

Toward a Comprehensive Electronics Company Advanced Development and Planning Center Built in Tenri

In 1970, the company changed its name from Hayakawa Electric Co., Ltd. to Sharp Corporation. Founding President Tokuji Hayakawa was appointed to the position of chairman and Senior Executive Director Akira Saeki became the new president of Sharp Corporation. With this new corporate structure, Sharp accelerated its business development in the electronics field.

Sharp made a bold decision to pass up the opportunity to exhibit at Expo '70 in Senri, Osaka. Rather than investing in a temporary pavilion, the company used the equivalent funds to build the Advanced Development and Planning Center, while also increasing its investments in manufacturing LSI chips, researching cutting-edge technologies, and strengthening employee training. Mass production of LED products began, and liquid crystal technology was developed around this time.

The Advanced Development and Planning Center, soon after opening (Tenri City, Nara Prefecture)

1 Company Name Change and Adopting a New Corporate Structure

Company Name Changed to Sharp Corporation

On January 1, 1970, the company changed its name from Hayakawa Electric Co., Ltd. to Sharp Corporation.

Just as the 1970s were about to dawn, President Hayakawa proposed the name change based on his hope for renewed growth in the company. The change was approved at the general shareholders meeting on November 28, 1969. The brand name Sharp—originally derived from the Sharp Pencil that President Hayakawa invented—had already been used on all the company's products from the radio onwards and had become familiar to the public.

There were two reasons behind the name change. First, the president wanted the name to fit the image of a company that was actively engaged in new fields in electronics, such as semiconductors. Second, he wanted to unify the company name and the brand name to strengthen the corporate image and improve the company's position in domestic and international markets.

With exports surpassing 40% of total sales—41.3% in the first half of fiscal 1969—the Sharp brand name was widely recognized. However, the same could not be said for the manufacturer's name, Hayakawa Electric. The company therefore decided to unify the corporate name and brand name, with a view to making a huge leap

forward as an international company. The change of the company name marked the beginning of a new era, as the company was striving to become a comprehensive electronics manufacturer that could compete on the world stage.



Replacing the outdoor signage of the head office reflecting the company's name change

President Saeki Appointed

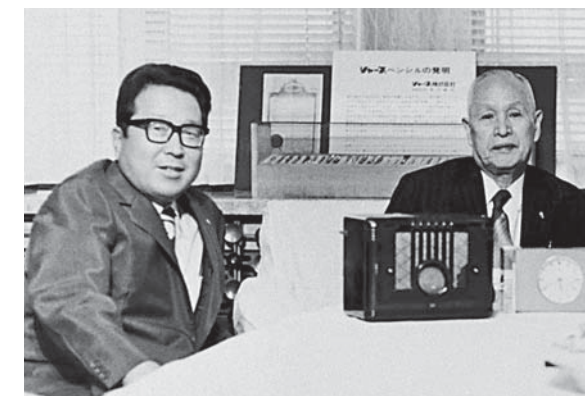
Fair and Impartial Human Resource Management, Transparent and Accurate Accounting

On September 15, 1970, President Hayakawa became chairman, while Senior Executive Director Akira Saeki became the new president.

In the 1960s, the consumer electronics industry experienced rapid growth in Japan, spurred by a period of high economic growth. Sharp was growing well. At the same time, intensifying competition among consumer electronics manufacturers began to affect overseas operations. To make matters worse, the economic cycles in Japan and overseas were approaching a difficult period.

In this climate, President Saeki spoke to employees about the company's approach. "The important thing for a corporation is how it fulfills its social responsibility. The pursuit of profit is an absolute necessity, but that is not the goal of the company. A true company must contribute to society and to the welfare of people. In order to do this, we must always consider our suppliers, our customers, the industry, and the economy as a whole, so that we may establish the right approaches to manufacturing and marketing." He spoke about his own management philosophy as follows, "I will adhere to a fair and open management philosophy, based on fair and impartial human resource management and transparent and accurate accounting. That means we must fairly evaluate the abilities and character of each employee and trust them to perform their work. We must also use funds in a way that people can clearly understand."

President Saeki then made policies to expand business and operations by further developing the consumer electronics field. This would begin with research and development of new products that would be useful for society—following the success of the electronic calculator—and would also involve entering new fields, such as housing equipment and office products.



New corporate structure initiated by Chairman Hayakawa (left) and President Saeki (right)

Overcoming Numerous Difficulties

Around 1970, when Sharp started moving forward with its new corporate structure, Japan's consumer electronics industry had various issues to deal with, such as lawsuits filed in the US charging Japanese manufacturers with

dumping TV sets on the US market at artificially low prices. There was also controversy over dual pricing of color TV sets in Japan's domestic market.

