

Chapter 9

Microprocessor Independence War

The year of 1989 was the year when the Japanese era name was changed from Showa to Heisei, and it was a year symbolizing a milestone when one era was over and a new era started. Hitachi's semiconductor business structure also entered a new turning point. After two years of being away from microprocessor business in the position of GM of Takasaki Works, I became deeply engaged in this business once again.

In February of this year, "Semiconductor Design and Development Center (abbreviated name, SDDC)" was established in the Semiconductor Division, and I was appointed the first GM of SDDC. The task of the Center GM was the integrated operation of all the design and development departments that had been in the factory organization until then. The coverage was for all the product fields including microprocessor, logic, memory, bipolar IC, discrete semiconductors, optoelectronics, and furthermore, basic technology groups such as process, package and CAD technology were also included.

The first big work as the GM of SDDC was to deal with a microprocessor trial case with Motorola. About a month before I became the SDDC GM, Motorola sued Hitachi for patent infringement. It became a huge problem not only for the semiconductor division but also for the whole company. Since the beginning of 1976, the relationship with Motorola started in a very intimate manner like honey moon as the ally in microprocessor business, but it came into a situation like a stage of ennui after 6 to 7 years, and finally reached a stage of serious confrontation.

Why did it develop like this? Although there are some overlaps with the previous sections, let me look back over the subjects briefly.

Hitachi developed its own 4-bit microprocessor in 1974, but the development of 8-bit product was running into difficulties. Yoshinobu Imamura, who was newly appointed to the GM of Semiconductor Business Division, was worried that Hitachi's microprocessor business would lag behind in this situation.

Imamura made courtesy visits to major US semiconductor manufacturers in May of 1974, and I also accompanied him. When we visited Motorola, the talks with their executives got very lively and developed into the discussion of mutual exchanging of technologies in which each side had its expertise. Practical discussions were held between the two companies to realize it, and Hitachi selected automated bonding machine as the candidate for exchange, and Motorola picked up 8-bit microprocessor (6800 series). After several twists and turns, we reached the technology exchange agreement in the next year. It was formally approved in the both companies at the end of 1975.

At that time Intel was in a clear top position in the field of microprocessor, and Motorola was seeking for its second source partner to pursue Intel. Therefore, this relationship between Hitachi and Motorola took the form of "6800 series alliance with Motorola as the leader to confront Intel", and the both companies raised their spirits toward the common goal.

As already mentioned, Hitachi worked on two major technological developments to strengthen the 6800 series. One was application of high-speed CMOS technology to microprocessor, and the

other was ZTAT (commercial word to abbreviate Zero-TAT) technology. The first product (NMOS version) introduced from Motorola was converted into CMOS over a year, and the product was announced in October 1981 with the model name of HD6301.

As for the ZTAT microprocessor, samples were completed at the end of 1984, and marketing activities was started immediately after that. Formal press release was held on May 16, 1985. The innovative product development such as the world's first high-speed CMOS microprocessor (6301) and the world's first ZTAT microprocessor (63701), etc. were carried out mainly by the microprocessor design department (then the Dept. Mngr. Yasuda), and among them were Toshimasa Kihara, Shiro Baba, Naoki Yashiki, Yasushi Akao, Tsuneo Sato, Kiyoshi Matsubara, Keiichi Kurakazu, and other up-and-coming young engineers, all taking active roles vigorously. They have played leading roles in microprocessor business until today, in Hitachi semiconductor and to Renesas Technology. For example, Akao, who served as the president of Renesas Electronics, was one who fostered his abilities by engaging in development projects for high-speed CMOS microprocessors soon after he entered Hitachi. Introduction of high-speed CMOS technology and ZTAT technology were very highly evaluated by the customers, and the sales increased rapidly.

