	8421.19.0000 8424.89.3000 8456.99.1000 8464.10.0040 8479.89.8474 8479.89.8490 8480.71.4000 8514.30.2000 9010.49.0000	8421.19.3000 8424.89.3000 8424.89.5000 8456.99.1000 8456.99.7000 8462.21.4045 8462.21.4085 8462.29.4045 8462.29.4085 8464.10.0040 8464.20.1000 8465.99.4000 8477.10.7000 8477.40.4000 8477.59.4000 8479.89.8474 8479.89.8490 8479.89.8700 8480.71.4000 8514.30.2000 8514.30.6000 9010.49.0000
3332950500	Parts for semiconductor manufacturing machinery, including packing equipment.....	8543.90.1000	8424.90.9080 8543.90.1000 8543.90.6400 8543.90.8400
3344111130	Power and special-purpose electron tubes, except forward wave tubes	8540.71.2000 8540.71.4000 8540.72.0000 8540.79.0000 8540.89.0020 8540.89.0040 8540.89.0080	8540.71.2000 8540.71.4000 8540.72.0000 8540.79.0000 8540.89.0020 8540.89.0040 8540.89.0080
3344114	Receiving type electron tubes, including cathode ray (new and rebuilt).....	8540.11.0035 8540.11.0070 8540.11.0080 8540.12.0000 8540.60.0055 8540.60.0080 8540.81.0000	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

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes and HTSUSA Import Codes: 2005

Product code	Product description	Export code 1/	Import code 2/
3344114	Receiving type electron tubes, including cathode ray (new and rebuilt) (continued).....		8540.12.1040 8540.12.1080 8540.12.2000 8540.12.5040 8540.12.5080 8540.12.7000 8540.60.0020 8540.60.0040 8540.60.0060 8540.60.0080 8540.81.0000
3344117	Electron tube parts.....	8540.91.2000 8540.91.4000 8540.99.0000	8540.91.1500 8540.91.2000 8540.91.5000 8540.99.4000 8540.99.8000
3344120105, 110, 115, 120, 125, 130, 139	Bare 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
3344131150	Monolithic integrated circuits, digital, nonsilicon.....	8542.21.8091 8542.21.8099	8542.21.8091 8542.21.8099
3344131143, 145, 152	Monolithic integrated circuits, digital, silicon.....	8542.21.8088	8542.21.8081 8542.21.8082 8542.21.8089
3344131174, 175, 176, 177, 178	Metal oxide (MOS) semiconductor, field effect transistors: Volatile memory DRAMs.....	8542.21.8021 8542.21.8028	8542.21.8020 8542.21.8024 8542.21.8025 8542.21.8026 8542.21.8027 8542.21.8028 8542.21.8030
3344131183, 187	Metal oxide (MOS) semiconductor, field effect transistors: Volatile memory SRAMs.....	8542.21.8031 8542.21.8038	8542.21.8031 8542.21.8032 8542.21.8039
3344131181, 188, 193	Metal oxide (MOS) semiconductor, field effect transistors: Nonvolatile EEPROMs	8542.21.8048	8542.21.8041 8542.21.8042 8542.21.8049
3344131155	Metal oxide (MOS) semiconductor, field effect transistors: Microprocessors (MPU) operating with an external data bus of 8 bits or less.....	8542.21.8071	8542.21.8071
3344131158	Metal oxide (MOS) semiconductor, field effect transistors: Microprocessors (MPU) operating with an external data bus of 16 bits.....	8542.21.8072	8542.21.8072
3344131161	Metal oxide (MOS) semiconductor, field effect transistors: Microprocessors (MPU) operating with an external data bus of 32 bits or more.....	8542.21.8079	8542.21.8079
3344131103, 107, 162	Nondigital silicon monolithic integrated circuits 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

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes and HTSUSA Import Codes: 2005