Making the situation worse, US President Nixon announced a new economic policy in August 1971 that suspended the convertibility between the US dollar and gold and that also placed a 10% tariff on imported products. The "Nixon Shock" came as a blow to Japanese industry.

Stock prices in Japan plunged temporarily, exports slowed, and the Japanese economy lost its momentum.

Further, in December 1971, the exchange rate was adjusted by 16.88%—from 360 yen to 308 yen per US dollar—under the Smithsonian Agreement, a currency exchange adjustment made by a group of ten advanced nations. Still, the US trade deficit increased, leading eventually to the adoption of a floating exchange rate system.

Starting about a month after the Nixon Shock on September 27, 1971, President Saeki began addressing the issue at Sharp by speaking directly with managers in the head office and by visiting factories around Japan. He also released a message to all employees on October 1, providing guidance to overcome these difficult circumstances.

His response was fast, following the company's swift analysis of the changing economic environment and political climate. Sharp developed and implemented concrete, comprehensive measures for product development, manufacturing, and marketing both in Japan and abroad.



President Nixon's announcement of emergency measures, centering on defending the US dollar, had a serious impact on the global economy (The Nikkei newspaper, August 16, 1971)



A pamphlet entitled *Facing a Period of Great Change in the World Economy* was published to explain measures being taken in response to the Nixon Shock

2 Aiming to Be a Comprehensive Electronics Manufacturer

Establishing Business Philosophy and Business Creed

In January 1973, Sharp carefully reviewed the basic spirit and ideas that had been guiding and nurturing the company since its beginning. The company then spelled out those ideas in its Business Philosophy, Business Creed, and Basic Business Principles.

The Business Philosophy describes ideas in line with what is now called corporate social responsibility (CSR)—ideas that aim to promote the mutual health and growth of society and stakeholders. It mentions contributing “to the culture, benefits and welfare of people throughout the world” and notes that “our future prosperity is directly linked to the prosperity of our customers, dealers and shareholders.”

The Business Creed declared that “Sharp Corporation is dedicated to two principal ideals: Sincerity and Creativity.” (Please refer to the title page.) “Sincerity” meant working in earnest, considering how to please and be useful to the people surrounding us. “Creativity” meant having the ability to open up future possibilities through constant innovation and improvement.

President Saeki thoughtfully placed “Sincerity” as a human being before “Creativity” as a company. He added “Courage” as the last item in the Business Creed, with the idea of incorporating into the company’s DNA the never-give-up spirit of the founder, who made a remarkable recovery after the Great Kanto Earthquake of 1923.

The Basic Business Principles included five key ideas: to develop unique technologies; to create the best products; to remain committed to customer-oriented sales; to build cooperative relationships for mutual prosperity; and to equate the growth of the company with the happiness of everybody.

The company created cards on which the Business Philosophy and Business Creed were printed and distributed them to businesses partners to help them understand the company’s corporate policies. This card



Cards for the Business Philosophy and Business Creed

was later translated into English, Chinese, French, German, and Spanish and distributed to employees and business partners overseas.

For the Annual Employee Award Ceremony, held in June 1972, a new award called the Sharp Grand Award was created to honor the individual or organization with the greatest achievement for the year.

Even now, this annually presented award continues to provide a source of motivation to individual employees. Morale is also raised in the workplace of each award recipient.

Making a Bold Decision, Progress in Manufacturing LSIs In-House

■ Building the Advanced Development and Planning Center

In January 1968, the company decided to cancel its participation in Expo '70, which was to be held in Senri, Osaka. The company considered that it would be more meaningful to allocate limited resources to building a facility that could be used for the long term. In November 1968, the company started construction of the Advanced Development and Planning Center in the hills of Tenri, Nara Prefecture. The term “Advanced Development” was intended to convey the new center’s purpose of advancing development and growth in two areas: the development of new technologies (in the Central Research Laboratories and a semiconductor plant) and the development of human resources (at a training institute for employees).

The construction of a semiconductor plant was prompted by the company’s experience of having difficulty in obtaining metal oxide semiconductor (MOS) large-scale integrated circuits (LSIs) when it was developing the world’s first LSI calculator—the QT-8D, released in 1969. “If we’re depending on other companies for the supply of semiconductors, we won’t be able to take the lead in the development of electronic calculators.” In March 1969, the company reached an agreement for technological cooperation with North American Rockwell Corporation and made an official announcement on the construction of a semiconductor plant.

Construction of the semiconductor plant, the Central Research Laboratories, and the training institute was completed in September 1970. Facilities for employee welfare were also built on the campus. Ever since, the Advanced Development and Planning Center has been serving as a supportive foundation in the development of technology and human resources for Sharp as a comprehensive electronics company.