From the standpoint of "the outcome of the Allied Forces of Motorola", we expected that they would also welcome this situation, but in reality it was very different from our thoughts. On the contrary, they considered these products as "unwelcome guests" and showed their uncomfortable feels against them. The first time I felt this kind of atmosphere was in April 1982 at a meeting with Motorola executives. At that time, I was responsible for the microprocessor business as the Deputy GM of Musashi Works, and I visited Motorola to meet Gary Tooker and other semiconductor executives to discuss how we would proceed our cooperative relationships into future. It was the time when the first CMOS product (6301) was introduced into the market and was gaining a good reputation. I explained the situation in detail, and made a proposal that we wanted them to second source the product and to promote it together with us. However, they showed somewhat indifferent attitude to my proposal. Furthermore, it seemed that they were losing their interest in the cooperation with Hitachi, including other joint development items. At this time, I felt, though just vaguely, a concern in my mind. "Can we continue to work in cooperation with Motorola concerning the microprocessor business in this kind of situation....?" Such doubts expanded further with the "63K authorization problem" regarding the 16-bit CMOS version, and it became decisive in the ZTAT "wind down case", about which I already mentioned.

In the four years from 1982 to 1986, while maintaining the partnership with Motorola, we made various moves to aim for independence of the microprocessor business. The first move was the development of peripheral LSI chips that had no architectural limitations. "Special Research Project on MPU Peripheral LSI" was started in June 1982, including Central Research Laboratories and Hitachi Research Laboratories. This project was proceeded, targeting at the products such as ACRTC (Advanced CRT Controller), HDC (Hard Disk Controller), etc. and it was finished in March 1984. Since these products were not related to Motorola architecture, we could sell them freely without any restrictions. Among them, ACRTC became a big hit product and contributed greatly to the sales expansion of the microprocessor division.

The next step was proprietary development of 32-bit microprocessor. As for the 32-bit, since no

product announcement had been made by Motorola, we had no restriction from them. Regarding this theme, fundamental studies had been carried out in the Central Research Laboratories for some time, and it was advanced in the form of Special Project starting from the end of 1983, with the code name of “ μ (micro)32”. It was a very large scale LSI with 400 thousand transistors which was record breaking at that time. State-of-the-art process technology was used, and it was also exhibited in “Hitachi Technology Exhibition” in November 1984. At this stage, it was a technical exhibition as a “transparent device”, so to speak, without having any specially classified architecture for particular OS. However, this was also a clear manifestation from Hitachi aiming at the independence of the microprocessor.

Based on this technology, customer reviews were conducted on the specifications of the microprocessor product to be commercialized under the name of H32. Before the activity reached a clear conclusion, a joint development project with Fujitsu came up and reached an agreement in July 1986. It was decided to jointly define the specifications of the 32-bit microprocessors, which led to the commercialization of the product in the form of “TRON chips”. However, as the TRON project was taken up by the US as a target of trade friction between Japan and the US, regrettably, we could not make a big fruit out of it.

While such development activities “without constraints from Motorola” were proceeding, studies of microprocessor business strategy were carried out in various levels from 1984 to 1986. Among them, the “Microprocessor Strategy Review Meeting” held in September 1984 was particularly noteworthy. This meeting was planned and promoted mainly by Yoshikazu Hatsukano who was the Dept. Mngr. of Microprocessor Marketing Dept. at the time. We invited the managers in charge of microprocessors from the sales companies worldwide to a hotel on the shore of Lake Yamanaka, and in-depth discussions on the microprocessor strategy were done in the form of an offsite meeting. In the various themes of discussions ranging from short term to long term, many opinions were presented regarding the policy of microprocessor independence. It was self-evident that Hitachi’s growth in the microprocessor business up to this point largely owed to the cooperation with Motorola, but it was also certain that it would be a major constraint in the development of the business into the future. In conclusion, a common recognition was developed that “no matter how hard it might be, sooner or later, we must have a complete freedom of architecture”.

I was promoted to the GM of Musashi Works in February 1986, and there were two huge problems with us at the time. One was a large deficit operation largely due to the collapse of the memory price, and the other problem was the “issue of original microprocessor strategy.” I was stuck with no way out indeed as the factory GM.

Regarding the policy of original microprocessor, even though we could make a philosophical vision, in reality, we would have to make very bitter and difficult decisions. Can we pave the way alone by ourselves if we completely stop the alliance with Motorola? Do we have enough resources with regard to technology and marketing? How many years will it take to recover development investment?

However, the relationship with Motorola had come into impassable difficulties, and we had to overcome hesitations from these calculations.

It was in October 1986 when we firmed up our mind to the “independence policy” and made the

“Declaration of Independence of the MPU” to the outside of the company. “We will continue to support products of existing Motorola architecture, but we will change all new products to Hitachi’s original architecture products.”

