Chapter 3 Electrical Machinery Sector

3-1 Household Electrical Machinery

3-1-1 Supply and demand trends

(1) Overview

Domestic production and shipments of Japanese household electrical machinery increased on the previous year in 2004 (as did domestic demand), and both exports and imports (including reverse imports) continued to rise. Since the beginning of 2005 as well, shipments, exports and imports have been growing (however, with regard to domestic production, while it is not possible to obtain precise figures, due to substantial statistical changes, broadly speaking there was a decline on the same period of the previous year).

At any rate, a certain amount of light could be seen in this sector in 2004. Along with the increase in domestic demand resulting from the recovery in the economy as a whole, such factors as the positive repercussions of the economic climate relating to digital home appliances (household electronic machinery), which began to take full effect in 2003, the subsequent healthy development of this sector even as the digital appliance boom was slowing down, and the buoyant condition of related fields due to the development of new legislation and such seasonal factors as unusually cool summers and heat waves have meant that trends that reverse those seen previously are emerging. Above all, the efforts of household electrical equipment manufacturers to bring out new products and high value-added products (primarily washer-driers, microwave ovens and refrigerators) have borne fruit. Moreover, since the beginning of 2005, domestic demand has been developing healthily, partly due to the fact that almost ten years have passed since the demand generated in 1997 as a result of the impending rise in consumption tax, so we have entered the peak of the replacement cycle, which is about ten years long.

At the same time, however, the question of how each manufacturer can beat its competitors in launching high-performance products that generate such new demand is critical. As far as the numerous Japanese household electrical appliance manufacturers are concerned, although replacement demand is growing, there are many issues besetting this sector, such as the continued fierce competition for a share of this pie, the fact that there is a continued sluggish trend in the household electrical equipment sector overall, even though it seems that the slight decline in prices and unit prices has been checked, and the effects of the rise in steel material prices since 2003. Moreover, the Japanese market is gradually beginning to be infiltrated as a result of the rise of Asian influences, such as manufacturers in the ROK and China, and the regaining of lost ground by manufacturers in Europe and the United States, which were conventionally the competitors of Japanese manufacturers.

Household electrical machinery is also known as "white goods"; air conditioners for household use, which are normally a typical example of white goods, are dealt with in the section on "refrigerating machines and appliances," in compliance with the *Yearbook of Machinery Statistics* published by the Ministry of Economy, Trade and Industry.

(2) Production

The domestic production of household electrical machinery in 2004 was ¥1,178.9 billion, an increase of 5.8% on the previous year, but this is still less than the ¥1,205.5 billion re-

corded in 2002 (a 12.9% decrease on the previous year) (Diagram 3-1-1). Moreover, in 2005 (January–June), the figure was ¥502.4 billion, a decrease of 11.9% on the same period of the previous year.

Furthermore, the trends for each major item in domestic production in 2004 were as follows. However, it is not possible to make exact comparisons with the previous year in major classifications, as there have been some statistical revisions, so only the value of production as recorded is shown: electrical space heaters totalled ¥10.6 billion, kitchen devices ¥532.2 billion, air conditioning and household equipment ¥184.0 billion, home laundry and allied equipments ¥282.4 billion, electrical personal appliances ¥87.1 billion, and other appliances ¥79.2 billion (these major classifications have been completely eliminated from the 2005 statistics). With regard to trends by product, listed in descending order of the share of the value of production for which they account in this industry, 3.02 million (up 5.6% on the previous year) refrigerators (accounting for 26.8% of the total value of production in 2004) were produced at a value of ¥315.6 billion (up 12.4% on the previous year); 2.63 million (down 9.1% on the previous year) fully automatic washing machines (11.1% of the 2004 total) were produced at a value of ¥130.7 billion (up 0.2% on the previous year); 2.61 million (up 8.3% on the previous year) toilet seats with a warm water flush system (6.3% of the 2004 total) were produced at a value of ¥74.7 billion (up 3.5% on the previous year); and 4.65 million (down 3.2% on the previous year) electrical cleaners (4.7% of the 2004 total) were produced at a value of ¥52.4 billion (down 21.0% on the previous year). Almost all of these products declined in 2005 (January–June) in comparison with the same period of the previous year. At the same time, the products with a large percentage gain were electric water heaters, with 250,000 units (up 5.0% on the previous year) produced at a value of ¥51.6 billion (up 17.7% on the previous year), and electrical massagers, with 630,000 units (up 49.7% on the previous year) produced at a value of ¥49.2 billion (up 11.5% on the previous year). However, in 2005, there was a decline in the value of water heaters produced and the number of units of massagers produced, compared with the same period of the previous year.

Diagram 3-1-1 Domestic production trends of household electrical machinery

	2002			2003				2004				Jan - June 2005			
	Number	Comparison with previous year	Value	Number	Comparison with previous year	Value	Comparison with previous year	Number	Comparison with previous year	Value	Comparison with previous year	Number	Comparison with previous year	Value	Comparison with previous year
	(units)	(%)	(¥1 million)	(units)	(%)	(¥1 million)	(%)	(units)	(%)	(¥1 million)	(%)	(units)	(%)	(¥1 million)	(%)
Total	-	-	1,205,513	-	-	1,114,681	92.5	-	-	1,178936	105.8	-	-	502,446	88.1
Electrical space heaters	-	-	27,964	-	-	24,956	89.2	-	-	10,603	42.5				
Electric heaters	1,621,655	121.6	8,220	1,471,300	90.7	7,241	88.1	550,589	37.4	3,538	48.9				
Electric carpets	1,536,982	83.2	14,935	1,415,901	92.1	13,013	87.1	863,252	61.0	7,065	54.3	Omitted from 2005			
Kitchen devices	-	-	503,369	-	-	435,231	86.5	-	-	532,208	122.3				
Microwave ovens	2,121,020	79.3	50,116	1,716,763	80.9	39,066	78.0	1,248,182	72.7	32,977	84.4	367,838	55.2	11,790	70.8
Electric rice-cookers	8,136,845	99.5	59,766	4,307,767	83.9	52,385	87.7	4,424,291	102.7	54,519	104.1	2,063,813	98.3	26,572	106.9
Electric hot plates	850,393	76.5	4,375	465,231	54.7	2,034	46.5	285,855	61.4	1,329	65.3	Omitted from 2005			
Electric kettles	4,309,642	84.6	23,690	3,552,154	82.4	17,156	72.4	3,155,076	88.8	15,837	92.3	1,304,405	78.4	6,389	75.5
Dishwashers & driers	782,832	137.1	38,347	945,502	120.8	42,653	111.2	949,531	100.4	45,326	106.3	437,071	96.7	20,212	96.8
Refrigerators	3,316,725	85.6	324,926	2,858,983	86.2	280,743	86.4	3,019,604	105.6	315,649	112.4	1,402,708	94.1	140,788	90.5
Electric cooktops	-	-	-	-	-	-	-	674,872	-	66,571	-	357,322	127.3	30,982	116.3
Freezers	81,910	66.3	13,863	66,122	80.7	12,782	92.2	-	-	-	-	20,357	85.6	5,793	89.6
Air conditioning and home-related equipment	-	-	155,788	-	-	152,958	98.2	-	-	184,015	120.3	Omitted from 2005			
Electric fans	1,596,397	80.6	5,531	1,384,397	86.7	4,843	87.6	555,126	40.1	2,391	49.4				
Ventilation fans	7,683,817	100.1	100,309	6,875,433	89.5	91,959	91.7	6,982,132	101.6	100,626	109.4	3,435,648	106.7	54,780	116.2
Electric water heaters	234,099	101.2	37,510	235,955	100.8	43,861	116.9	247,667	105.0	51,628	117.7	119,421	102.1	20,225	83.8
Natural coolant heat pump type water heaters	-	-	-	-	-	-	-	-	-	-	-	95,880	-	12,519	-
Electric well pumps for household use	290,130	97.3	12,438	282,856	97.5	12,295	98.9	272,956	96.5	12,691	103.2	124,732	98.0	5,724	96.4
Air purifiers	-	-	-	-	-	-	-	1,147,058	-	16,679	-	429,499	85.0	5,230	72.6
Home laundry and allied equipments	-	-	299,891	-	-	286,044	95.4	-	-	282,404	98.7	Omitted from 2005			
Washing machines	3,524,402	86.8	147,139	3,132,701	88.9	135,415	92.0	2,847,961	90.9	135,294	99.9	1,405,032	89.6	71,715	98.2
Fully automatic washing machines	3,272,609	87.9	141,703	2,895,099	88.5	130,353	92.0	2,631,936	90.9	130,670	100.2				
Twin-tub washing machines	251,793	74.8	5,436	237,602	94.4	5,062	93.1	216,025	90.9	4,624	91.3				
Washing machines (fully automatic & twin-tub) <from 2005>	-	-	-	-	-	-	-	-	-	-	-	872,044	-	26,270	-
Washer-driers <from 2005>	-	-	-	-	-	-	-	-	-	-	-	532,988	-	45,445	-
Clothes driers	185,827	75.2	7,530	182,993	98.5	7,125	94.6	151,011	82.5	6,213	87.2	Omitted from 2005			
Electric irons	1,688,739	70.5	4,657	1,612,245	95.5	3,777	81.1	1,672,017	103.7	3,800	100.6				
Electric cleaners (vacuum, etc.)	5,199,540	95.5	70,446	4,809,931	92.5	66,392	94.2	4,654,560	96.8	52,441	79.0	2,146,693	99.0	29,059	97.3
Toilet seats with warm water flush system	2,180,361	94.4	67,015	2,412,149	110.6	72,144	107.7	2,612,570	108.3	74,656	103.5	1,131,337	89.3	31,610	87.0
Electrical personal appliances	-	-	82,590	-	-	85,196	103.2	-	-	87,118	102.3	Omitted from 2005			
Electric shavers	6,592,263	95.8	32,777	6,922,586	105.0	36,443	111.2	6,253,757	90.3	33,960	93.2	1,841,516	52.1	9,986	51.9
Electrical massagers	476,226	96.6	44,919	422,067	88.6	44,102	98.2	632,024	149.7	49,173	111.5	190,491	59.4	23,024	107.3
Hairdryers	1,411,187	103.7	4,894	1,541,967	109.3	4,651	95.0	1,392,806	90.3	3,985	85.7	Omitted from 2005			
Electric kitchen waste disposers	122,184	83.2	4,578	103,345	84.6	3,890	85.0	104,510	101.1	3,427	88.1	59,103	143.7	1841	139.7
Other household electrical machinery	19,122,703	118.7	131,333	22,673,054	118.6	126,406	96.2	22,787,937	100.5	79,161	62.6	Omitted from 2005			

Source: *Yearbook of Machinery Statistics*, Ministry of Economy, Trade and Industry, and data provided by the Japan Electrical Manufacturers' Association (JEMA).

(3) Shipments

The value of shipments of household electrical machinery in 2004 was ¥1,392.8 billion, an increase of 0.7% on the previous year, just about halting the decline that began in 2001 (¥1,507.9 billion, a decline of 2.0% on the previous year) and continued until 2003 (¥1,382.6 billion, a decline of 4.1% on the previous year). Moreover, in 2005 (January–June), the value was ¥674.9 billion, up 3.4% on the same period of the previous year (Diagram 3-1-2).

In addition, with regard to trends in shipments of major products in 2004, according to materials published by JEMA, with regard to refrigerators (all types), the value of shipments totalled ¥358.9 billion (up 3.2% on the previous year), while the number of units shipped was 4.43 million (up 4.7% on the previous year); of the latter, 680,000 refrigerators with a capacity of less than 351-400 litres were shipped, an increase of 14.8% on the previous year. With regard to washing machines (all types), 4.44 million units (up 2.1% on the previous year) were shipped at a value of ¥236.7 billion (up 5.6% on the previous year); fully automatic washing machines are predominant, but if we look at the growth rate, we can see that integrated washer-driers totalled 820,000 units (up 32.4% on the previous year, accounting for about 19% of all washing machines in terms of the quantity shipped). This growth continued in 2005 (January–June), reaching 540,000 units (up 37.7% on the same period of the previous year). Furthermore, while there were increases on the previous year in electric cleaners (5.87 million units, up 5.2%, with a total value of ¥116.3 billion, up 1.9%), ventilation fans (7.67 million units, up 8.8%, with a total value of ¥115.4 billion, up 9.7%), and dishwashers and driers (940,000 units, up 4.0%, with a total value of ¥49.8 billion, up 4.0%), in 2005, apart from the number of units of electric cleaners produced, all these figures showed a decline on the same period of the previous year.

Diagram 3-1-2 Trends in shipments of household electrical machinery

	Value (¥1 million)	Comparison with previous year (same period of previous year) (%)
2002	1,441,104	95.2
2003	1,382,614	95.9
2004	1,392,801	100.7
2005 (January–June)	674,879	103.4

Source: Data provided by JEMA

At the same time, in 2005, the products demonstrating remarkable growth in terms of both the number of units shipped and the value of shipments were air purifiers (1.06 million units, up 33.1%, with a total value of ¥21.2 billion, up 43.8%) and electric kitchen waste disposers (50,000 units, up 57.9%, with a total value of ¥2.4 billion, up 57.5%).