Including construction and equipment costs, investment in the Advanced Development and Planning Center totaled 7.5 billion yen. It was a bold investment, considering that the operating capital for the company at that time was around 10.5 billion yen.

In August 1969, the company issued European Depository Receipts (EDRs) to raise 4.2 billion yen. 10 million new shares were issued. As a result, the total number of issued shares reached 210 million. The company became the first in Japan to issue EDRs and target Europe as a whole with new shares.



Senior Executive Director Saeki saw a model of the Apollo space capsule at North American Rockwell, a supplier of MOS LSI, and was convinced of the infinite possibilities of semiconductors

■ Starting In-House LSI Production

Initially the semiconductor plant in Tenri was working on only the second half of the manufacturing process. It imported LSI chip wafers from North American Rockwell

and then placed those chips in packages and finished them as LSIs. In 1972, the plant started operation of the first-half processes and became a facility for the integrated manufacture of LSIs.



Employees at the semiconductor plant working with microscopes in the later stages of the production process

Next, the company started producing more energy-efficient complementary metal oxide semiconductor (C-MOS) LSIs, in conjunction with development of a COS*-type calculator—the EL-805 Liquid Crystal Compet (released in 1973). The company harnessed innovative technologies to overcome challenges presented by the increasingly complicated C-MOS production process.

In March 1976, Sharp developed a process for packaging LSIs using the film-carrier method. This method involved placing LSI chips onto film, where circuit patterns were printed and then sealed with resin. LSIs made with this method were easy to process, transport, and store. This contributed to a streamlining of the production process for electronic calculators and also led to a surge in demand for semiconductors. The company began constructing a second plant in December 1976 and established a system capable of producing one million units per month.

* COS stands for Calculator On Substrate, a method of constructing the entire calculator system—including the display, driver, and key access points—on a single panel.

Japan World Expo '70

On March 14, 1970, Japan World Expo '70 opened in Senri Hills (in Suita City, Osaka Prefecture) with the theme of Progress and Harmony for Humankind.

The first World Expo held in Asia, it was a national event that symbolized the economic strength of Japan.

People waited in long lines to see exhibitions in pavilions located on a site covering 3.3 million m². By the time the expo closed on September 13, attendance numbers for the 183 days of the event had topped 64.2 million. Novel items such as a wireless telephone—the forerunner of today’s mobile phones—canned coffee, and Bulgarian-style yogurt made an impact at the expo and subsequently became popular.



Tower of the Sun, the symbol of Expo '70

3 Development of Liquid Crystals and Growth in Office Products

Developing Liquid Crystals and Application in Thin Electronic Calculators

■ Practical Application of LCDs

One technology that helped both to reduce the energy consumption of electronic calculators and provide them with thinner profiles was the LCD. The LC stands for “liquid crystal”—a crystal state between liquid and solid form. Liquid crystals were first discovered in 1888 by Friedrich Reinitzer, an Austrian plant biologist. In 1963, researchers at RCA in the US discovered that the transparency level of liquid crystal changes when it is electrically stimulated. In 1968, George Heilmeyer from RCA made an application based on this property and created the world’s first LCD.

In January 1969, NHK introduced the LCD developed by RCA in a television program. A Sharp researcher who saw the program was so impressed that he convinced management to start basic research. By the summer of that year, Sharp researchers succeeded in a verification experiment similar to the ones conducted by RCA using a device with a simple structure.

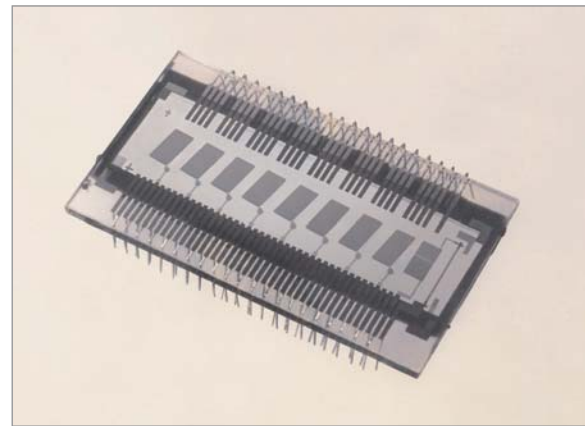
LCDs boasted low power consumption, but presented difficulties with technical issues such as display performance and service life. Other companies were not making much progress toward mass commercialization. Sharp boldly took on this challenge and succeeded in overcoming problems by developing an ionized organic compound as an additive.