It was a clear manifestation not to rely on Motorola for all future products. As I wrote in the previous chapter, in December, two months after this, the top meeting was held between Hitachi and Motorola regarding ZTAT microprocessor, and Motorola President Michell told Hata, Hitachi Senior Executive Director, that their alliance with Toshiba had been concluded, and the relationship between our two companies was completely broken off.

Before the “Declaration of Independence of the MPU, Musashi Works had undertaken the development of its own microprocessor with the most elite engineers. In addition, we received strong support from the research laboratories of Hitachi, such as Central Research Laboratories, Hitachi Research Laboratories, Systems Research Laboratories, and Microelectronics Research Laboratories, as the top priority project. Meanwhile, I was suddenly dismissed from the GM of Musashi Works in February 1987, and took office as the GM of Takasaki Works. I came to be away from the engagement in microprocessor business by this change.

Meanwhile, the development of the microprocessor of Hitachi original architecture proceeded smoothly, and the product was announced in the name of H8 in June 1988. It gained a good reputation in the market, and design-ins also spread extremely smoothly.

However, there came an unexpected situation here. Soon after the market introduction of H8, Motorola filed a lawsuit on the grounds that H8 infringed their patents. “Microprocessor Independence War” literally entered into a “battle stage” at this point. It started on January 18, 1989. It was a lawsuit filed to the district court of the state of Illinois where Motorola’s headquarter office was located.

I was not in a position to receive a direct report at this time because I was working at Takasaki Works, but Toshimasa Kihara told me later a very dramatic development of the situation as follows.

In the morning of the day of the discussion on H8 between the two companies, the attitude of Motorola was very stubborn and they “refused to listen” from the beginning. The meeting was not a sincere one at all, but they proposed to have a dinner after the meeting, and the five members from Hitachi were to wait in the hotel.

Hitachi side lawyer Alan Laudermilk had a suspicion of “something strange” in the attitude of Motorola at this time. He read intuitively that they would make a lawsuit. And when he realized that there was actually such a move through his personal channel, he quickly took an action for all the members to leave the hotel and disappear. He was afraid of the order of appearance from the court without being prepared at all. He instructed everyone to check out immediately. He deliberately spoke in a loud voice in the hotel lobby, telling everyone “We will head to O’Hare Airport now. Please hurry up because we have little time.” He spoke to be heard by hotel employees. And the actual destination they took was a bar association facility in the city, which had nothing to do with the O’Hare airport. Since daytime movement was dangerous, after having stayed there for a while they all went out together late at night of the day. It was Indianapolis Airport, 65 miles south from Chicago. They headed for New York on the early morning flight on the 19th, and managed to arrive

to Japan safely.

This was exactly the event of “the first battle” symbolizing the intensity of the microprocessor independence war. The lawsuit against H8 by Motorola created a big company-wide fuss within Hitachi, and the counterattack system was quickly made. Hitachi filed a counterclaim that “Motorola’s 32-bit microprocessor (68030) infringes Hitachi’s patents” on January 25. Fig. 9.1 is a summary of the chronology of microprocessor development in Hitachi and litigation battle.