(4) Exports and imports

The value of exports of household electrical machinery in 2004 was ¥111.1 billion, representing an increase of 16.8% compared with the previous year. This upward trend had continued since 2003, but in 2005 (January–June), the value stuck at ¥53.0 billion, an increase of just 0.1% on the same period of the previous year (Diagram 3-1-3).

Diagram 3-1-3 Trends in exports and imports of household electrical machinery

Exports & imports	2002		2003		2004		2005 (January–June)	
	Value (¥1 million)	y/y (%)	Value (¥1 million)	y/y (%)	Value (¥1 million)	y/y (%)	Value (¥1 million)	y/y (%)
Exports	89,445	96.0	95,132	106.4	111,106	116.8	52,998	100.1
Imports	272,067	118.4	292,639	107.6	323,030	110.4	170,297	113.9

Source: Data provided by JEMA

Looking at individual products, the main items that experienced remarkable growth in 2004 were refrigerators (compression type), with exports totalling 43,000 units, up 31.0%, at a value of ¥980 million, up 12.3%; electric shavers, with exports totalling 71,000 units, up 32.1%, at a value of ¥140 million, up 91.0%; electric heaters, with exports totalling 131,000 units, up 109.9%, at a value of ¥1.34 billion, up 209.8%; and electrical irons, with exports totalling 811,000 units, up 12.7%, at a value of ¥1.64 billion, up 3.6%. Moreover, the products that experienced growth in both 2004 and 2005 (January–June) were other refrigerators, upright freezers, fully automatic washing machines, vacuum cleaners, microwave ovens and electrical rice-cookers.

At the same time, the value of imports of household electrical machinery in 2004 was ¥323.0 billion, an increase of 10.4% compared with the previous year, and even in 2005 (January–June), the value grew by 13.9% on the same period of the previous year to ¥170.3 billion (Diagram 3-1-3). With regard to imports over the last few years, the trend has been towards an average increase of almost 10%. Of course, these figures also include reverse imports and there is still an adverse balance of payments. By product, the main items experiencing growth in 2004 were freezers, kitchen waste disposers, food mixers and juicers, and electric kettles, while the main growth items in both 2004 and 2005 (January–June) included refrigerators, washing machines (fully automatic), electric vacuum cleaners, electrical irons and microwave ovens.

3-1-2 Business conditions and industry trends

(1) Business trends

The business performance of major companies involved in the production of household electrical machinery is shown in Diagram 3-1-4. In some cases, these figures include a broad range of home appliances, which are not products or classifications included in the category of household electrical machinery, so it is not possible to make exact comparisons, but if we look at the general situation, we can see that the introduction of high value-added products has borne fruit, with increases in both sales and profits in FY 2004, and the business performance of many companies exceeded that of FY 2003. However, gaps are emerging among companies and these increased further in the first quarter of FY 2005. Against the background of various problems besetting this industry, such as the severity of market competition, it seems that these disparities have emerged because of such factors as the product development strategies and business strategies deployed by various companies, as well as management reforms and organisational restructuring.

Diagram 3-1-4 Business performance of household electrical machinery manufacturers

		Sales	y/y	Share of total sales	Operating profit	y/y
		(¥100 million)	(%)	(%)	(¥100 million)	(%)
Matsushita Electric Industrial Co., Ltd.	**Appliance sector**					
	FY2002	11,975	-	16.2	452	-
	FY2003	12,232	102.0	16.0	527	117.0
	FY2004	13,328	109.0	15.3	776	147.2
	FY 2005 1st quarter	3,232	94.0	16.0	186	9.0
Toshiba Corporation	**Home appliances**					
	FY2002	6,336	96.6	11.2	41	40.7
	FY2003	6,373	106.0	11.4	35	84.0
	FY2004	6,610	104.0	11.8	▲33	-
	FY 2005 1st quarter	1,612	103.0	11.4	▲46	-
Sanyo Electric Co., Ltd.	**Electrical appliances**					
	FY2002	2,655	92.5	11.7	▲105	-
	FY2003	2,497	94.0	9.6	▲84	-
	FY2004	2,607	108.6	9.8	▲24	-
	FY 2005 1st quarter	612	102.5	10.0	▲17	-
Sharp Corporation	**Electrical appliances**					
	FY2002	2,239	95.0	11.2	22	60.0
	FY2003	2,084	95.0	9.2	5	22.7
	FY2004	2,122	101.8	8.4	20	415.1
	FY 2005 1st quarter	576	110.9	9.3	11	109.0
Hitachi, Ltd.	**Digital media & household appliances**					
	FY2002	12,055	103.0	12.0	62	-
	FY2003	12,269	102.0	14.2	69	112.0
	FY2004	12,803	104.0	14.2	86	125.0
	FY 2005 1st quarter	2,972	89.0	13.0	▲81	-
Mitsubishi Electric Corporation	**Home appliances**					
	FY2002	7,891	109.0	22.0	362	97.0
	FY2003	7,823	99.1	21.4	193	53.3
	FY2004	8,664	110.8	22.8	256	132.6
	FY 2005 1st quarter	2,139	103.0	25.8	113	109.0

Source: Compiled from account settlement data from each company (obtained from websites and newspaper reports).

Note: The product classifications of each company in the aforementioned sector are not precise. They may include products that fall into categories other than that of household electrical machinery. Moreover, with regard to Matsushita Electric Industrial Co., Ltd., the comparison with the previous year has not been calculated, as a modification took place in FY 2002, so the figures would not be consistent.

(2) Industry trends

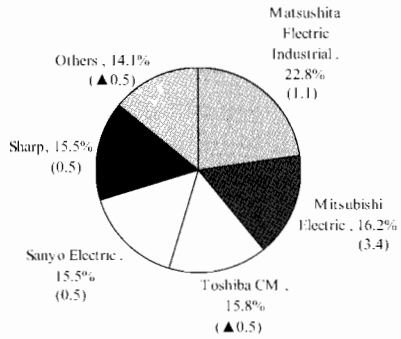
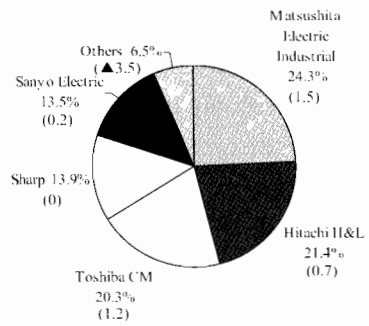
1) Development of high value-added products

In 2004, there was a group of products known as "the Big Four," which were washer-driers (washing machines with an integrated tumble drier), cyclone cleaners, CFC-free refrigerators and turntable-less microwave ovens. Companies have even managed to make mature products more sophisticated by constantly incorporating new perspectives. Moreover, from the latter half of 2004 into 2005, they launched products with new perspectives, such as washer-driers that have undergone further improvements and ovens that cook using steam, as well as refrigerators that generate nutrients, such as vitamins.

Over the last few years, there has been particularly strong growth in washer-driers (washing machines with an integrated tumble drier). With regard to the types of washing machines as well, in addition to drum-types, vertical drum-types and pulsator-types, Matsushita's "30° diagonal drum," which evolved from the vertical drum-type machine, and the BeatWash (a beat-type washing machine) created by Hitachi Home & Life Solutions, which is a third type of washing machine that combines advantages of the pulsator-type, the drum-type and the beat-type, were developed and put on the market in 2004. Thus, Japanese home appliance manufacturers are paying minute attention to their products in a variety of ways, based on the advanced technology that they have built up hitherto.

The trends with regard to refrigerators and washing machines in 2005 and in the future are shown in Diagram 3-1-5. If we also look at the current situation with regard to the shares of home appliance manufacturers in the Japanese market, we can see that, while at least six or seven companies are engaged in fierce competition in a single field, the concepts and issues relating to products are progressing in the same direction in all fields.

Diagram 3-1-5 Product trends and market shares relating to refrigerators and washing machines

	Refrigerators	Washing machines
Overview	In addition to pursuing their essential function in the form of their ability to maintain freshness and their ability to conserve electricity, progress has been made in switching to CFC-free models that take the environment into consideration, and improving the insulation material used. As well as maintaining freshness, products are intended to appeal to customers through deodorising and sterilising functions, particularly the moisture retention function of the vegetable compartment. Moreover, the attractiveness of their visual design and universal design that is easy to use are also key points, so manufacturers are taking into consideration such matters as ease of storing vegetables and frozen foods, and the ease with which things can be taken out of the refrigerator, from the perspective of ergonomics. The trend towards ever-larger refrigerators is continuing, with all companies developing products with a capacity in excess of 400 litres.	While the share of washer-driers that integrate washing, water extraction and drying is increasing (accounting for about 20% of all fully automatic washing machines), manufacturers are, of course, improving their basic functions, such as washing performance and water conservation performance, while also appealing to customers on the basis of (improved) user-friendliness (= universal design). Various types are emerging, such as the vertical-type and the drum-type.
Share (Japanese market)	 Source: *Nikkei Business Daily*, July 26, 2005. Figures in parentheses represent percentage increase or decrease compared with the previous year, with ▲ representing a decrease.	 Source: *Nikkei Business Daily*, August 5, 2005. Figures in parentheses represent percentage increase or decrease compared with the previous year, with ▲ representing a decrease.

Source: Overview compiled from various materials. Details of shares are as indicated in the diagram.

With regard to refrigerators, in addition to pursuing their essential function in the form of their ability to maintain freshness and their ability to conserve electricity, switching to CFC-free models that take the environment into consideration and improving the insulation material used, the attractiveness of their visual design and universal design that is easy to use are also key points, so manufacturers are focusing on such matters as ease of storing vegetables and frozen foods, and the ease with which things can be taken out of the refrigerator.

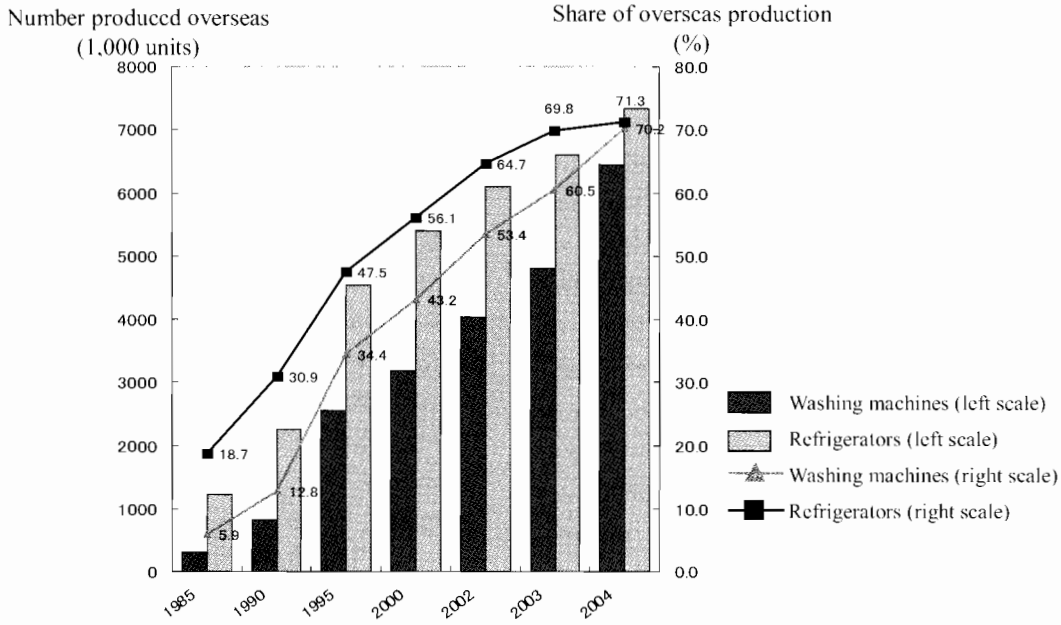
Moreover, while the share of washer-driers that integrate washing, waster extraction and drying is increasing (accounting for about 20% of all fully automatic washing machines), as stated earlier, manufacturers are, of course, improving their basic functions, such as washing performance, while also appealing to customers on the basis of (improved) user-friendliness (= universal design), which is the primary advantage of electrical appliances used for carrying out housework.

What can be said overall is that, in addition to improving conventional functions (making appliances more sophisticated), consideration is being incorporated into products in the form of universal design perspectives, such as user-friendliness, operability and comfort.

2) Active overseas development

Originally, the characteristics of household electrical machinery meant that they were predominantly produced within Japan. However, over the last few years, there has been a marked trend towards overseas expansion and, as shown in Diagram 3-1-6, the percentage of overseas-produced refrigerators and washing machines, which truly were the quintessential items of household electrical machinery, has soared. At the same time, since 2000, overseas production has exceeded domestic production, with the share of overseas-produced goods exceeding 70% in 2004. Home appliance manufacturers are implementing corporate collaboration and partnership on a global scale, including collaboration with emerging Asian companies, as a strategy for promoting the global business upon which their growth strategy for survival depends.

Furthermore, in addition to the expansion of production at existing overseas production hubs in order to reduce all costs relating to goods produced within a single company and the import of those goods to that country (the Out-In strategy), other trends being seen include the restructuring of production hubs within Asia, especially China, and optimum location production and optimum location sales on a global scale as a means of enhancing supply systems aimed at overseas markets (the Out-Out strategy). Moreover, one active development seen over the last few years has been expansion not only into production hubs, but also into the field of research and development, chiefly in China, based on consideration for responses to the local market. Along with the restructuring of production hubs, this is one indication of global expansion aimed at the unfathomably immense Chinese market.