Research and development of liquid crystal in a lab

■ The World’s First COS Pocket Electronic Calculators Using an LCD, the EL-805

Entering the 1970s, the utilization of LSIs for major components progressed, and that made it easier for businesses to get into the market for electronic calculators. This caused severe competition in sales of electronic calculators, which would later become known as the “electronic calculator war.” However, Sharp started



Prototype of LCD used for electronic calculators (1972)

exploring ideas for electronic calculators that were different from the products of competitors. Around that time, fluorescent display tubes and LEDs were starting to be used, replacing Nixie tubes. When combined with C-MOS LSIs, LCDs could be made thinner and battery life could be extended. As such, the company succeeded in making a prototype in early 1972 and decided to position LCDs as the next strategic product.

Due to the fact that liquid crystal can be sandwiched between two pieces of glass, COS structures were also considered. One of the two pieces of glass for the LCD was extended to make a substrate upon which electronic components could be mounted and connected by thick-film wiring.

However, it took two years from the start of full-scale research to be able to see results with liquid crystal. There were many issues to resolve concerning issues such as the mass production of transparent conductive film, the development of liquid crystal materials, and the technology for injecting liquid crystal. The company also needed to build a production line right away.

Requests for support were made to the Osaka National Research Institute as well as to Sharp’s LSI research division. Starting with the development of technologies to produce transparent conductive film and seal the pieces of glass, the obstacles were addressed one by one. Sharp finally succeeded in using liquid crystal for practical applications. In June 1973, Sharp introduced the world’s first COS pocket electronic calculator with an LCD, the EL-805 Liquid Crystal Compet. The technology allowed the calculator to be just 20 mm thick and offer 100 hours of continuous use from a single AA battery. It created a sensation following its release, and newspapers and television reports gave glowing reviews using words such as “groundbreaking” and “technological innovation.” With Sharp having proven the commercial value of liquid crystal, chemical material manufacturers and device manufacturers became convinced of the business potential of LCDs, and a cooperative environment was formed and strengthened.



COS substrate and the EL-805

The company introduced the COS-type LCD electronic calculator at the 5th International Liquid Crystal Conference held in Stockholm in 1974. It was hailed by display researchers from many countries as a significant breakthrough.

New Business with Cash Registers, POS, and Office Computers

Based on technologies used in its electronic calculators, Sharp developed new business-use products such as cash registers and point-of-sale (POS) terminals. Office product dealers had high hopes, and the market held much promise.

For cash registers, a new electronic type that would work with a light touch on the keys was desired to replace the old mechanical types. Sharp entered the market in 1971 with the ER-40, which incorporated IC technology. The following year, Sharp became the first company to succeed in practically applying LSIs. Since then, the company has continued to release unique products such as the industry’s first battery-operated cash register as well as one with a voice function.

In 1972, the company developed the Billpet, a compact business-processing terminal to be used by the salespeople of Coca-Cola (Japan) Co., Ltd. Salespeople were able to input sales data while visiting customers, and the data would be incorporated into a host computer. Sharp designed the logic architecture of Japan’s first micro-processing unit (MPU) for the commercialization of the Billpet. It had been incorporated into an LSI by Nippon Electric Co., Ltd. a year earlier.



The ER-40 electronic cash register, incorporating ICs



The Billpet compact business-processing terminal

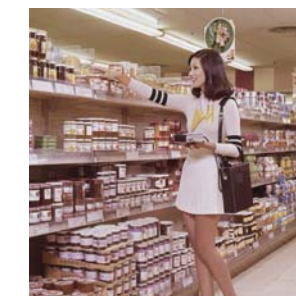


The HAYAC-5000 was able to simultaneously process multiple jobs

The BL-3001 POS terminal installed in a Daikyo gas station



The BL-3110 electronic memo pad was used at Jusco



Sharp developed and released the HAYAC-3000—an office computer with the ability to issue vouchers and other functions—in 1971. Making its debut in 1974 was the HAYAC-5000, which could be multi-tasked to run as many as 15 programs at once. This model could simultaneously process information to issue vouchers, calculate salaries, and perform other functions that had previously only been done by large computers. It could also simultaneously issue vouchers to multiple typewriters.

4 Development and Commercialization of Copiers

Sharp innovations had helped to cultivate increasing demand among office product retailers for more products. The company therefore started developing a copier in 1970 to further establish the office products category as one of its core businesses.

The copier was developed from scratch by a small group of engineers who had little previous experience in the field. It was a major challenge for Sharp, as copiers feature complex mechanisms. The new development needed to bring together technologies from various fields such as electronics, optics, mechanics, and chemistry.