Product code	Product description	Export code 1/	Import code 2/
3344131118, 151	Hybrid integrated circuits.....	8542.60.0075 8542.60.0095	8542.60.0075 8542.60.0095
3344134	Transistors.....	8541.21.0080 8541.29.0080	8541.21.0075 8541.21.0095 8541.29.0075 8541.29.0095
3344137	Diodes and rectifiers.....	8541.10.0050 8541.10.0060 8541.10.0070 8541.10.0080 8541.40.6050	8541.10.0050 8541.10.0060 8541.10.0070 8541.10.0080 8541.40.6050
334413A105	Solar cells.....	8541.40.6020 8541.40.6030	8541.40.6020 8541.40.6030
334413A123	Light-emitting diodes (LEDs).....	8541.40.2000	8541.40.2000
334413A137	Other light sensitive and light-emitting devices.....	8541.40.7080 8541.40.8000 8541.40.9500	8541.40.7080 8541.40.8000 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	All other semiconductor parts, including headers, packages, and heat sinks, accessories, etc.	8541.90.0000	8541.90.0000
3344140173	Capacitors.....	8532.21.0020 8532.21.0040 8532.21.0050 8532.21.0080 8532.22.0020 8532.22.0040 8532.22.0055 8532.22.0085 8532.23.0020 8532.23.0040 8532.23.0060 8532.24.0020 8532.24.0040 8532.24.0060 8532.25.0010 8532.25.0020 8532.25.0030 8532.25.0040 8532.25.0060 8532.25.0070 8532.25.0080 8532.29.0020 8532.29.0040 8532.30.0010 8532.30.0090	8532.21.0020 8532.21.0040 8532.21.0050 8532.21.0080 8532.22.0020 8532.22.0040 8532.22.0055 8532.22.0085 8532.23.0020 8532.23.0040 8532.23.0060 8532.24.0020 8532.24.0040 8532.24.0060 8532.25.0010 8532.25.0020 8532.25.0030 8532.25.0040 8532.25.0060 8532.25.0070 8532.25.0080 8532.29.0020 8532.29.0040 8532.30.0010 8532.30.0090

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes and HTSUSA Import Codes: 2005

Product code	Product description	Export code 1/	Import code 2/
3344140175	Parts for capacitors, including unfinished chips for further finishing and assembly.....	8532.90.0000	8532.90.0000
3344150182	Resistors.....	8533.10.0020 8533.10.0042 8533.10.0057 8533.10.0070 8533.21.0025 8533.21.0045 8533.21.0075 8533.21.0080 8533.21.0090 8533.31.0000 8533.39.0080 8533.40.0080	8533.10.0020 8533.10.0042 8533.10.0057 8533.10.0060 8533.10.0065 8533.21.0010 8533.21.0020 8533.21.0030 8533.21.0040 8533.21.0050 8533.21.0060 8533.21.0070 8533.21.0080 8533.21.0090 8533.31.0000 8533.39.0080 8533.40.8050 8533.40.8060 8533.40.8070
3344150184	Parts for resistors	8533.90.0000	8533.90.4000 8533.90.8000
3344160	Electronic coils, transformers, and other inductors.....	8504.31.2000 8504.31.4035 8504.31.4065 8504.31.6000 8504.32.0000 8504.33.0020 8504.33.0040 8504.34.0000 8529.90.3540 8540.91.2000	8504.31.2000 8504.31.4035 8504.31.4065 8504.31.6000 8504.32.0000 8504.33.0020 8504.33.0040 8504.34.0000 8529.90.3300 8529.90.3600 8540.91.2000
3344171	Coaxial (RF) connectors for electronic circuitry.....	8536.69.4010	8536.69.4010
3344174	Cylindrical connectors for electronic circuitry.....	8536.69.4020	8536.69.4020
3344177	Rack and panel (rectangular) connectors for electronic circuitry.....	8536.69.4030	8536.69.4030
334417A	Printed circuit connectors for electronic circuitry.....	8536.69.4040	8536.69.4040
3344191180	Piezoelectric devices.....	7104.10.0000 8541.60.0025 8541.60.0060 8541.60.0080	7104.10.0000 8541.60.0010 8541.60.0020 8541.60.0030 8541.60.0050 8541.60.0060 8541.60.0080
3344197	Switches, mechanical, for electronic circuitry.....	8536.50.7000 8536.50.9020 8536.50.9025 8536.50.9030 8536.50.9035 8536.50.9040 8536.50.9045 8536.50.9050 8536.50.9055 8536.50.9065	8536.50.7000 ** 8536.50.9020 8536.50.9025 8536.50.9031 8536.50.9032 8536.50.9033 8536.50.9035 8536.50.9040 8536.50.9045 8536.50.9050 8536.50.9055 8536.50.9065

** HS codes include switches of product class 36433.

1/Source: 2005 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 (2005).

Appendix.

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

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 Foodservices
- 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.)

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.

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). Beginning in 2005 data for the MA334Q will be collected under the title Semiconductors, Electronic Components, and Semiconductor Manufacturing Equipment. Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library.