Source: Electric Home Appliance Industry Handbook, Association for Electric Home Appliances, and others.

Diagram 3-1-6 Overseas production trends relating to washing machines and refrigerators

In 2005 as well, many home appliance manufacturers are beginning to cultivate overseas markets for high added-value products. In 2004, Matsushita Electric Industrial began ex-

porting its diagonal drum washing machine to China, Malaysia and Singapore. Hitachi H&L launched its BeatWash washer-drier in Taiwan in July 2005 and plans to sell it in China and Southeast Asia as well in the future. Sharp is apparently going to sell its Healsio steam oven in such countries as the US and Hong Kong (*Nihon Keizai Shimbun*, August 6, 2005).

Moreover, with regard to production hubs, Matsushita Electric Industrial has positioned the Hangzhou district of Zhejiang province, China, as a strategic hub for its home appliance (white goods) business and is building one of the world's largest factories there. In addition to moving its existing washing machine factory there and upgrading it, it also plans to establish two new plants for the manufacture of air conditioner parts, build the Matsushita Hangzhou Industrial Park, which will bring a number of the company's factory complexes together in the same place for the first time, and to put this immense supply hub, which will be focused not only on the domestic Chinese market, but also on exports, into operation in September 2005 (*Fuji Sankei Business*, April 14, 2005).

Thus, with home appliance manufacturers enhancing overseas local production and consolidating production hubs, they are promoting materials procurement from a global perspective and the use of overseas materials. At the same time, however, local procurement of high-end materials such as steel, including chromium-free steel, is difficult and the degree of reliance on Japanese-manufactured materials is increasing, so the export orientation of the materials of Japanese-affiliated materials manufacturers destined for the local production hubs of home appliance manufacturers is, conversely, growing (*Japan Metal Daily*, July 7, 2005).

For example, Hitachi, Ltd. has implemented revisions from the design stage onwards, in order to promote cost reductions through group purchasing of components by group companies (*Nihon Keizai Shimbun*, July 9, 2004).

Matsushita Electric Industrial suffered from a great deal of inefficiency in such areas as development, production and materials procurement, as divisions conventionally expanded overseas separately, but by consolidating its production hubs, it will be able to conduct group purchasing of components and promote greater efficiency in distribution and production, so it can expect to achieve reductions in costs. With the aim of countering local Chinese manufacturers and manufacturers from the ROK, which are becoming more competitive and reinforcing its operating base, it has decided to reorganize its business through large-scale investment (*Fuji Sankei Business*, April 14, 2005).

Moreover, at the company-wide level within Matsushita Electric Industrial, moves are emerging aimed at reducing the cost through large-scale materials procurement by the global group. In FY 2004, when the cost of raw materials rose ¥35 billion on the previous fiscal year, the global group procured ¥3.4 trillion of materials, cutting costs by ¥340 billion, or 10%. In FY 2005 as well, raw material costs rose by ¥35 billion; cost-boosting factors increased, such as responses to the EU's RoHS directive and quality-focused manufacturing, and the materials procurement environment is becoming more severe, but the global group is apparently aiming to cut materials procurement costs by 11% of ¥4 trillion (of which, about ¥2 trillion is the cost of purchasing devices). In order to reduce materials procurement costs, it is implementing a policy of contributing to business through total cost reductions in materials, focused on the keywords of "concentration," "VE" and "MRO (maintenance, repair, operation)." In the concentrated ordering of materials, the company will focus on excellent partners, purchasing from materials suppliers that fulfil three trading-related conditions in the form of quality assurance, environmental assurance, and e-commerce, as well as criteria relating to management performance, cost performance, development performance, production technology performance and CSR. Furthermore, the company is making efforts to

ensure thorough environmental management among materials supplicrs, including factory audits for the purpose of green procuremcnt (*Dempa Shimbun*, August 29, 2005).

3) Prospects and challenges

The recent boom in household electrical machinery has certainly been remarkable, but this sector is almost entirely composed of mature products, so it is dominated by replacement demand. What is more, the numerous Japanese home appliance manufacturers are engaged in a fierce battle for a share of this pie, while competing to ensure that they are ahead of other companies in launching new products. Moreover, we have repeatedly seen the situation in which, when a new product area is established, almost all home appliance manufacturers instantly enter that market all at once.

Along with these trcnds towards market maturation and saturation, in addition to fierce competition among companies in the market, the environment relating to the home appliance industry is still harsh. It faces such issues as escalating price wars by means of price reductions and reductions in unit costs (some products seem to have stopped falling, but overall this trend is not very pronounced), the emergence of Asian countries as seen in the expansion of companies from the ROK and the great advances made by Chinese companies, and major changes in demand (divcrsifying consumer needs and purchasing behaviour, changes in demand due to changes in the socioeconomic structure). Consequently, in addition to implementing thorough cost reductions, including cxamining materials, and conducting structural reforms of organizations, sales and business (including partnership and organizational collaboration focused on all home appliance businesses of both domestic and foreign companies), as they have done hitherto, manufacturers are desperately trying to implement countermeasurcs from a medium- to long-term perspective, such as developing new products with new concepts in the housework and lifestyle sectors, developing new growth (hit) products and high-performance products in existing sectors and making certain that replacement demand is secured, and developing global strategies that include the cultivation of foreign markets.

Precisely because of this situation, it is necessary for manufacturers to respond to diversifying consumer needs by bringing out high value-added products with new functions that take the user's perspective into account. Furthermore, in order to survive and develop by making use of the sector's strength as a traditional field, they are faced by the question of whether or not they can create new lifestyles or provide new lifestyle solutions. Above all, there are limits to the development of "hard" products, such as equipment and systems, so, along with enhancing "soft" products, there are great hopes for such areas as the full-scale provision of networked home appliances.

3-2 Household Electronic Machinery (Including Cameras)

3-2-1 Supply and demand trends

(1) Overview

With regard to household electronic machinery in 2004, the product groups that have driven the so-called digital appliance boom continued to do well, including flat-screen televisions such as LCD televisions and plasma televisions (hereafter referred to as PDP televisions), DVD recorders and digital cameras. Appliances in this category, particularly these digital home appliances, brought about an increase in domestic production and growth in the domestic market, domestic demand, and exports and imports. This robust performance generally continued into 2005.

Moreover, the market for digital home appliances is showing signs of spreading to North America, Europe and Asia, rather than being confined to Japan.

However, at the same time, many domestic and foreign home appliance manufacturers, including new players, are entering the market for digital home appliances and companies are engaged in fierce competition in identical fields and with regard to identical products. Consequently, there has been a sharp decline in the price of digital home appliances, which seems to be having an impact on corporate profits, but at the same time, a gap in business performance is beginning to emerge among the top one or two companies in terms of their share of this market, with some companies experiencing healthy growth in both sales and profits compared with the previous fiscal year.

(2) Production

The value of domestic production of household electronic machinery in 2004 was ¥2,488.0 billion, an increase of 7.6% compared with the previous year, representing consecutive growth of more than ¥2 trillion since 2003, due to rises each year since 2002 (Diagram 3-2-1). However, total production in 2005 (January–June) has so far totalled ¥1,171.3 billion (a decrease of 1.8% on the same period of the previous year) (Diagram 3-2-2).

Diagram 3-2-1 Domestic production trends concerning household electronic machinery

	2002				2003				2004			
	Quantity	y/y	Value	y/y	Quantity	y/y	Value	y/y	Quantity	y/y	Value	y/y
	(units)	(%)	(¥1 million)	(%)	(units)	(%)	(¥1 million)	(%)	(units)	(%)	(¥1 million)	(%)
Household electronic machinery	-	-	1,973,782	105.2	-	-	2,313,147	114.2	-	-	2,488,012	107.6
Visual equipment	-	-	1,573,033	110.0	-	-	1,983,215	122.0	-	-	／	-
Televisioins	3,226,657	112.7	340,464	131.9	3,049,958	97.5	422,716	124.6	3,472,556	113.9	554,239	131.1
Color TVs (including PDP TVs)	1,480,702	89.2	207,901	112.7	1,220,082	82.5	217,138	104.5	807,500	66.2	180,470	83.1
LCD TVs	1,745,955	145.2	132,563	179.6	1,829,876	110.9	205,578	156.3	2,665,056	145.6	373,769	181.8
Video tape recorders (other than for broadcasting purposes)	1,563,058	68.0	36,347	66.8	334,303	28.2	15,191	45.2	／	-	×	-
DVD players	2,332,310	82.4	85,543	106.3	3,568,006	152.6	138,416	161.8	3,071,818	86.1	132,793	95.9
Video cameras (other than for broadcasting purposes)	8,993,027	105.5	415,479	101.4	11,876,507	118.6	476,402	102.8	11,956,514	100.7	413,529	86.8
Digital cameras	16,916,251	132.3	436,492	112.8	25,084,449	148.3	591,896	135.7	29,199,755	116.4	712,417	120.4
Car navigation systems	3,027,298	117.6	258,416	107.7	3,834,331	126.7	338,594	127.9	4,706,830	122.8	415,633	122.8
Audio equipment	-	-	400,749	89.8	-	-	329,932	82.4	-	-	／	-
General-purpose tape recorders (other than in-car tape recorders)	2,863,939	85.9	21,861	82.6	10,309,156	-	75,231	-	6,259,345	60.7	49,285	65.5
Radio/cassette players	864,566	113.7	7,931	108.4	658,234	-	5,774	-	×	-	×	-
Headphone stereo player	333,155	58.7	1,084	35.4	8,361,696	-	60,660	-	5,317,098	63.6	43,385	71.5
Other magnetic recording and playback devices	1,122,172	88.2	8,326	78.4	1,289,226	77.7	8,797	68.9	／	-	／	-
Hi-fi stereos	16,835,774	82.4	242,093	88.3	2,280,428	-	43,631	-	×	-	＼	-
Hi-fi stereo systems	1,334,660	78.1	32,657	71.7	1,325,622	99.3	28,709	87.9	621,135	46.9	14,627	50.9
Hi-fi components (except tape decks)	15,501,114	82.8	209,436	91.6	954,806	-	14,922	-	＼	-	×	-
Amplifiers	752,051	67.5	13,138	79.7	431,759	-	7,435	-	167,550	38.8	5,182	69.7
Speakers	490,384	118.6	7,547	123.9		-	2,769	-	×	-	／	-
Digital audio disc players	13,945,419	83.2	182,098	92.2	353,489	-	4,718	-	115,545	32.7	3,155	66.9
Other audio equipment	-	-	136,795	93.9	-	-	211,070	-	-	-	＼	-
Ordinary radios	1,264,566	104.3	3,083	73.4	1,174,889	92.3	2,469	79.9	×	-	／	-
In-car audio equipment	15,856,569	82.0	101,215	93.6	15,361,917	-	183,224	-	13,807,722	89.9	148,610	81.1
Car stereos	6,191,409	94.4	85,041	95.6	6,356,024	111.4	149,608	176.6	5,232,681	82.3	109,555	73.2
Car speakers	9,135,860	75.2	11,681	78.1	7,848,536	85.9	9,304	79.9	7,394,504	94.2	13,174	141.6
In-car digital audio disc players	-	-	-	-	1,157,357	-	24,312	-	1,180,537	102.0	25,881	106.5
PA systems	254,328	94.1	17,750	93.1	168,595	66.2	9,177	51.7	170,977	101.4	9,137	99.6
Hearing aids	244,205	97.9	14,747	103.1	267,004	108.9	16,200	109.3	260,148	97.4	15,887	98.1

Source: *Yearbook of Machinery Statistics*, Ministry of Economy, Trade and Industry, and data provided by the Japan Electronics and Information Technology Industries Association (JEITA).

With regard to trends in each product in 2004, the number of LCD televisions produced grew by 45.6% on the previous year to 2.67 million units, with their value rising 81.8% on the previous year to ¥373.8 billion; digital camera production grew by 16.4% on the previous year to 29.2 million units, with their value rising 20.4% on the previous year to ¥712.4 billion; car navigation system production was up 22.8% on the previous year to 4.71 million units, with their value also rising by 22.8% on the previous year to ¥415.6 billion; and production of in-car digital audio disc players rose by 2.0% on the previous year to 11.81 million units, with their value rising by 6.5% on the previous year to ¥25.9 billion. Thus, while the fields of visual equipment and car-related equipment were doing well, the trend towards an all-round decline in the audio equipment sector is continuing.

Moreover, in 2005 (January–June), although there was no continuity in certain areas, due to revisions in statistical categories, there was remarkable growth in terms of both the number of units of LCD televisions and car navigation systems produced and the value thereof. The number of LCD televisions produced rose 46.2% on the same period of the previous year to 1.71 million units, with their value rising 29.4% on the same period of the previous year to ¥210.6 billion, while the number of car navigation systems grew by 17.3% compared with the same period of the previous year to 2.65 million units, which represented a 14.8% increase in value to ¥232.1 billion. As far as production trends with regard to plasma televisions are concerned, 360,000 units were produced, worth ¥81.5 billion.