The process from design to preproduction went smoothly for the most part. But at the final stage the copier began to have trouble sending paper through for copying, depending on the paper type. Engineers determined that the cause of the problem was the direction of the fibers in the paper*¹. Sending paper in the direction of the fibers—that is, with the “grain” of the paper—solved the problem and paper travel became smooth again. It was an important lesson: that making a good copier involves paying attention to more than just the machine itself.

Sharp released its first copier, the SF-201, in January 1972. It was an indirect-electrostatic wet-toner copier and was well received. The company increased its lineup by releasing the SF-101 (a mass-market model) and the SF-301 (a high-end model) the same year.

The company announced its first plain-paper copier (PPC) at the 1973 Business Show in Osaka and started selling it as the SF-710 in October 1974. Most copiers at that time used complex mechanisms for control, but the SF-710 used IC control.



Sharp's first photocopier, the SF-201

The company exhibited the machine at the Hannover Messe in West Germany in April 1974, just before its commercial release. Many people from major office product companies in Europe and beyond came to see it, and about 10 companies showed interest. Sharp subsequently received official requests for OEM*², and Sharp's OEM business started growing as a core business in tandem with the growth of the Sharp brand in the copier market.

*1 The paper fibers, or grain of the paper, can be aligned either vertically or horizontally.

*2 OEM, original equipment manufacturing, is the manufacture of products to be sold under other companies' brand names.

5 Expansion of the Domestic Marketing and Service Organization

Development of the Sales Organization

In January 1972, Sharp announced a new sales company system to consolidate its 61 regional sales companies nationwide into 16 companies organized in regional blocks. This consolidation streamlined management operations and enabled the company to utilize 1,000 personnel for the frontline sales force. The previous year's Nixon Shock had caused an economic recession and slow sales, so an organizational change to focus on marketing was needed.

The former regional sales companies were renamed “sales centers,” and they increased in number from 61 to 73. In adding offices and branches under each sales center, 138 new sales bases were created to make a stronger sales network.

As part of the new sales company system, existing equipment companies and credit companies were also

reorganized by region in April 1972 to strengthen the organization. The purpose was to make cooperation with sales companies stronger and to promote greater activity in marketing and service activities.

In the field of office products, specialized sales companies were established in Tokyo, Osaka, and Nagoya in July 1969. Before becoming independent companies, the new companies had all been part of Sharp's office equipment marketing divisions in Tokyo, Osaka, and Nagoya. In other regions, home appliance and equipment companies were initially in charge of business machine sales. Later on, office product sales companies were set up in Kyushu, Chugoku, Kanto, Tohoku, and Shikoku and responsibilities were transferred.

In October 1972, the computer systems marketing division was spun off to establish Sharp System Products Co., Ltd. (SSP). This company consisted of three divisions: sales, software development, and maintenance services.

In order to strengthen marketing in the Tokyo metropolitan area, the Sharp Tokyo Building was built in June 1974. The Tokyo Branch, the Home Appliance Marketing Group, the Industrial Machine Marketing Group, and SSP—which had its headquarters in Tokyo—all moved into the building.



Sharp Tokyo Building built in 1974 (later, the Tokyo Ichigaya Building)

Enhancing Systems for Quality and Service

■ Establishment of the Product Reliability Control Center

In 1972, Sharp established the Product Reliability Control Center to further enhance its company-wide quality-control activities. The organization first consisted of a Product Testing Room, where products were tested

from the point of view of customers, and a Packaging Technology Room, where appropriate packaging was researched and developed. Later, a Quality Standards Room was added, to deal with regulations related to product safety and to develop standards. The company also implemented a company-wide design review (DR) in 1972 to prevent malfunctions by predicting potential problems in new products and by thoroughly examining quality and other issues in the design stage.

In July 1972, Sharp opened Consumer Information Centers at nine service companies around the country. The organizational change was made in response to increased demands from consumers following the enactment of the Basic Consumer Protection Act in 1968.

In 1973, the quality control division and service division were consolidated into the Service Group. The new organization was in charge of the Product Reliability Control Center, the Service Management Division (which managed the service companies), and the Parts Center.

The company changed the name of the internal standards for quality control, from “HS” to “SS” (Sharp Corporation Standards) along with the company name change in 1970. As new factories were opening in Hiroshima and Tochigi Prefectures, company-wide quality standards became necessary and the nationwide SS was implemented in May 1974.

In April 1974, the company moved its Parts Center to the Tanabe Plant to establish a standardized distribution system for home-appliance service parts. In 1984, the Parts Center in Osaka was consolidated and relocated to Fujiidera. The Parts Center improved its efficiency by introducing a new service parts automation system.