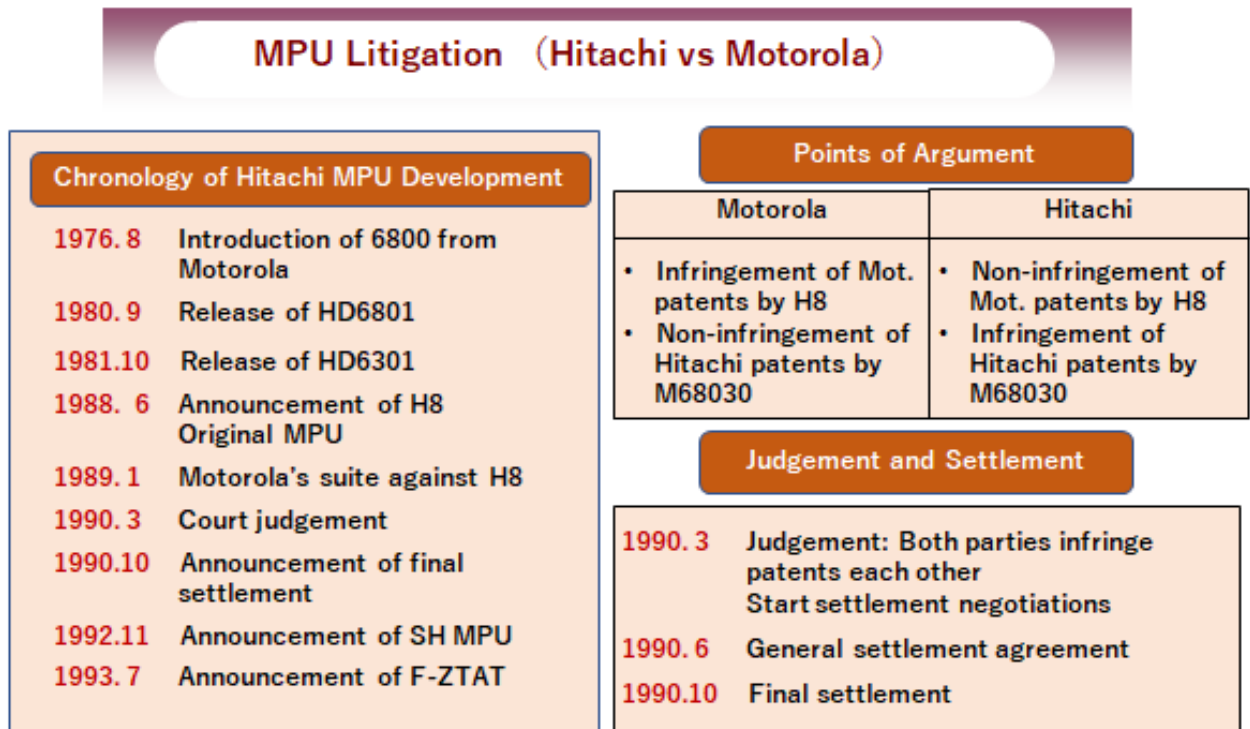


Fig. 9.1 Litigation battle between Hitachi and Motorola

Should I call it a twist of fate, I was appointed as GM of the Semiconductor Design and Development Center (SDDC) from GM of Takasaki Works in the next month after the filing of lawsuit by Motorola. This microprocessor trial case was a matter that SDDC should take the main responsibility for, and I was to deal with this problem by sparing much time and energy. This trial was showing the appearance of all-out war between Hitachi and Motorola, and many related people in and out of the company were mobilized. 50 people from Semiconductor Division and the laboratories, 23 from the headquarters (the president’s office, oversea department, intellectual department, etc.), 83 from law firms in Japan and the US. There were 34 persons in the company who took the testimony, with 85 in total days. The prepared documents reached about 700 cardboard boxes. This was the first case of Hitachi’s long history that developed into a trial with the United States.

I myself gave a record testimony on December 8, 1989, on the chilling day towards the end of the year in Chicago. Barbara Steiner of J. Soroby Lawyers Office did a preliminary exercise for me to the testimony. I remember that she gave me a simple and fundamental advice that “Do not try to recall the matters which are ambiguous in your memory. Make a clear statement and maintain it to the end that ‘I do not remember. I do not know.’”

The back and forth continued in the trial, and the judgment was issued on March 29, 1990. The content of that ruling was that “Hitachi H8 and Motorola 68030 infringe on each other’s patents, so we stop the sales of the products from the both sides.”

The suspension of sales of the rapidly growing H8 microprocessor was a serious problem for Hitachi. The impact on business and customers was immeasurable, since the sales volume of H8 was much larger than that of Motorola’s 68030. Considering such social impacts, the judge decided the suspension of sentence “to suspend execution of the judgment until June 18”. He gave both companies the time to have mutual talks for settlement. Movement along that line began at both companies, but it was not easy. It was difficult to take the seats together to start with, and it was in late April when we had the first meeting.

It was Kazunobu Miki (deceased) of the headquarters who worked fully, doing really a good job, as a main negotiator of Hitachi for this settlement negotiation. The overseas department, the IP unit, the president’s office of the headquarters gathered the power, centering on him, and our business division also organized full-time team, and we were fully prepared.

On May 14th, an engineering-based meeting began in Tokyo and the discussions were held over three days on “similarity of microprocessors”, i.e. whether the architecture of H8 is the same as that of Motorola. Although they did not come to a clear conclusion, the meetings between the executives were held in parallel from 15th to 17th, and we finally got to the starting point of discussion by this face-to-face meeting.