Diagram 3-2-2 Trends in household electronic machinery in 2005

	January–June 2005			
	Quantity (units)	y/y (%)	Value (¥1 million)	y/y (%)
Household electronic machinery	-	-	1,171,323	98.2
TVs	×	-	\	-
Plasma TVs	355,946	-	81,477	-
LCD TVs	1,705,775	146.2	210,587	129.4
Other color TVs	×	-	×	-
Video tape recorders (sets) (other than for broadcasting purposes)	×	-	×	-
DVD players	933,941	69.7	35,932	62.3
Video cameras (other than for broadcasting purposes)	6,434,089	99.8	218,804	99.1
Digital cameras	12,949,158	101.0	303,088	94.9
Single lens reflex type	1,286,178	-	51,577	-
Compact type	11,662,980	-	251,511	-
Car navigation systems	2,646,576	117.3	232,107	114.8
Portable audio equipment	1,183,882	36.2	11,407	50.2
Home audio equipment	312,810	-	7,252	-
Car audio equipment	2,807,916	79.7	56,023	76.1
Hearing aids	127,461	99.7	7,957	101.3

Source: Data provided by JEITA

Moreover, the domestic demand for household electronic machinery (domestic production – exports + imports) has been growing annually, reaching ¥954.3 billion in 2002,

¥1,192.6 billion in 2003 and ¥1,433.0 billion in 2004, thereby demonstrating active domestic demand.

(3) Shipments

The value of shipments of household electronic machinery in 2004 was ¥2,376.3 billion, recording an increase of 13.1% on the previous year and rising for the third consecutive year since 2002. Moreover, in 2005 (January–June), the figure increased by 6.7% on the same period of the previous year to ¥1,103.9 billion (Diagram 3-2-3).

Diagram 3-2-3 Trends in shipments of household electronic machinery

	Value (¥ billion)	y/y (%)
2002	2,022.2	100.6
2003	2,101.3	103.9
2004	2,376.3	113.1
2005 (January–June)	1,103.9	106.7

Source: Data provided by JEITA

If we look at the value of shipments in 2004 by sector, we can see that visual equipment rose for the fifth consecutive year, reaching ¥1,153.3 billion (up 17.9% on the previous year) and recording a two-digit increase for the first time since 1998. On the other hand, audio equipment declined for the fifth year in succession, reaching ¥209.9 billion (down 15.1% on the previous year). In addition, in-car audio-visual equipment rose for the sixth consecutive year, reaching ¥653.2 billion (up 11.4% on the previous year) (according to data provided by JEITA).

Looking at the situation by product, LCD color televisions (10-inch screen size and more: up 94.5% on the previous year to 2.41 million units), PDP televisions (up 42.3% on the previous year to 340,000 units) and DVD players (DVD recorders: up 107.5% on the previous year to 4.07 million units, of which HDD players were up 141.9% on the previous year to 3.18 million units) continued to be buoyant.

On the other hand, the harsh situation with regard to audio equipment is still continuing, due to the lack of leading products driving the market, including such factors as the demand cycle for MD-related equipment and the stagnation in CD/radio/cassette players, but in this sector, IC recorders experienced growth (up 10.6% on the previous year to 720,000 units).

Moreover, with regard to in-car audio-visual equipment, car navigation systems remained buoyant, increasing 23.9% on the previous year to 3.51 million units, while in-car color televisions grew by 13.6% to 1.18 million units. Furthermore, the situation with regard to trends by product in 2005 (January–June) was similar: LCD color televisions (10-inch screen size and more: up 85.7% on the previous year to 1.65 million units, of which type 16:9 models were up 163.5% to 890,000 units), PDP televisions (up 17.2% to 160,000 units), and DVD players (recorders: up 31.5% on the previous year to 1.69 million units, of which HDD players were up 50.8% to 1.39 million units). In addition, in-car audio-visual equipment did well, but shipments of almost all types of audio equipment were poor.

(4) Exports and imports

The value of exports of household electronic machinery in 2004 was ¥1,789.1 billion, a rise of 4.0% compared with the previous year; there have been successive rises in this figure since 2002 (Diagram 3-2-4). On the other hand, in 2005 (January–June) there was a decrease of 12.2% on the same period of the previous year to ¥772.5 billion.

Diagram 3-2-4 Trends in exports and imports of household electronic machinery

Exports & imports		2002		2003		2004		2005 (Jan.–June)	
		Value	y/y	Value	y/y	Value	y/y	Value	y/y
		(¥1 million)	(%)	(¥1 million)	(%)	(¥1 million)	(%)	(¥1 million)	(%)
Exports	Total value	1,629,508	115.6	1,721,876	105.7	1,789,104	104.0	772,479	87.8
	Visual equipment	1,421,444	118.2	1,569,187	110.4	1,656,769	105.7	722,172	88.6
	Audio equipment	208,063	100.5	152,689	73.4	132,335	86.7	50,307	77.0
Imports	Total value	610,052	91.3	601,334	98.6	734,113	122.1	364,545	109.5
	Visual equipment	357,782	88.0	374,423	104.7	485,171	129.6	214,437	97.7
	Audio equipment	252,270	96.4	226,912	89.9	248,942	109.7	150,108	132.2

Source: Data provided by JEITA

In addition, if we look at the situation by field, while the value of exports of visual equipment in 2004 was up 5.7% on the previous year to ¥1,656.8 billion, in 2005 (January–June), there was a decrease of 11.4% on the previous year to ¥722.3 billion. Of this, with regard to trends in 2004, televisions experienced growth in both the number exported and the value thereof compared with the previous year, rising 8.1% to 3.41 million units and 27.9% to ¥172.2 billion; of this, LCD televisions (color) rose 25.1% on the previous year to 1.22 million units, with their value rising 37.5% on the previous year to ¥165.2 billion. Moreover, still video cameras rose 15.0% on the previous year to 38.57 million units, a 7.8% rise in value to ¥1,191.3 billion.

At the same time, the value of exports of audio equipment in 2004 was ¥132.3 billion (a decrease of 13.3% compared with the previous year), while in 2005 (January–June), the figure was ¥50.3 billion (a decrease of 23.0% compared with the same period of the previous year). With regard to trends by product, while some radio/cassette recorders and some other tape recorders are experiencing growth, along with car-related products, the overall situation is sluggish.

The value of imports of household electronic machinery in 2004 was ¥734.1 billion, an increase of 22.1% compared with the previous year, breaking the downward trend that had continued for the last few years (Diagram 3-2-4). There was a similar trend in 2005 (January–June), with a rise of 9.5% on the same period of the previous year to ¥364.5 billion being recorded.

Looking at the situation by category, the value of imports of visual equipment in 2004 was ¥485.2 billion (up 29.6% on the previous year), while in 2005 (January–June) it was ¥214.4 billion (down 2.3% on the same period of the previous year). As far as trends among products in this category are concerned, 7.88 million televisions were imported, down 0.9% on the previous year, at a value of ¥162.5 billion, up 5.4% on the previous year; imports of recording and playback equipment overall rose

25.6% on the previous year to 10.55 million units, with a 36.9% increase in value to ¥142.1 billion; and imports of still video cameras rose 52.4% on the previous year to 95 million units, with a 53.2% increase in value to ¥170.7 billion. As we can see from this, there was remarkable growth in the latter two product areas.

At the same time, the value of imports of audio equipment in 2004 was ¥248.9 billion (an increase of 9.7% on the previous year), while in 2005 (January–June) it was ¥150.1 billion (up 32.2% on the same period of the previous year).

As far as trends among products in this category are concerned, many products experienced increases in both the number of units and the value thereof, compared with the previous year.

With regard to the export-import balance in the household electronic machinery sector, the export surplus continued. However, over the last few years, a trade structure has emerged in which there has been an increasing import surplus with regard to audio equipment, reflecting the decline in domestic production.

(5) Camera trends

In this section, we would like to provide an overview of the situation with regard to cameras (silver salt cameras). Within the optical equipment sector, the value of production in 2004 in categories relating to cameras (the total for cameras, their accessories, and interchangeable lenses for cameras) was ¥164.4 billion, an increase of 12.9% on the previous year (Diagram 3-2-5). Of this, the value of production of cameras (silver salt cameras) alone was ¥57.3 billion, a decline of 0.8% on the previous year; this figure has been declining for the last few years. In particular, there has been a significant decline in 35mm cameras, and the growth, expansion and replacement of digital cameras is plain to see. These trends did not alter in 2005 (January–June).

At the same time, with regard to exports and imports of cameras in 2004, exports totalled ¥105.5 billion (up 6.0% on the previous year), while imports fell to ¥61.3 billion (down 20.9% on the previous year). Similar trends were also seen in 2005 (January–June) (Diagram 3-2-6). This field has an export surplus structure, but while both exports and imports of cameras and their accessories are continuing to decline, an increase is being seen in camera lenses.

Moreover, with regard to domestic demand (domestic production – exports + imports), the figures have been almost unchanged for the last few years, totalling ¥108.1 billion in 2002, ¥109.7 billion in 2003, and ¥104.8 billion in 2004.

Diagram 3-2-5 Domestic production trends concerning cameras (silver salt cameras)

Domestic production	2002				2003				2004				2005 (Jan.–June)			
	Quantity	y/y	Value	y/y	Quantity	y/y	Value	y/y	Quantity	y/y	Value	y/y	Quantity	y/y	Value	y/y
	(units)	(%)	(¥1 million)	(%)	(units)	(%)	(¥1 million)	(%)	(units)	(%)	(¥1 million)	(%)	(units)	(%)	(¥1 million)	(%)
Optical equipment	-	-	146,359	84.2	-	-	145,644	99.5	-	-	164,368	112.9	-	-	80,947	104.4
Cameras	609,894	47.9	63,385	85.2	409,307	67.1	57,417	90.6	258,472	63.1	57,277	99.8	73,257	56.4	23,147	85.4
of which, 35mm cameras	540,868	44.6	17,686	53.3	349,977	64.7	10,666	60.3	204,264	58.4	8,227	77.1	49,700	46.3	1,735	45.7
Interchangeable camera lenses	3,604,798	89.4	65,148	85.7	3,388,145	94.0	68,275	104.8	3,997,392	118.0	83,631	122.5	2,248,457	120.3	47,099	120.2
Camera accessories (flashes, tripods, filters)	3,417,252	83.3	7,959	112.7	3,408,775	99.8	6,087	76.5	3,757,409	110.2	8,147	76.5	1,557,634	85.4	3,484	91.3
Total	-	-	136,492	86.7	-	-	131,779	96.5	-	-	149,055	113.1	-	-	73,740	105.2

Source: Yearbook of Machinery Statistics, Ministry of Economy, Trade and Industry

Diagram 3-2-6 Trends in exports and imports of cameras (silver salt cameras)

Exports & imports	Exports							
	2002		2003		2004		2005 (Jan.–June)	
	Value	y/y	Value	y/y	Value	y/y	Value	y/y
	(¥1 million)	(%)	(¥1 million)	(%)	(¥1 million)	(%)	(¥1 million)	(%)
Cameras & their accessories	66,436	72.8	48,695	73.3	44,710	91.8	14,227	65.2
Camera lenses	42,908	95.5	50,859	118.5	60,814	119.6	33,696	125.4
Total	109,343	80.3	99,555	91.0	105,525	106.0	47,923	98.4

Exports & imports	Imports							
	2002		2003		2004		2005 (Jan.–June)	
	Value	y/y	Value	y/y	Value	y/y	Value	y/y
	(¥1 million)	(%)	(¥1 million)	(%)	(¥1 million)	(%)	(¥1 million)	(%)
Cameras & their accessories	70,445	90.7	58,739	83.4	41,254	70.2	15,078	68.2
Camera lenses	10,518	97.5	18,784	178.6	20,047	106.7	12,515	128.6
Total	80,963	91.5	77,523	95.8	61,302	79.1	27,593	86.7

Source: "Monthly Trade Bulletin," Ministry of Finance

Note: With regard to "cameras and their accessories", the Monthly Trade Bulletin cites HS9006.10-59 and HS9006.61-99 as "cameras (excluding video cameras) and flashes and flashbulbs for cameras"; with regard to "camera lenses," the publication cites HS9002.11-010 as "objective lenses for cameras."

3-2-2 Business conditions and industry trends

(1) Business trends

Diagram 3-2-7 shows the business performance of major companies involved in the household electronic machinery sector. A precise classification is not available because the household electrical machinery sector sometimes includes home appliances. Taking a rough overview, we can see that a gap began to emerge in FY 2004, between companies that were doing well and those that were not, unlike in FY 2003, when many companies achieved sales and operating profits in excess of the previous fiscal year primarily due to buoyant sales of digital home appliances. This disparity became even clearer in the first quarter of FY 2005. Such gaps may be attributable to corporate strategies that focus on digital home appliances or differences in product strategies, and there are also differences in the effects of structural reforms conducted so far, such as management and organizational reforms. Moreover, differences are emerging between product fields, such as home electronics and car electronics.