■ Start of Sharp Precision Machinery and Sharp Kosan

The company's Appliance Division opened a precision manufacturing plant in 1969 to make metal molds*. This was in response to the increased demand for metal molds and the need to modernize and streamline the process of manufacturing them. On March 2, 1970, the plant was independently established as Sharp Precision Machinery, Co., Ltd. (now Sharp Manufacturing Systems Corporation). Anticipating that all business divisions would need metal molds, Sharp had launched its own specialty metal molding company.

Meanwhile, Soei Jitsugyo—a company established in 1962 that operated in real estate, damage insurance, and automobile repair businesses—changed its company name to Sharp Kosan (now Sharp Finance Corporation).



Consumer Information Center at Sharp Kinki Service Center

* Metal molds are used for press or resin molding to mass-produce parts and components for industrial products. The quality of the mold determines the product's appearance, quality, and performance, and it can even affect productivity.

6 Trade Friction and Expansion of Overseas Operations

Growth of Exports to the US and Trade Conflict

Higher Hopes for Exports and Growth of SEC

Sharp's export sales started surging in 1968 and reached 23.6 billion yen in the first half of fiscal 1969—a 155% increase over the same period in the previous year and more than 40% of total sales. As Japan's consumer electronics market had become fairly saturated and the expectations placed on exports became even higher, the company reorganized its Export Group into the Overseas Business Group in April 1970.



Kaiji Geppo ("Overseas Business Monthly"), a publication started by Sharp in 1974 as a newsletter of the Overseas Business Group. It provided updates about the Group, information on regional trends, and product information. It included some articles in English. It was published until 1990, and there were 120 issues.

In the US, the largest market for Sharp's exports, the penetration rate of color TV sets was just over 40%. Sharp anticipated increased future demand and made efforts to reduce costs and increase awareness of the Sharp brand. At the Consumer Electronics Show (CES) in New York in 1970, Sharp exhibited 40 color television sets, including unique products such as a TV with an electronic tuner. These models were reported by the industry media and helped improve Sharp's brand image. Meanwhile, in the market for smaller TVs, the demand for black-and-white TV sets was still strong. Sharp's black-and-white sets had a good reputation for quality and design, and unit sales increased steadily from about 120,000 units in 1968 to 340,000 units in 1970.

Exports of other products were also increasing. There was still strong consumer demand for radios, and Sharp's exports of radios were increasing. Exports of tape recorders, which were shifting to the cassette format, were increasing as well. Exports of microwave ovens, an area



The R-7600, a microwave oven released in the US in 1974. It featured a turntable, which was a popular feature in Japan as well.

where Sharp already had the top market share among Japanese makers, continued to rise. Sharp's US sales subsidiary, SEC, was growing.

In 1970, SEC opened branches or sales offices in Chicago, Los Angeles, Detroit, and Atlanta and the number of employees reached about 300. SEC sales reached US\$26.12 million (approx. 9.4 billion yen), which was about 30% of the company's export sales.

Increasing Exports of Color TVs Cause Trade Friction

Around that time, Japanese consumer electronics manufacturers made progress in using ICs in color TVs, which had previously used transistors. These companies created high-quality products at lower costs, and exports increased. However, the rapid expansion of Japanese exports was seen as causing a decline in US TV manufacturing and an increase in the US unemployment rate. This all led to increasing trade friction.

One event that became symbolic of the time was the filing of an anti-dumping lawsuit by the US Electronics Industry Association against Japanese black-and-white and color TV manufacturers. In March 1971, an anti-dumping tariff was introduced. It remained in place until negotiations between the US and Japan led to a settlement in 1980. In December 1970, a US television manufacturer, National Union Electric Company filed a lawsuit against seven Japanese manufacturers, including Sharp, charging that the manufacturers were acting as a cartel and dumping their products in violation of US antitrust laws. In September 1974, Zenith Radio Corporation joined the lawsuit. The two companies were demanding restitution of US\$1.26 billion. The lawsuit ended with the complete vindication of the Japanese manufacturers in April 1987—but it took a long time to resolve, and Sharp took on a heavy burden in legal expenses. The lawsuit also required a huge amount of paperwork to produce the needed reference materials.

Expansion of Overseas Manufacturing and Sales Bases

Sharp decided to strengthen its manufacturing operations overseas as a way of dealing with trade friction and the economic policies of the US. The company set up a number of manufacturing facilities for re-export. These facilities would export parts and unfinished products to third countries, mostly in Asia, which in turn would then export finished products to Europe and North America.