In response to this situation, the first full-scale negotiations were held in Chicago in late May, and Kazunobu Miki and Hitoshi Akagi (IP Dept.) from the headquarters and I attended representing the business division. When we arrived in Chicago on the 27th afternoon, we had an internal meeting at the J. Soroby’s office. It was a strategy meeting for the negotiations from the next day, among five members including the lawyers, Soroby and Harris, and three of us from Japan.

The meeting with Motorola continued for three days from 28th to 30th. Gilman, Fischer and Seligman from Motorola, and three of us from Hitachi. There was no lawyer attendance from either side. In the negotiations at this time the arguments of two sides were far apart for the agreement, but we could understand better as to what the other party was thinking.

As the suspension date of judgment (June 18) was approaching, we finished the meeting with the conclusion that we would have the next meeting in Chicago before the deadline.

The next round began in Chicago from 15th June. The attending members of both sides were the same as before. We started the meetings from the morning and we had negotiations throughout the day, taking breaks several times, but we did not reach a compromise point. At the beginning of the next talks on the 16th, Motorola presented “final proposal”, and we got the detailed explanation. Hitachi made “counter proposal” after the break, and we discussed it after our background explanation. Not reaching the conclusion, we had break again. And there was a further “counter proposal” from their side, and we further continued discussion with no compromise. In this way, it

became clear that we would not be able to settle by the 18th, the suspension date. We asked the court to extend the suspension date again, and it was extended until June 29.

After the meeting on the 17th I returned to Japan and took a catcher's role, so to speak, and Miki stayed by himself to negotiate "one to one" with Gilman. And early in the morning of 20th, Miki gave me an international call at my home, and informed me of the latest proposal from Motorola side. I could see that it was a rather drastic proposal from their standpoint, and judged that we should work out details based on this proposal. I told Miki that I would work on summarizing Hitachi side opinions, and reported to Kimbara, Division GM, and got his direction, and further got consent from Katsushige Mita, Hitachi President.

We finally came to the settlement. It was on June 25th when we made a public announcement that "Hitachi and Motorola have reached a general consensus on patent dispute resolution".

The relationship between the two companies entered into a cease-fire state on this day. The detailed negotiation after that were carried out by the attorneys, focusing on the wording and other necessary details, and it was approved by Hitachi Executive Committee on October 4. It was on October 9th when we made an announcement to the outside, after Motorola's internal resolution, that "settlement negotiation was finally agreed".

For nearly two years, under the situation of jurisdiction, the development and sales activities of microprocessors had been stagnant. It was a big damage for Hitachi's semiconductor business, but by this settlement, now we could promote our original products with no limitation. In other words, "microprocessor independence war" ended on October 9, 1990.

We could settle the situation in the form where we could avoid the worst case scenario for Hitachi's microprocessor business, and we largely owed it to the total Hitachi power. But we also should recognize the capability and efforts of Miki in the resolution of this case. Indeed, the professional negotiator's real ability was shown on its best.

As an aside, I later became the main negotiator of the Japan-U.S. Semiconductor negotiations in 1996, and I think I was helped a lot by Miki's negotiation technique which I had learned through this Motorola case.

Sometime in the summer of 1990 after the general consensus of the resolution, I invited three key persons in this trial case (Miki, Ogawa, and Akagi) to a golf game, in commemoration of the settlement. I wanted to express my appreciation to them who played the important central role for solving this difficult issue with their dedicated efforts. It was an enjoyable golf game still remaining in my memory. Photo 9.1 was taken after the game.



Photo 9.1 Memorial golf of trial settlement with Motorola

From left, the author, Hitoshi Akagi, Kazunobu Miki, and Katsuo Ogawa (at Sayama GC, 1990)

On February 13, 2008, “A gathering of fellow soldiers” who participated in the Motorola trial case was held at the Hitachi Mejiro Club. Approximately 20 persons participated, and Alan Laudermilk also came all the way from US and joined the gathering. In this gathering, each participant talked his own experience. Among them were new stories never presented before, and it was full of bustling. Photo 9.2 is the picture of all the participants, Photo 9.3 is a picture of Laudermilk and I.



Photo 9.2 Gathering of Motorola trial team (February, 2008, Hitachi Mejiro Club)



Photo 9.3 Lawyer Loudermilk (February 2008, Mejiro Club)

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