As far as a comparison is possible, the companies (divisions) that experienced increases in both sales and profit in FY 2004 and the first quarter of FY 2005 were Sharp, Mitsubishi Electric Corporation and Hitachi. (it should be noted that household electrical machinery is also included in the case of the these companies); in addition, this group also includes Toshiba Corporation and Matsushita Electric Industrial, which experienced almost no change in profits in FY 2004 but earned major profits in FY 2005. At the same time, companies (divisions) experiencing an increase in sales but a decrease in profits were the car electronics businesses of Toshiba, Pioneer and Kenwood, while those experiencing declines in both sales and profits were the home electronics businesses of Sanyo Electric, Hitachi, Sony, JVC (Victor) and Kenwood (all these companies experienced deficits in ordinary profits). The profits of some even fell into the red. In particular, the situation was grave with regard to trends relating to Sony, Sanyo Electric, Pioneer and JVC, the corporate results of which had, until now, been thought to be accurately reflecting the buoyant nature of the digital home appliance sector. However, these companies are formulating various strategies aimed at regaining lost ground in the future. Broadly speaking, Sony is returning to its main business in the hardware (electronics) sector and focusing on sales of widescreen televisions; Pioneer is devoting resources to the PDP sector; JVC has its rear projection development strategy; and Sanyo Electric is engaged in corporate (organizational) reorganization while also being involved in household electrical machinery, and is employing a "select and focus" strategy.

In any case, factors behind this include the escalation of market competition by domestic and foreign home appliance manufacturers, as well as steep declines in prices.

(2) Trends and problems relating to major products

In this section, we will look at the major products in this industry and examine related trends and issues.

1) Flat-screen televisions

In 2004, flat-screen televisions began to become widespread; one contributory factor in this was the "Olympic effect." In addition to LCD and PDP televisions, display panels, such as rear projection, SED and organic EL models, also joined the line-up. There was some com-

partmentalisation in these displays, based on the characteristics of the different systems and technical limitations, with, for instance, people opting for plasma if they wanted widescreen televisions, but for LCD if they were shopping for a television that was medium-sized or smaller. However, in order to keep pace with the market for flat-screen televisions, in which competition has been intensifying, manufacturers began to pursue bigger screens, as well as higher picture quality and higher resolution. This trend intensified further in 2005. Moreover, developments being seen among manufacturers include the augmentation of large-scale capital investment for this purpose, including the establishment, improvement and expansion of production bases within Japan, as well as an increase in investment in research and development. In order to capture even a slightly larger share, and to take into account even a slight diversification in investment risk, manufacturers are actively promoting the formulation of strategies, such as those focused on the production of panels, the development of other major components and the creation of a mass production system, as well as engaging in business alliances and collaboration to this end with other companies in the same industry and implementing changes in their business operations, such as spin-off and the establishment of subsidiaries.

Diagram 3-2-7 Business performance of household electronic machinery manufacturers

		Sales (¥ billion)	y/y (%)	Share of total sales (%)	Operating profit (¥ billion)	y/y (%)
Matsushita Electric Industrial Co., Ltd.	AVC network sector					
	FY2002	3,668.2	-	50	82.8	-
	FY2003	3,840.3	105	51	129.1	156
	FY2004	3,858.8	101	44	127.4	99
	FY 2005 1st quarter	913.4	101	45	28.4	165
Toshiba Corporation	Digital products					
	FY2002	2,073.0	110	37	24.8	-
	FY2003	2,009.4	97	36	▲23.8	-
	FY2004	2,224.2	111	38	7.3	-
	FY 2005 1st quarter	518.6	106	37	0.6	-
Sanyo Electric Co., Ltd.	AV, information and telecommunications equipment					
	FY2002	910.4	112	40	40.5	124
	FY2003	1,002.9	110	38	43.9	108
	FY2004	987.6	99	37	31.3	71
	FY 2005 1st quarter	215.4	84	35	▲5.4	-
Sharp Corporation	AV & telecommunications equipment					
	FY2002	746.4	114	37	23.9	132
	FY2003	837.3	112	37	27.8	116
	FY2004	973.1	116	38	32.3	116
	FY 2005 1st quarter	239.2	111	39	1.1	109
Hitachi, Ltd.	Digital media & consumer appliances					
	FY2002	1,205.5	103	12	6.2	-
	FY2003	1,226.9	102	14	6.9	112
	FY2004	1,280.3	104	14	8.6	125
	FY 2005 1st quarter	297.2	89	13	▲8.1	-

		Sales (¥ billion)	y/y (%)	Share of total sales (%)	Operating profit (¥ billion)	y/y (%)
Mitsubishi Electric Corporation	Household electrical appliances					
	FY2002	789.1	109	22	36.2	97
	FY2003	782.3	99	21	19.3	53
	FY2004	866.4	111	23	25.6	133
	FY 2005 1st quarter	213.9	103	26	11.3	109
Sony	Electronics division					
	FY2002	4,940.5	93	66	41.4	-
	FY2003	5,042.3	102	65	▲35.3	-
	FY2004	5,021.6	100	70	▲34.3	-
	FY 2005 1st quarter	1,115.2	99	72	▲36.2	-
JVC (Victor)	Consumer division					
	FY2002	677.7	106	69	25.3	-
	FY2003	642.8	95	68	25.8	87
	FY2004	627.3	98	75	10.4	40
	FY 2005 1st quarter	132.5	94	76	▲1.4	-
Pioneer	Home electronics					
	FY2002	279.7	-	41	3.9	-
	FY2003	282.9	104	40	2.1	54
	FY2004	303.2	107	39	▲22.1	-
	FY 2005 1st quarter	63.5	113	39	▲12.4	-
	Car electronics					
	FY2002	282.4	-	42	26.1	-
	FY2003	294.6	104	42	28.9	111
	FY2004	304.7	103	39	18.6	64
	FY 2005 1st quarter	82.6	104	50	5.3	84
Kenwood	Car electronics business					
	FY2002	117.0	95	52	11.7	105
	FY2003	100.8	86	56	7.0	60
	FY2004	104.8	104	58	2.2	31
	FY 2005 1st quarter	26.3	101	60	0.7	74
	Home electronics business					
	FY2002	41.9	51	19	▲4.5	-
	FY2003	24.0	25	13	▲1.2	-
	FY2004	18.9	79	10	▲1.9	-
	FY 2005 1st quarter	3.3	98	8	▲0.5	-

Source: Compiled from account settlement data from each company (obtained from websites and newspaper reports), etc.

Note: The product classifications of each company in the aforementioned sector are not precise. They may include products that fall into categories other than that of household electronic machinery. Moreover, with regard to Matsushita Electric Industrial Co., Ltd., the comparison with the previous year has not been calculated, as a modification took place in FY 2002, so the figures would not be consistent.

As far as the business strategies of domestic manufacturers and product trends relating to the flat-screen television market are concerned, Sharp acquired Fujitsu's flat-screen television business, Hitachi jointly established a company with Matsushita Electric Industrial and Toshiba, and Sony undertook a merger with Samsung Electronics of the ROK. Moreover, in 2004 and 2005, Sharp achieved the kind of large LCD screens that it had previously been deemed impossible to develop, launching 45-, 57- and 65-inch screens.

At the same time as Sony was withdrawing in 2005, Matsushita Electric Industrial jointly

established a company with Toray, while Hitachi turned the panel manufacturing company it ran with Fujitsu into a subsidiary, and Pioneer acquired a business from NEC.

However, manufacturers are engaged in a fierce scramble for a share of the market for flat-screen televisions, both in Japan and overseas. This competition is not only among Japanese manufacturers of home appliances; a wave of Asian manufacturers, such as those from Taiwan and the ROK, and new powers are also emerging, launching low-priced products. Consequently, this is having a significant impact on the business structure on the supply side, with home appliance manufacturers withdrawing from the market or downsizing their projects.

2) DVD recorders

Sales of DVD recorders are increasing annually, due in part to the replacement of video recorders, and in 2004, for the first time, more DVD players and recorders were shipped than video recorders. The average worldwide penetration rate is 21.8% (2004) and these products have been expanding steadily as products in which Japanese manufacturers can demonstrate their superiority, even among digital home appliances. As well as the products becoming more diverse, and capacity and picture quality improving and evolving as an independent product, they are beginning to be combined with other equipment (such as all-in-one CRT televisions, all-in-one home theater systems, and all-in-one flat-screen televisions) and becoming multifunctional with other digital equipment.

The recent major topic in this product field is the standardization of "next-generation DVDs." However, a fierce battle over formats is currently raging and it has still not proved possible to achieve convergence on a single format. In the global market, it is not just a problem of a struggle for supremacy among Japanese home appliance manufacturers, but also affects the plans of content providers and (powerful Japanese and foreign) manufacturers of digital equipment such as personal computers, so the situation is becoming more complex.

3) Portable digital audio players

Although it is said that audio equipment is inferior to visual equipment in terms of production and sales performance, portable digital audio players are increasingly attracting attention, with the iPod series proving to be a big hit. In contrast to existing portable players, such as CD and MD players, these are portable devices to which, essentially, music files are transferred via a personal computer; the files are stored on an internal memory card, non-volatile memory or small hard disk, and can be played back.

In 2004, the worldwide market was 22 million units, with the Japanese market reaching 1.6 million units in 2004 and expected to grow to 3 million units in 2005. As well as Apple Computer, Inc., which manufacturers the aforementioned iPod series, Japanese manufacturers are also entering the market and more than 30 companies have apparently launched products into the Japanese market (*Electronics Yearbook*, April 2005).

Digital home appliances are certainly the motive force behind this industry in Japan and the market for such devices is booming. However, there are both advantages and disadvantages of "digital." While they retain high quality, the equalization of quality propels the pace of product development and demand cultivation, and neither the intense market competition both at home and abroad, nor the fall in prices show any sign of ceasing. There are also limits to the development of hard products alone. Moreover, it is necessary to reconsider the business model. Amidst this situation, while worldwide shipments of LCD televisions doubled on the previous year in 2005, there are those who talk about

the "2008 problem," which forecasts that home appliance manufacturers will plunge into the cautionary zone from 2008, with a 20% decrease on the previous year taking place in 2008 and a fall in plasma television growth from 75% in 2004 to 11% in 2008 (*Nihon Keizai Shimbun*, August 11, 2005).

With regard to the question of how the Japanese industry and the various manufacturers can increase profits, both in name and in substance, it is of course necessary for manufacturers to come up with product characteristics that can demonstrably not be found elsewhere, as a strategic product, as well as demonstrating the ability to stem the fall in prices, even if only slightly. Moreover, corporate management innovations and organizational reforms will be required in order to respond to the necessity for user-centred manufacturing, including responding to changes in future markets (demand structure) in the medium- to long-term, rather than aiming solely for short-term growth. The fate of this promising industrial sector will be the focus of much attention in the future.

3-3 Electronic Devices

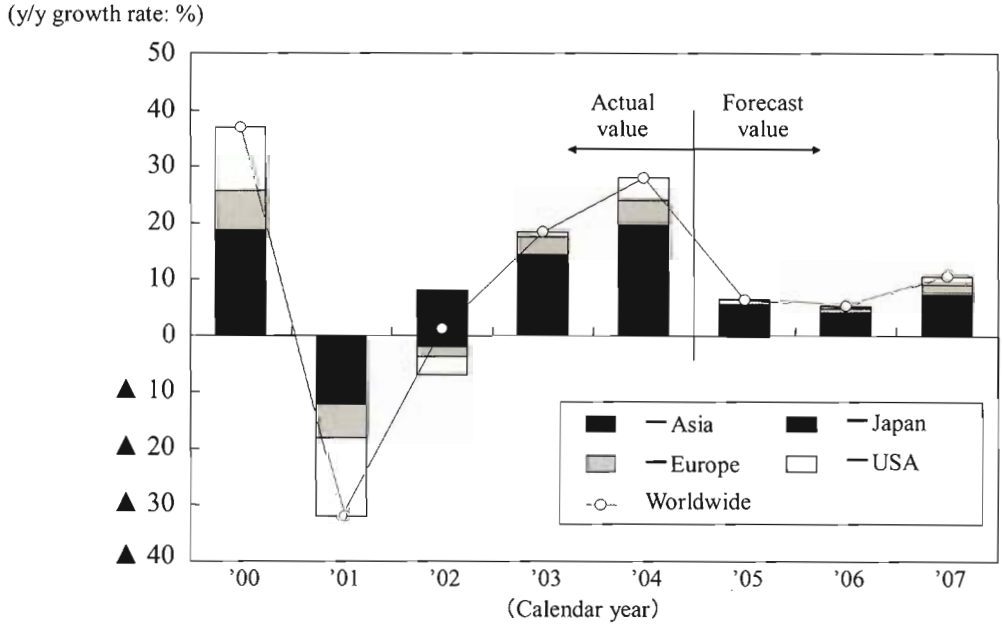
3-3-1 Supply and demand trends

(1) Overview

With regard to electronic devices in 2004, production of LCD devices expanded in particular, as a result of the expansion in the market for flat-screen televisions, especially LCD televisions, due to the effect of the Athens Olympics.

(2) Orders

According to the *Spring 2005 Market Forecast* published by World Semiconductor Trade Statistics Inc. (WSTS) (published on May 31, 2005), the world semiconductor market grew significantly to $213.0 billion in 2004, up 28.0% on the previous year (Diagram 3-3-1). If we look at the growth rate of the global market in terms of percentage contribution, we can see that, whereas the contribution rates of the markets of Japan, the United States and Europe were all around the 4% mark, the contribution of Asian and Oceanian states, led by China, was 15.6%. From this, we can see that, by region, Asian and Oceanian markets were the driving force. The scale of Asian and Oceanian markets in 2004 was $88.8 billion, up 41.3% on the previous year.