In 1971, Sharp invested in Sampo Electronics Company in Taiwan and built a new plant where a million radios and 300,000 television sets could be manufactured for export to the US. In 1973, the company established Sharp Data Corporation (SDA^{*1}) mainly to manufacture electronic calculators for export to the US. SDA produced an original-model pocket electronic calculator that used locally made parts. In 1974, the company established Sharp-Roxy Corporation (M) Sdn. Bhd. (SRC^{*2}) in Malaysia as its first large-scale center for re-export of Sharp audio products. In 1975, construction was completed of a 57,000 m² plant capable of producing 700,000 radio sets and 400,000 tape recorders a year.

Meanwhile, beside the centers for re-export, the company established Sharp do Brasil S.A. Indústria de Equipamentos Eletrônicos (SDB) as a manufacturing base for electronic calculators and color TVs for Brazil's domestic market.

With a view to establishing a sales organization that did not rely so much on the US market, Sharp opened a number of new sales subsidiaries. In 1971, the company established Sharp Corporation of Australia Pty. Ltd. (SCA). SCA, with capital of 400,000 Australian dollars (150 million yen) sold electronic calculators, stereo sets, tape recorders, microwave ovens, and other products. SCA built a plant in 1975 and started manufacturing color TVs. In 1974, the company established Sharp Electronics of Canada Ltd. (SECL) with capital of 300,000 Canadian



Inside the SRC plant established in Malaysia in 1974. Since then, Sharp established a sales company and a manufacturing company in Malaysia, making that country an important overseas base.

dollars (90 million yen), selling electronic calculators and other office products and offering after-sales services. Strengthening sales networks around this time helped to raise awareness of the Sharp brand, and the company could accelerate its plans to move away from exporting "store brands."

^{*1} The company name was changed to Sharp Korea Corporation (SKC) in 1984.

^{*2} In 2008, Sharp dissolved the joint venture agreement with Roxy and started a new joint venture with Onkyo Corporation under a new company name, S&O Electronics Malaysia Sdn. Bhd. (SOEM).

The First Oil Crisis

Triggered by the Fourth Arab-Israeli War that started in October 1973, Arab nations substantially reduced oil supplies to the US and other Western nations and then continued to reduce oil production. Further, OPEC (Organization of the Petroleum Exporting Countries) raised crude oil prices to about four times their previous levels over a period of just two months.

Japan had made a full-scale shift in energy supply from coal to oil in the 1960s and was relying heavily on oil. The reduction of oil imports and rising prices had a serious impact on the economy.

Companies were frantic to secure raw materials and fuel, and—partly as a result of their rush to purchase supplies—the balance of supply and demand was severely challenged. Prices, even in the area of consumer items, surged dramatically.



During the oil crisis, even gas stations were putting up banners calling for people to conserve energy (photo courtesy of *Asahi Shimbun* newspaper)

Device Industry and Information/Communications Products That Originated in Calculators

Device industry stemming from the calculator

Semiconductor Industry




Camera module

Microwave oven

Word processor

Faced with the need for LSIs to use in its calculators, Sharp built the Advanced Development and Planning Center including a semiconductor plant in Tenri in 1970 and began mass-producing LSIs. Sharp's approach of developing distinctive products through the in-house manufacture of key devices began here.

LCD Industry



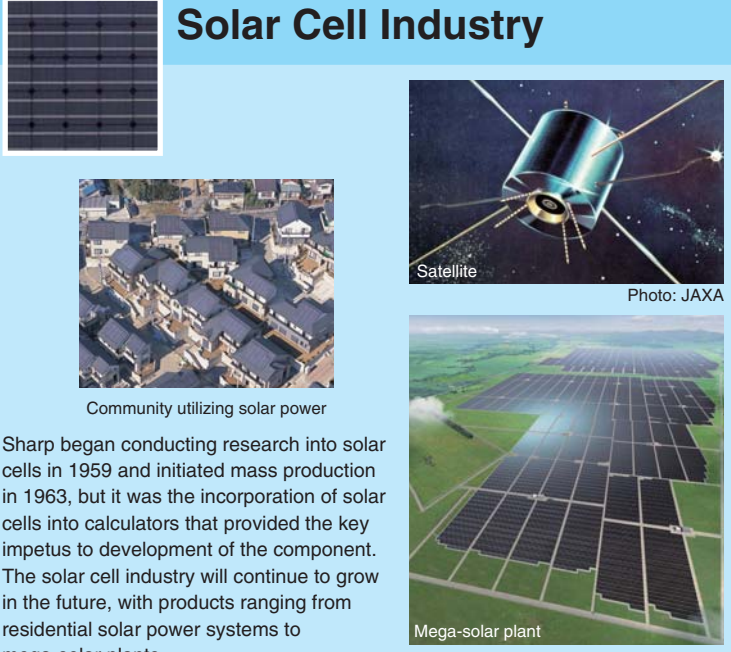
LCD TV

Media tablet

Videocamera

To differentiate its offerings from those of competitors, Sharp incorporated an LCD, which it had been researching since 1969, in a calculator, thereby creating a thinner device that used less power. LCDs went on to become key devices used in fields ranging from information/communications devices to audiovisual products, evolving into a premier electronics industry.