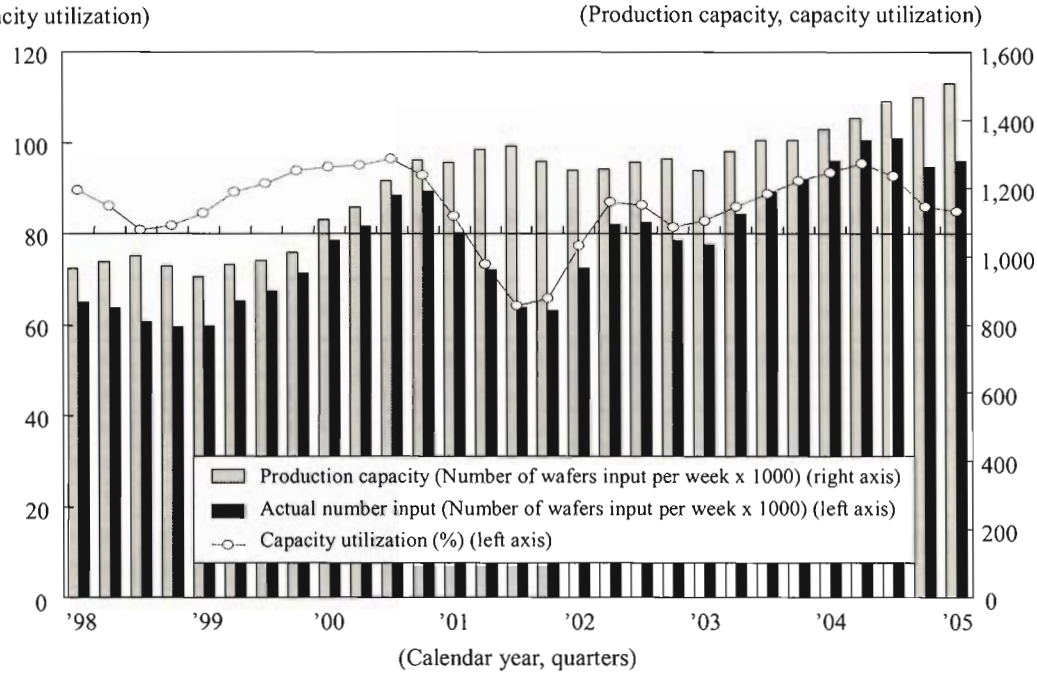
Source: Compiled by the author from World Semiconductor Trade Statistics Inc. (WSTS), Spring 2005 Market Forecast

Diagram 3-3-1 World semiconductor market forecast and contribution rates by region

With regard to market projections for the global market, as the deceleration in the growth rate that occurred in the latter half of 2004 continued in the first quarter of 2005, the growth rate on the previous year for the whole of 2005 is likely to stick at 6.3%. However, in the fall 2004 projections published by WSTS, the growth rate for the whole of 2005 was forecast to be 1.2% on the previous year, so the figure has been revised upwards. After bottoming out in 2005, growth rates on the previous year are projected to undergo gradual, sustained growth, reaching 5.2% in 2006 and 10.5% in 2007.

Furthermore, if we look at semiconductor

manufacturing capacity utilization recorded by Semiconductor International Capacity Statistics (SICAS), we can see that although capacity utilization demonstrated a downward tendency in 2004, it was still in excess of the target level of 80% (Diagram 3-3-2).



Note: All data has been converted to 8-inch wafer equivalents.

Source: Compiled by the author from Semiconductor International Capacity Statistics (SICAS), *World Semiconductor Capacity Statistics 1st Quarter 2005*

Diagram 3-3-2 World semiconductor manufacturing capacity utilization

(3) Production (Diagram 3-3-3)

The value of production of electronic devices in 2004 reached ¥6,818.7 billion, achieving positive growth of 9.0% compared with the previous year. Against the background of an expansion in the digital AV equipment market focused on the "new three holy durables" of flat-screen televisions, DVD recorders and digital cameras, due to the effect of the Athens Olympics, the value of production recorded its highest level since the IT bubble of the year 2000.

Looking at the value of production in 2004 by major product category, we can see that the value of production of integrated circuits (ICs), which are central to electronic devices, recorded steady growth of 5.3% on the previous year to ¥3,619.1 billion. The stagnation in analog AV equipment led to growth in microcomputers stalling at 3.4%. At the same time, with regard to logic ICs, demand for LSI was stimulated by the enhanced performance and increased multifunctionality of equipment itself, in addition to the expansion in demand for digital AV equipment, and reached ¥1,226.0 billion, up 8.7% on the previous year. As far as memory ICs were concerned, while the decline in dynamic random access memory (DRAM) ICs and static random access memory (SRAM) ICs continued as a result of the shift of PC production overseas, the market for flash memory ICs absorbed the impact of the decline in prices and recorded an increase, albeit slight, due to the expansion of the market for mobile phone handsets and the increase in loaded capacity. As a result of the ex-

pansion in the market for digital cameras and mobile phone handsets with built-in cameras, as well as higher pixel counts, the market for charge coupled devices (CCD) grew considerably, increasing by 30.7% on the previous year. The market for liquid crystal devices increased steadily, against the background of the expansion in the market for LCD televisions (large units) and the expansion in the market for the third generation mobile phone handsets (small units), achieving a high growth rate of 17.1% on the previous year to reach ¥1,799.8 billion. In particular, with regard to large active matrix LCDs, the sixth-generation production lines began operating.

Diagram 3-3-3 Trends in production of electronic devices (money basis)

(Unit: ¥1 million)

Production	2002	2003	2004	03-04 growth rate	2005 forecast	04-05 growth rate
Electronic tubes, semiconductor devices and integrated circuits	5,630,132	6,256,132	6,818,703	9.0%	7,381,291	8.3%
Electronic tubes	306,485	320,257	327,368	2.2%	382,924	17.0%
Semiconductor devices	885,262	961,808	1,072,516	11.5%	1,144,521	6.7%
Silicon diodes	67,984	63,764	62,838	▲1.5%	62,985	0.2%
Transistors	284,433	303,782	305,424	0.5%	310,354	1.6%
Opto electronic devices	367,993	428,028	518,866	21.2%	585,668	12.9%
Integrated circuits	3,178,755	3,437,568	3,619,050	5.3%	3,732,872	3.1%
Monolithic integrated circuits	2,912,889	3,169,588	3,337,883	5.3%	3,434,076	2.9%
Digital ICs	2,417,085	2,679,745	2,861,619	6.8%	2,955,339	3.3%
Metal oxide semiconductor (MOS) ICs	2,366,430	2,624,747	2,814,139	7.2%	2,909,951	3.4%
Microcomputers	655,786	657,498	679,917	3.4%	674,225	▲0.8%
Micro processing units (MPU)	62,173	44,137	41,184	▲6.7%	-	-
Micro controller units (MCU)	593,613	613,361	638,733	4.1%	-	-
Logic ICs	1,060,608	1,127,648	1,225,989	8.7%	1,241,984	1.3%
Standard logic ICs	93,481	97,781	125,924	28.8%	-	-
Semi-custom ICs	339,703	295,727	397,159	34.3%	-	-
Display driver ICs	243,796	265,889	273,601	2.9%	-	-
Memory ICs	513,394	602,833	605,364	0.4%	647,043	6.9%
DRAM	157,036	51,250	39,626	▲22.7%	-	-
SRAM	51,318	45,397	36,463	▲19.7%	-	-
Flash memory ICs	281,980	479,632	487,100	1.6%	-	-
Other MOS ICs	136,642	236,768	302,869	27.9%	346,699	14.5%
CCD	126,141	215,872	282,166	30.7%	-	-
Hybrid ICs	265,866	267,980	281,167	4.9%	298,796	6.3%
Liquid crystal devices	1,259,630	1,536,499	1,799,769	17.1%	2,120,974	17.8%
Active matrix LCDs	1,084,485	1,351,608	1,640,500	21.4%	1,961,370	19.6%
Large	661,149	617,645	697,486	12.9%	-	-
Middle and small	423,336	733,963	943,014	28.5%	-	-
Passive matrix LCDs	175,145	184,891	159,269	▲13.9%	159,604	0.2%
Liquid crystal modules	138,395	144,351	116,691	▲19.2%	-	-
Liquid crystal panels	36,750	40,540	42,578	5.0%	-	-

Source: 2002-2004 actual results: Yearbook of Machinery Statistics, Research and Statistics Department, Economic and Industrial Policy Bureau, Ministry of Economy, Trade and Industry.

2005 forecast: 2005 Electronics Industry Production Forecast, December 2004, Japan Electronics and Information Technology Industries Association (JEITA).

(4) Exports and imports (Diagram 3-3-4 & 3-3-5)

The value of exports of electronic devices in 2004 was ¥3,840.4 billion, up 8.5% on the previous year, while the value of imports was ¥2,195.9 billion, up 12.8% on the previous year; thus, there was an increase in both imports and exports. Integrated circuits, which make up the majority of exports, grew by 8.0% on the previous year, due to an expansion in production of mobile phones, PC peripheral devices and AV equipment in the Asia region, which account for more than 80% of all exports. Against the background of an increase in reverse imports arising from an overseas shift in production from Asia, which accounts for almost 80% of the total, imports of semiconductor devices grew by 17.1% on the previous year, while those of integrated circuits increased by 12.7% over the same period.

Diagram 3-3-4 Trends in exports of electronic devices (money basis)

(Unit: ¥1 million)

Exports	2002	2003	2004	03-04 growth rate
Electronic devices	3,291,195	3,540,761	3,840,442	8.5%
Electronic tubes	127,951	108,243	81,419	▲24.8%
Semiconductor devices	621,309	721,664	831,115	15.2%
Diodes	100,356	99,038	103,591	4.6%
Transistors	186,124	185,788	199,530	7.4%
Opto electronic devices	304,658	410,067	500,476	22.0%
Integrated circuits	2,541,936	2,710,854	2,927,909	8.0%
Monolithic integrated circuits	2,405,976	2,571,277	2,798,690	8.8%
Digital ICs	1,881,754	2,033,710	2,176,354	7.0%
Metal oxide semiconductor (MOS) ICs	1,786,895	1,935,623	2,051,357	6.0%
Memory ICs	215,673	249,511	286,134	14.7%
DRAM	64,481	53,519	85,120	59.0%
SRAM	32,978	26,925	27,711	2.9%
ROM	118,214	169,068	173,303	2.5%
Microcomputers	421,625	410,388	386,021	▲5.9%
MPU	123,723	121,812	101,751	▲16.5%
MCU	283,190	275,769	274,517	▲0.5%
Bipolar ICs	31,644	31,281	48,832	56.1%
Other types (BICMOS)	63,215	66,806	76,166	14.0%
Other integrated circuits	524,222	537,567	622,336	15.8%
Hybrid ICs	121,337	128,180	118,607	▲7.5%

Figure 3-3-5 Trends in imports of electronic devices (money basis)

(Unit: ¥1 million)

Imports	2002	2003	2004	03-04 growth rate
Electronic devices	1,842,766	1,946,971	2,195,927	12.8%
Electronic tubes	18,970	18,152	15,226	▲16.1%
Semiconductor devices	151,468	174,350	204,121	17.1%
Diodes	30,303	32,041	34,645	8.1%
Transistors	46,691	40,686	44,869	10.3%
Opto electronic devices	63,712	89,959	108,287	20.4%
Integrated circuits	1,672,328	1,754,470	1,976,580	12.7%
Monolithic integrated circuits	1,634,709	1,721,941	1,877,575	9.0%
Digital	1,384,059	1,453,906	1,567,733	7.8%
Metal oxide semiconductor (MOS) ICs	1,253,023	1,346,415	1,487,237	10.5%
Memory ICs	350,085	386,038	468,287	21.3%
DRAM	191,583	205,348	251,907	22.7%
SRAM	31,445	22,249	19,802	▲11.0%
ROM	127,057	158,440	196,578	24.1%
Microcomputers	319,493	314,811	323,247	2.7%
MPU	262,832	240,322	246,551	2.6%
MCU	33,490	55,636	58,945	5.9%
Bipolar ICs	46,294	44,173	44,186	▲1.2%
Other types (BICMOS)	84,742	62,778	36,310	▲42.2%
Other integrated circuits (analog)	250,650	268,035	309,842	15.6%
Hybrid ICs	31,524	17,316	72,290	317.5%

Source: Both figures from *Trade Statistics*, Ministry of Finance

3-3-2 Business conditions and industry trends

(1) Business trends

Diagram 3-3-6 shows the sales and operating profit (consolidated) in each division of ten electronic device manufacturers.

NEC Corporation's electron device division recorded sales of ¥868.7 billion in FY 2004, a 7% decline on the previous year. The causes of this decline are believed to include the sale of its plasma display division (the company reached a basic agreement to sell all its shares in NEC Plasma Display Corp. to Pioneer, as well as transferring all intellectual property rights relating to plasma displays (NEC press release, February 3, 2004) and the convergence of its contracted dynamic random access memory (DRAM) ICs manufacture business (until the first half of FY 2004). The company has announced that, excluding the effects of the structural reforms of its businesses, it recorded sales that were almost unchanged since the previous year. Sales in the semiconductor field, which accounts for the bulk of its electronic device business, fell by 2% on the previous year to ¥708.0 billion. This decline in sales was due to the transfer of its contracted DRAM ICs manufacture business to Elpida Memory, Inc. In the field of system large-scale integration (LSI), sales of system LSI and LCD driver ICs for digital home appliances performed well in the first half, due to an expansion in worldwide demand for semiconductors, but in the second half, sales were affected by weakening demand as inventory adjustments by set manufacturers became more protracted. Semiconductors for automobiles maintained a strong performance throughout the year. While there was strong

performance in the display field, particularly with regard to color LCD displays for industrial use, the transfer of NEC's plasma display business to Pioneer brought about a decline of 31% on the previous year to ¥68.9 billion. FY 2004 operating profit in the electron device division was ¥37.2 billion, ¥17.1 billion lower than the previous year. The reasons for this fall in profits include the fact that, although profitability improved as a result of structural reforms of business in such sectors as color LCD displays and electronic components, demand stagnated in the semiconductor sector; in addition, depreciation resulting from the creation of production lines increased. With regard to the company's semiconductor business in FY 2005, semiconductors for consumer appliances and versatile, multipurpose ICs (for microcomputers, etc.) are forecast to perform well, along with semiconductors for automobiles, but semiconductors for telecommunications equipment and those for computers and peripherals are expected to find the going rather tougher.

Sales in Fujitsu Limited's electronic device division totalled ¥794.8 billion in FY 2004, down 1.2% on the previous year. Although income fell due to the impact of tougher price competition as a result of deterioration in the demand and supply balance with regard to plasma display panels (PDPs) and LCDs, there was an increase in orders of cutting-edge products and a boom was seen in sales by subsidiaries manufacturing electronic components. Operating profit in its electronic device division totalled ¥32.6 billion, an increase of ¥5 billion on the previous year. There was a decline in PDP and LCD sales, but the company was able to cover this and achieve an increase in profits by promoting increased manufacturing efficiency and through increases in the revenue of subsidiaries manufacturing electronic components. As far as electronic devices are concerned, with regard to its plasma display panel business, Fujitsu sold some shares in Fujitsu Hitachi Plasma Display, Ltd. to Hitachi, Ltd. in March 2005, as well as handing over intellectual property rights relating to plasma display panels. Furthermore, with regard to its liquid crystal device division, in April 2005, it concluded the handover of its flat panel display business to Sharp Corporation. Fujitsu plans to reinforce its business by concentrating its management resources on its LSI business in its electronic device business.

Toshiba Corporation's semiconductor business increased to ¥938.9 billion in FY 2004, due to an increase in sales of digital home appliance system LSI and individual semiconductors. Although its LCD display business was affected by price falls in the markets for LCD displays for televisions and monitors, it managed to achieve an increase in sales in FY 2004 to ¥298.8 billion, by focusing on high value-added products, particularly small and medium-sized displays, and promoting measures aimed at expanding overseas sales. FY 2004 sales in its electronic device business as a whole reached ¥1,307.2 billion, an increase of ¥23.6 billion on the previous year. Operating profit of its LCD display business ended on a successful note, resulting in ¥13.5 billion surplus in 2004. Operating profit of its semiconductor business totalled ¥82.7 billion, down ¥35.7 billion on the previous year. The reason for this fall was the effect of inventory adjustment of digital appliances in the second half, though sales of memory ICs including NAND-type flash memory had been hovering at a high level. Operating profit of its whole electronic device business was ¥92.5 billion, down ¥24.5 billion compared with the same period.

Diagram 3-3-6 Consolidated statement for 10 electronic device manufacturers (Actual results and projections) (at the time of the most recent announcement of financial statements)

(Consolidated basis, unit: ¥100 million, rounded up to the nearest ¥100 million)

	FY2003 actual		FY2004 actual		FY2005 forecast	
	Sales	Operating profit	Sales	Operating profit	Sales	Operating profit
NEC Corporation	Note: Includes inter-segment sales					
Electron device business	9,322	543	8,687	372	8,800	300
Semiconductors	7,244	-	7,080	-	-	-
Displays	999	-	689	-	-	-
Reference: NEC Electronics Corporation	Note: Sales to external customers (including NEC)					
Total	7,120	-	7,080	-	-	-
Semiconductors business total	6,716	-	6,798	-	-	-
Communications equipment sector	1,523	-	1,380	-	-	-
Computers and peripherals sector	1,382	-	1,409	-	-	-
Consumer electronic equipment sector	883	-	1,013	-	-	-
Automobiles and industrial equipment sector	907	-	1,028	-	-	-
Versatile & multipurpose ICs	800	-	786	-	-	-
Discrete, optical, microwave	1,221	-	1,182	-	-	-
Fujitsu Limited	Note: Includes internal sales between segments					
Electronic devices (old segment)	8,047	275	7,948	326	-	-
Device solutions (new segment)	-	-	7,950	330	7,500	200
LSI	-	-	4,680	-	5,000	-
Toshiba Corporation	Note: Includes internal sales between segments					
Electronic devices	12,836	1,170	13,072	925	14,000	750
Semiconductors	8,988	1,184	9,389	827	10,400	750
Discrete	2,191	-	2,276	-	2,328	-
System LSI	4,205	-	4,436	-	4,777	-
Memory ICs	2,592	-	2,677	-	3,295	-
Liquid crystal	2,856	▲63	2,988	135	3,050	100
Hitachi Ltd.	Note: Includes internal sales between segments					
Electronic devices	13,124	304	13,202	370	12,600	370
Displays	-	-	2,237	▲146	2,620	0
Liquid crystal	-	-	1,940	-	2,270	-
Large	-	-	885	-	420	-
Small & medium-sized	-	-	1,055	-	1,850	-
Mitsubishi Electric Corporation	Note: Includes internal sales between segments					
Electronic devices	1,704	▲47	1,644	61	1,700	130
Matsushita Electric Industrial Co., Ltd.	Note: Includes internal sales between segments					
Devices	16,597	501	14,690	578	13,800	620
Sony Corporation	Note: Includes internal sales between segments					
Semiconductors	4,000	-	4,550	-	5,800	-
Liquid crystal	1,300	-	1,600	-	1,800	-
Sanyo Electric Co., Ltd.	Note: Includes internal sales between segments					
Electronic devices	5,052	269	4,424	▲79	-	-
Semiconductors	-	-	2,168	-	2,227	-
Electronic components	-	-	995	-	1,021	-
Sharp Corporation	Note: Includes internal sales between segments					
Electronic components, etc.	-	-	11,973	935	13,520	1,005
IC	-	-	2,067	128	2,110	130
Flash memory ICs	-	-	637	-	640	-
CCD & CMOS imagers	-	-	721	-	760	-
Liquid crystal	-	-	7,201	556	8,300	610
Elpida Memory, Inc.						
Total sales	1,004	▲264	2,070	151	2,060	186
PC sector	403	-	768	-	770	-
Premier business	601	-	1,302	-	1,830	-
Commissioned foundry, etc.	143	-	209	-	170	-
Premier DRAM ICs	458	-	1,093	-	1,660	-
Digital appliance/mobile equipment sector	217	-	662	-	1,160	-
Server sector	241	-	431	-	500	-

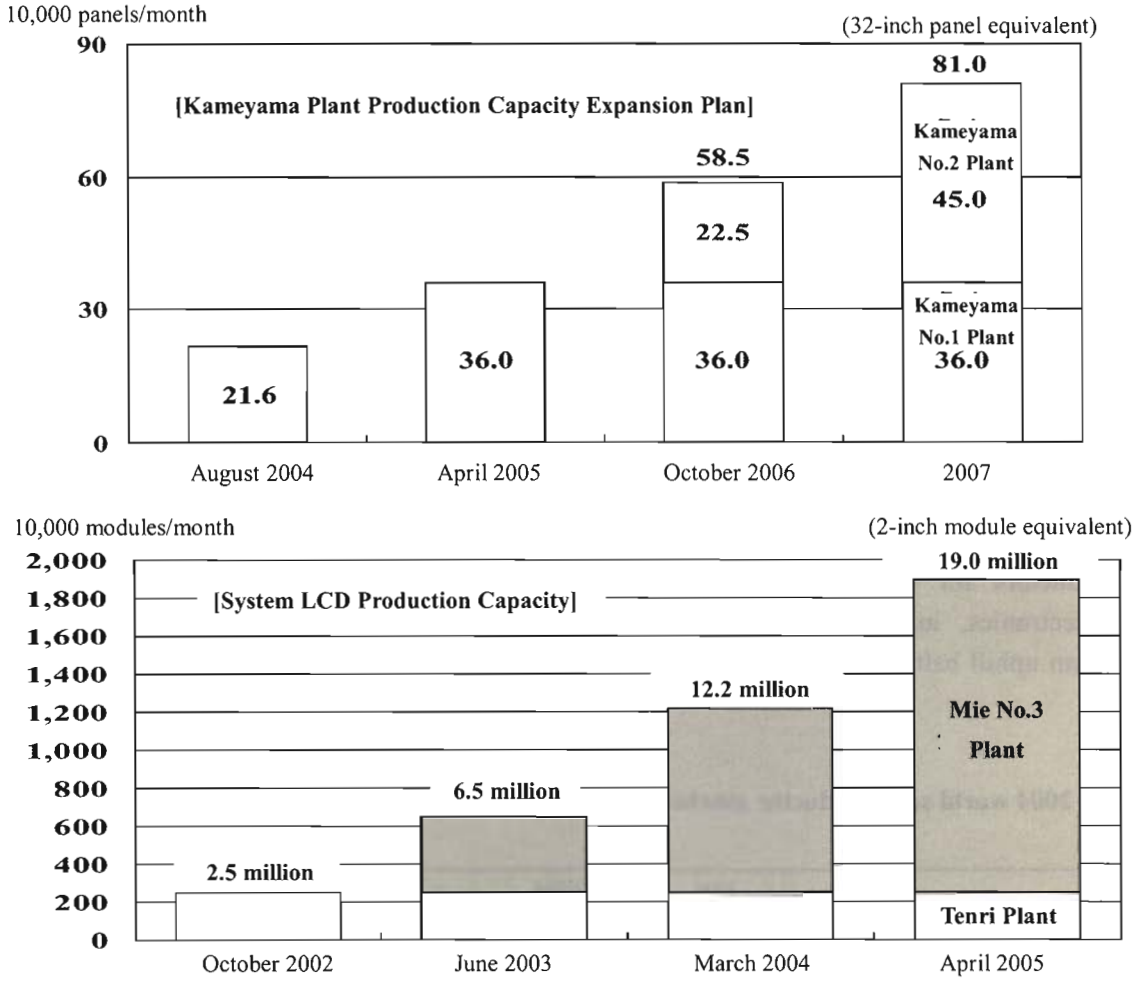
Note 1: Sony: Sales figures for FY 2004 include sales from its semiconductor manufacturing business, which includes the conventional game sector.

Note 2: Sanyo: Internal sales have been erased from the figures for sales of semiconductors and electronic components.

Note 3: Sharp: IC figures do not include internal sales (LSI etc. for liquid crystal: ¥48.9 billion in FY 2004, forecast to rise to ¥52.0 billion in FY 2005).

Source: Compiled by the author from accounting bulletins posted on the websites of each company.

Sharp's IC division experienced a downturn due to the price decline of flash memory ICs, posting a 10.9% decline in sales in FY 2004 to ¥206.7 billion. With regard to its liquid crystal division, along with growth in panels for LCD televisions due to an increase in production at the Kameyama plant, there was strong performance in high value-added LCD panels for mobile devices, mainly mobile phone handsets; sales in FY 2004 totalled ¥720.1 billion, an increase of 36.2% on the previous year (Diagram 3-3-7).



Source: *Sharp's Business Strategy*, Sharp Corporation, February 16, 2005

Diagram 3-3-7 Production capacity in Sharp's Liquid Crystal Division

Sanyo Electric's semiconductor division experienced a significant decline in sales, because Niigata Sanyo Electronics, which was a major semiconductor manufacturing hub, was affected by the Niigata Prefecture Chuetsu Earthquake (which occurred on October 23, 2004). Moreover, with regard to its liquid crystal business, the merger on October 1, 2004 with Seiko Epson Corporation to create Sanyo Epson Imaging Devices Corporation using the equity method led to a decline in sales.

With regard to the business environment faced by Elpida Memory, demand for premier DRAM ICs increased in the first half of the fiscal year, due to the expansion of the market for digital home appliances such as digital cameras and DVDs, and the enhanced sophistication of mobile phone handsets; however, in the second half of the fiscal year, the environment became harsher, as demand stagnated due to inventory

adjustments in the digital home appliance sector, and a fall occurred in the price of multipurpose DRAM ICs, because of a deterioration in the demand and supply balance. Despite this tough situation, a rise in production capacity and a fall in price led to sales growing considerably to ¥207.0 billion, a rise of 106.1% on the previous year. Operating profit also improved by ¥41.6 billion on the previous year, entering the black at ¥15.1 billion.

(2) Technological innovation and business environment

1) Semiconductor market ranking

Diagram 3-3-8 shows the 2004 world semiconductor market share ranking, as compiled by a research company. Renesas Technology Corp., in fifth place, is top among the Japanese manufacturers. If we compare Japanese manufacturers with those in the west and the ROK, we can see that, in general, the growth rates of Japanese manufacturers are low. Toshiba, in seventh place, is losing ground in the NAND-type flash memory market to Samsung Electronics, which is in second place, and it has also faced a hard struggle in the market for semiconductors for digital home appliances. NEC Electronics, in eighth place, has been fighting an uphill battle in the field of semiconductors for in-house produced mobile phone handsets and for digital home appliances. The positions of Sony and Matsushita Electric Industrial, in twelfth and thirteenth place respectively, represent a reversal of the previous order. Matsushita Electric Industrial apparently manufactures a great number of products using in-house produced semiconductors. In other words, Japanese manufacturers, which have a high degree of reliance on in-house set manufacturers, have faced an uphill struggle, while manufacturers with a high rate of external sales of semiconductors for PCs and mobile phone handsets experienced a high growth rate.