Solar Cell Industry



Satellite Photo: JAXA

Mega-solar plant


Community utilizing solar power

Sharp began conducting research into solar cells in 1959 and initiated mass production in 1963, but it was the incorporation of solar cells into calculators that provided the key impetus to development of the component. The solar cell industry will continue to grow in the future, with products ranging from residential solar power systems to mega-solar plants.

Sharp Calculators Recognized as an IEEE Milestone (2005)

Sharp calculators have been recognized as an IEEE Milestone by the IEEE, an international academic society in the area of electricity and electronics. The honor recognizes innovative initiatives undertaken by Sharp from 1964 to 1973 to miniaturize calculators and reduce their power consumption.


Semiconductor, LCD, and solar cell technologies established as part of these research processes made significant contributions to the development of the electronics industry.



IEEE Milestone commemorative plaque


Sharp's information communications products that are attracting attention today

All-transistor diode calculators




1964: CS-10A

IC calculators




1967: CS-31A

LSI calculators




1969: QT-8D
Used MOS LSIs to achieve a higher degree of integration than was possible with ICs

LCD calculators




1973: EL-805
Used an LCD and C-MOS LSIs; could be used for 100 hours on a single AA battery

Solar-powered calculators




1976: EL-8026
Brought solar cells, which had previously been used exclusively in lighthouses and on satellites, to the calculator

Buttonless




1977: EL-8130

0.8 mm thick



1985: EL-900

Exceptional designs




1979: EL-8152

Development of more advanced manufacturing technologies


ELSiS
Awarded the 1970 Okochi Memorial Production Prize


Development of the film carrier method



1976: EL-8020

Production line automation

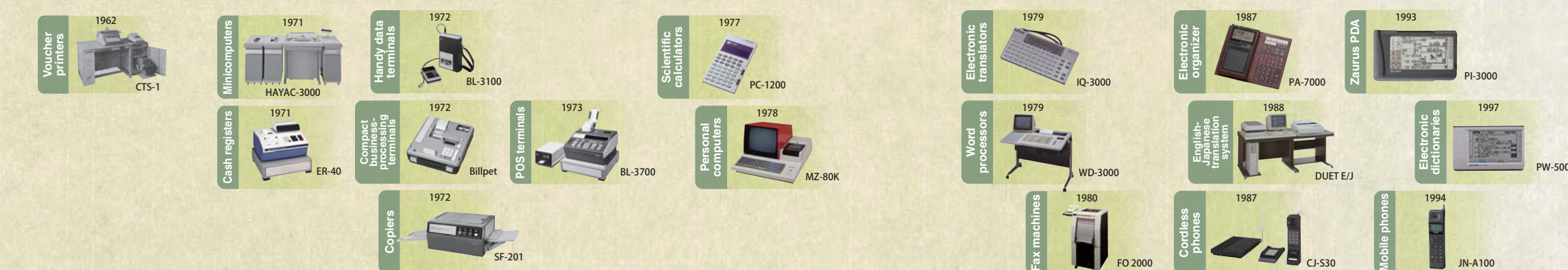
First-half process  **1978: EL-8140**

Second-half process  **1980: EL-211**

Awarded the 1980 Okochi Memorial Production Prize



- Touchscreen LCD monitor
- Digital MFP
- Electronic cash register
- POS terminal
- Media tablet
- Business-use mobile handsets
- Electronic dictionary
- Fax machine
- Calculator
- Smartphone



- Voucher printers: 1962 CTS-1
- Minicomputers: 1971 HAYAC-3000
- Handy data terminals: 1972 BL-3100
- Scientific calculators: 1977 PC-1200
- Electronic translators: 1979 IQ-3000
- Electronic organizer: 1987 PA-7000
- Zaurus PDA: 1993 PI-3000
- Cash registers: 1971 ER-40
- Compact business processing terminals: 1972 Billpet
- POS terminals: 1973 BL-3700
- Personal computers: 1978 MZ-80K
- Word processors: 1979 WD-3000
- English-Japanese translation system: 1988 DUET E/J
- Electronic dictionaries: 1997 PW-5000
- Copiers: 1972 SF-201
- Fax machines: 1980 FO 2000
- Cordless phones: 1987 CJ-530
- Mobile phones: 1994 JN-A100

Origins of information/communications products