Diagram 3-3-8

2004 world semiconductor market ranking (established values) and share by region

(Revenue unit: US$1 million)

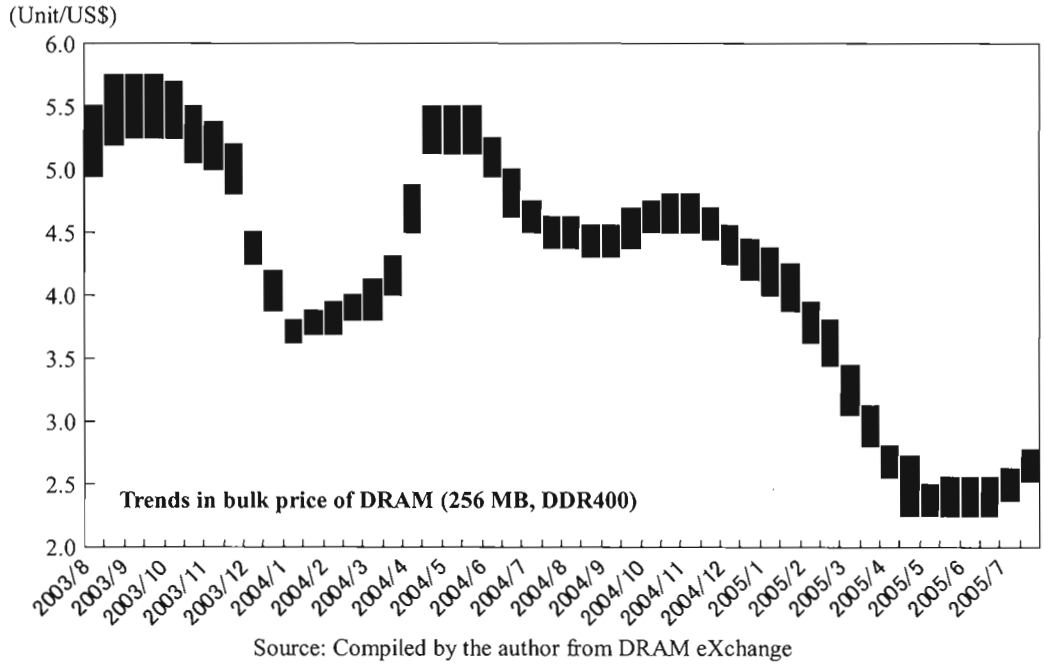
2004 Rank	Company Name	2004 Revenue	2003-2004 growth rate	% by region			
				USA	Europe	Asia/Pacific	Japan
1	Intel	31,346	15.9%	23.1%	22.7%	44.9%	9.3%
2	Samsung Electronics	15,759	58.0%	26.7%	23.2%	36.8%	13.3%
3	Texas Instruments	10,225	30.3%	-	-	-	-
4	Infineon Technologies	9,180	29.1%	-	-	-	-
5	Renesas Technology	9,000	12.9%	6.4%	9.8%	25.3%	58.5%
6	STMicroelectronics	8,760	21.0%	-	-	-	-
7	Toshiba	8,752	15.6%	6.2%	4.4%	27.1%	62. 3%
8	NEC Electronics	6,503	14.0%	11.6%	10.8%	19.7%	57.9%
9	Philips Semiconductors	5,692	26.2%	-	-	-	-
10	Freescale Semiconductor	5,519	19.2%	-	-	-	-
11	AMD/Spansion	5,108	29.7%	-	-	-	-
12	Sony	4,794	38.7%	1.8%	1.6%	18.5%	78.1%
13	Matsushita Electric Industrial	4,689	16.3%	2.4%	1.7%	31.0%	64.9%
15	Sharp	3,488	-	3.4%	6.2%	24.7%	65.7%
16	Fujitsu	2,840	-	7.0%	10.0%	16.3%	66.7%
19	Rohm	2,824	-	3.4%	3.9%	50.2%	42.5%
23	Sanyo Electric	2,205	-	8.3%	1.7%	50.0%	40.0%
27	Elpida Memory	1,807	-	26.2%	7.5%	34.1%	30.2%
Total Revenue		227,246	24.0%	-	-	-	-

Source: Compiled by the author from *Semiconductor Industry News*, April 6, 2005 and June 8, 2005

Research company analysts are focusing on the sales distribution ratio by region of Japanese manufacturers. Japanese manufacturers have a sales distribution centred mainly on the Japanese market and the Asia-Pacific market. Sales in the Asia-Pacific market apparently are no greater than demand generated by Japanese set manufacturers shifting their manufacturing bases to areas within this region. Therefore, it has been pointed out that Japanese manufacturers face the following problems: i) they are still using a business model oriented towards in-house production; and ii) they have got off to a late start in developing overseas business. It used to be said that Japanese manufacturers, which were "general IDM (vertically integrated)," would be able to demonstrate their strengths as the market for digital home appliances expanded. However, as it turned out, the winners were manufactures that mainly focused on semiconductors for PCs and mobile phone handsets, while the losers were Japanese manufacturers of semiconductors for digital home appliances.

2) Price trends

The bulk price for DRAM ICs (256 MB, DDR400) consistently demonstrated a downward trend in 2004, but bottomed out in May and June 2005 and began rising again in July (Diagram 3-3-9). This price rise was apparently due to the fact that, while demand rose due to back-to-school sales in the US, the quantity supplied by manufacturers did not increase, so demand and supply became tight. As demand is expected to increase from early fall, due to Christmas sales and year-end sales, it is anticipated that the underlying upward trend in the bulk price will continue.



Source: Compiled by the author from DRAM eXchange

Diagram 3-3-9 Trends in bulk price of DRAM ICs

3) Equipment investment trends

Diagram 3-3-10 shows actual capital investment by 13 leading Japanese semiconductor manufacturers, as well as projections for future capital investment. The total for all 13 companies was ¥1,046.3 billion in FY 2004, representing a significant rise of 32.8% on the previous

fiscal year. The projection for FY 2005 is ¥965.7 billion, a decline of 7.7% on the previous fiscal year, but this is still a high level. Thus, Japanese semiconductor manufacturers are enhancing production capacity to deal with 300 mm wafers (Diagram 3-3-11) and promoting the introduction of 65 nm to 90 nm process technology.

Diagram 3-3-10 Equipment investment by 13 leading semiconductor manufacturers

(Unit: ¥ billion)

	FY2003 results		FY2004 results		FY2005 projections	
Renesas Technology	120.0	(-)	90.0	(▲25.0%)	80.0	(▲11.1%)
Toshiba	168.0	(154.5%)	203.0	(20.8%)	151.0	(▲25.6%)
NEC Electronics	103.0	(89.7%)	163.2	(58.4%)	100.0	(38.7%)
Matsushita Electric Industrial	51.0	(▲7.3%)	81.0	(58.8%)	86.0	(6.2%)
Fujitsu	30.1	(▲20.8%)	45.0	(49.5%)	95.0	(111.1%)
Sony	80.0	(95.1%)	150.0	(87.5%)	160.0	(6.6%)
Rohm	43.6	(19.5%)	67.1	(53.9%)	50.0	(25.5%)
Sharp	10.8	(▲58.6%)	18.0	(67.0%)	10.0	(44.4%)
Sanyo Electric	26.1	(34.4%)	21.2	(▲18.8%)	13.7	(▲35.4%)
Elpida Memory	99.0	(115.0%)	125.0	(26.3%)	144.0	(15.2%)
Nichia	28.5	(90.0%)	39.7	(34.6%)	40.0	(0.8%)
Oki Electric Industry	15.4	(1.3%)	23.1	(50.0%)	18.0	(▲22.1%)
Seiko Epson	12.5	(4.2%)	20.0	(60.0%)	18.0	(▲10.0%)

Note 1: Triangles represent negative growth. Figures in brackets represent growth compared with the previous year.

Note 2: Some figures have been estimated by *Semiconductor Industry News*.

Source: *Semiconductor Industry News*, June 15, 2005

Diagram 3-3-11

Operational status of 300-mm wafer plants of Japanese semiconductor manufacturers

(Unit: pieces)

Top: company name Bottom: Plant name	Current production situation (monthly output of wafers)	Full production capacity (monthly output of wafers)
Renesas Technology Naka No.2 Plant	14,000	25,000
Toshiba Oita Plant	4,750 (7,000 or more in the second half of the period)	12,500 (Around 2007-2008)
NEC Electronics Yamagata Plant	4,000 (6,000 or more in the first half of the period)	20,000
Fujitsu Mie Plant	3,000 (Mass production beginning in September 2005)	13,000 (During FY 2006)
Sony Nagasaki Plant	- (Mass production beginning in 2005)	- (Not disclosed)
Matsushita Electric Industrial Uozu Plant	- (To begin operating at the end of 2005)	7,500

Source: *Nikkan Kogyo Shimbun*, July 7, 2005

(3) Future prospects and challenges

The Japan Electronics and Information Technology Industries Association (JEITA) has published its research report *Medium- to Long-term Prospects for the Semiconductor Industry from the Perspective of Major Global Electronic Equipment 2005* (Diagram 3-3-12). According to this report, the value of global demand for semiconductors in 32 major categories in 2005 is forecast to grow by 5.5% on the previous year to US$160.9 billion. Subsequently, the figure is projected to grow by 8.5% on the previous year to US$174.5 billion in 2006, by 9.4% on the previous year to US$191.0 billion in 2007, and by 9.8% on the previous year to US$209.7 billion in 2008. In the consumer sector, the "new three holy durables," video games and AV receivers will be the driving forces in the market, with the annual average growth rate (compound annual growth rate: CAGR) for 2004-2008 forecast to reach 13.2%. In the computer sector, laptop PCs and LCD monitors will drive the market, with the annual average growth rate for 2004-2008 projected at 8.8%.

Diagram 3-3-12 Global semiconductor demand by appliance for 32 major electronic appliances

(Unit: $1 million)

	2003 (actual)	2004 (actual)	2005 (projected)	2006 (projected)	2007 (projected)	2008 (projected)	GAGR (2004-2008)
Total Demand	119,896	152,547	160,869	174,529	190,961	209,658	8.3%
Consumer sector	16,627	20,145	20,749	25,409	29,408	33,128	13.2%
Video games	2,318	1,841	1,227	3,713	5,058	5,442	31.1%
DVDs	2,022	2,828	3,112	3,470	3,945	4,265	10.8%
TVs	3,951	4,820	5,282	6,341	7,759	10,002	20.0%
Digital set-top boxes	1,991	2,203	2,471	2,760	3,093	3,479	12.1%
Digital video cameras	1,208	1,305	1,453	1,540	1,602	1,643	5.9%
Digital still cameras	2,861	4,395	4,388	4,306	4,267	4,238	▲0.9%
AV receivers	892	1,207	1,228	1,528	1,807	2,050	14.2%
Air conditioners (household)	1,385	1,546	1,589	1,752	1,877	2,007	6.7%
Computer sector	52,256	68,682	74,556	77,986	85,169	96,090	8.8%
Personal computers	40,625	54,442	58,656	61,135	66,958	76,347	8.8%
Desktop PCs	24,728	31,811	33,502	33,178	34,552	37,891	4.5%
Laptop PCs	11,521	16,676	18,974	21,588	25,377	30,491	16.3%
PC servers	4,377	5,955	6,180	6,369	7,028	7,965	7.5%
LCD monitors	2,881	3,817	4,825	5,139	5,442	5,746	10.8%
Printers	2,369	2,710	2,885	3,025	3,218	3,520	6.8%
DVD players & writers	1,913	2,324	2,334	2,238	2,349	2,452	1.4%
HDD	2,679	2,861	3,002	3,130	3,315	3,571	5.7%
IC cards	1,788	2,529	2,854	3,319	3,885	4,455	15.2%
Telecommunications sector	37,879	48,449	48,866	52,793	55,725	56,332	3.8%
Digital cellular	33,220	43,162	43,927	47,615	50,305	50,288	3.9%
Base stations for mobile phones	2,228	2,664	2,210	2,013	1,882	1,816	▲9.1%
Routers	1,032	1,078	1,113	1,206	1,257	1,447	7.6%
LAN switches	1,399	1,545	1,616	1,960	2,282	2,781	15.8%
Automobile sector	13,134	15,271	16,697	18,341	20,659	24,108	12.1%
Power supply-related	286	329	395	491	554	616	16.9%
Driving-related	5,334	6,137	6,260	6,845	7,823	9,157	10.5%
Body-related	4,657	5,476	6,481	7,189	8,061	9,119	13.6%
Information-related	2,816	3,172	3,307	3,416	3,559	3,705	4.0%
Hybrid-related	41	157	254	401	662	1,511	76.0%

Source: Compiled by the author from Medium- to Long-term Prospects for the Semiconductor Industry from the Perspective of Major Global Electronic Equipment 2005, May 2005, JEITA