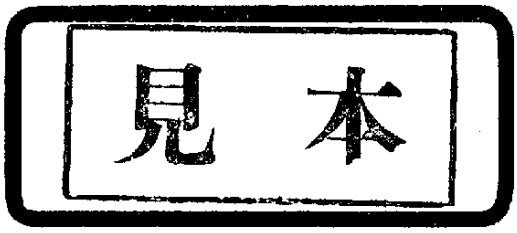
ISSN 0910-6707

1991

Japan Computer Quarterly



Japan Information Processing

Development Center

Laptop Computer in Japan
— Market & User Strategies —

No. 84

Japan Computer Quarterly

1991

Japan Computer Quarterly (JCQ) is published quarterly by the Japan Information Processing Development Center (JIPDEC), Kikai Shinko Kaikan Bldg., 3-5-8 Shibakoen, Minato-ku, Tokyo 105 Japan.
Publisher: Eiji Kageyama, President
Editor: Yuji Yamadori, Director Research & International Affairs

JIPDEC is a non-profit organization founded in 1967 with the support of the Ministry of International Trade and Industry, the Ministry of Posts and Telecommunications and related industry circles for the purpose of promoting information processing and the information processing industry in Japan.
JCQ, formerly called the *JIPDEC* Report, was first published in September, 1970 and is prepared with the assistance of the Japan Keirin Association through its Machine Industry Promotion Funds.

Translated and Printed by The Translation Institute of Technology Science & Culture
Printed in Japan, January, 1991

CONTENTS

No. 84

From The Editor

The term "Lap Top" Personal Computer has come to be widely used during the past few years. This term is said to have originated in the United States from the saying that newly developed very compact computers were "small enough to place on one's lap." Those who are engaged in the computer field are gifted with "creativity" and often like to create new expressions and coin new terms. For example, the term "intelligent terminal" does not mean that the terminal itself has intelligence and the often-discussed "hypermedia" and "hypertext" are terms that are not to be found in the dictionary. The Japanese like to immediately adopt these new terms, but need to have them clearly defined. Initially, a "lap-top" PC weighed 6 to 8 kilograms. It was not something that could be kept on the lap for a long time. However, new models weighing about 2 or 3 kilograms have recently appeared one after the other. These can be said to be "lap-top" in the literal sense of the word. JEIDA (Japan Electronic Industry Development Association) has conducted various PC surveys, in which a "lap-top" PC is defined as follows.

1. Its display, keyboard and main unit are unified into one.
2. Its display is flat.
3. It is easy to carry.
4. It is a model which has been registered as a "lap-top."

In Japan, "lap-top PC" is often used as a general term for note-type and book-type PCs. If so, the third requirement, "It is easy to carry," is ambiguous. Here, JEIDA's definition (see the text) for a notebook type PC, namely "A4 size, weighing no more than 3kg," will be of use.

However, these definitions in themselves are not important. It is a well-known fact that the previous generations of large, general-purpose computers characterized by gigantic bodies have quickly become smaller as the result of technological innovation. This trend is expected to continue. Therefore, it has become almost meaningless to discuss the scale of computers based on their physical sizes. It is far more meaningful to discuss their functions and characteristics. The main theme of the present issue is the state of the "lap-top" PC market in Japan, but our principal intention is to describe the explosive growth of small PCs, regardless of how they are defined, and to show how they are utilized in the business world.

In Japan, informatization is spreading widely, from industry to society, and from society to individuals and their daily lives. "Lap-top" PCs are in the spotlight as an excellent tool for furthering the trend. Their functions are being improved rapidly through technological innovations, as is indicated by the spread of

32-bit machines and the appearance of flat color displays. Their fields of application are also expanding rapidly. For example, in addition to being used in business, they are being used for musical composition and for commercial art, such as design and illustration. On the other hand, the rapid spread of PC communications is beginning to bring about changes in conventional personal relations. New means of communication that transcend time and space have appeared through the use of bulletin boards and electronic mail. The expansion of networking enables the individual to access a large variety of databases. It is said that, as a result of the fusion of computers and telecommunications, the major advanced countries, including Japan, are moving toward something called a "network society." This trend will be accelerated by the rapid spread of "lap-top" PCs.

However, problems of security and privacy will become increasingly important when everyone is able to easily access information systems. Problems will arise concerning the standardization of the connection of machinery of different models from different networks. These problems must be studied internationally, not just domestically, and hence are now being handled by various international organizations. A true network society will be implemented only when these problems are solved.

We hope that the articles in the present issue will be of use to our readers.

Yuji Yamadori
Director
Research & International Affairs

Japan's Laptop Computer Market: an Analysis of Current Trends

Katsuyuki Ohkawara
Editorial Staff
Computer News Inc.

Laptop machines are now making their presence felt in Japan's personal computer market as an indispensable genre of products. The size of laptop market growth was revealed in a recent Japan Electronic Industry Development Association (JEIDA) survey. It shows that of the 976,000 personal computers shipped during the first two quarters (April through September) of the fiscal year ending in March 1991, 398,000, or 40% of the total, were laptop models.

Indeed, in a matter of just four years since their debut in Japan in 1986, laptop computers have not only secured a place in the product lines of practically all domestic manufacturers, they are also now close to half of total domestic personal computer shipments.

Growth of laptop computer market as shown by JEIDA surveys

Each year, JEIDA, in cooperation with 24 domestic manufacturers, conducts quarterly surveys of the volume of personal computer shipments in Japan. However, laptop computers were not covered in these surveys until the fourth quarter of 1987, so, there are unfortunately no reports available on laptop machines before this time. Thus, our evaluation of the growth of this market will be based on data from subsequent surveys.

According to these surveys, there were 24,000 laptop personal computers shipped during the fourth quarter of 1987, or 2% of the total. However, in the fourth quarter of 1988, the very next year, this number had jumped to 65,000, accounting for 16% of the total number of all machines shipped. This number rose further to 152,000, or 31% of the total, in the fourth quarter of 1989, a more than twofold yearly growth.

A sharp rise is also seen in yearly shipment numbers. The number of laptop personal computers shipped in fiscal year 1988 (April, 1988, through March, 1989) totaled 197,000 (14% of the total volume of the year's personal computer shipments). Shipments in fiscal year 1989 totaled 432,000 (26%). It has been estimated that this number will rise to 660,000 (34%) in fiscal year 1990.

However, a look at the records for the first half of 1990 leads one to predict that actual shipments for the year will substantially exceed this initial estimate of 660,000 machines (34% of total shipments). Some forecasts estimate that shipments of laptop personal computers alone will exceed a million in fiscal year 1990.

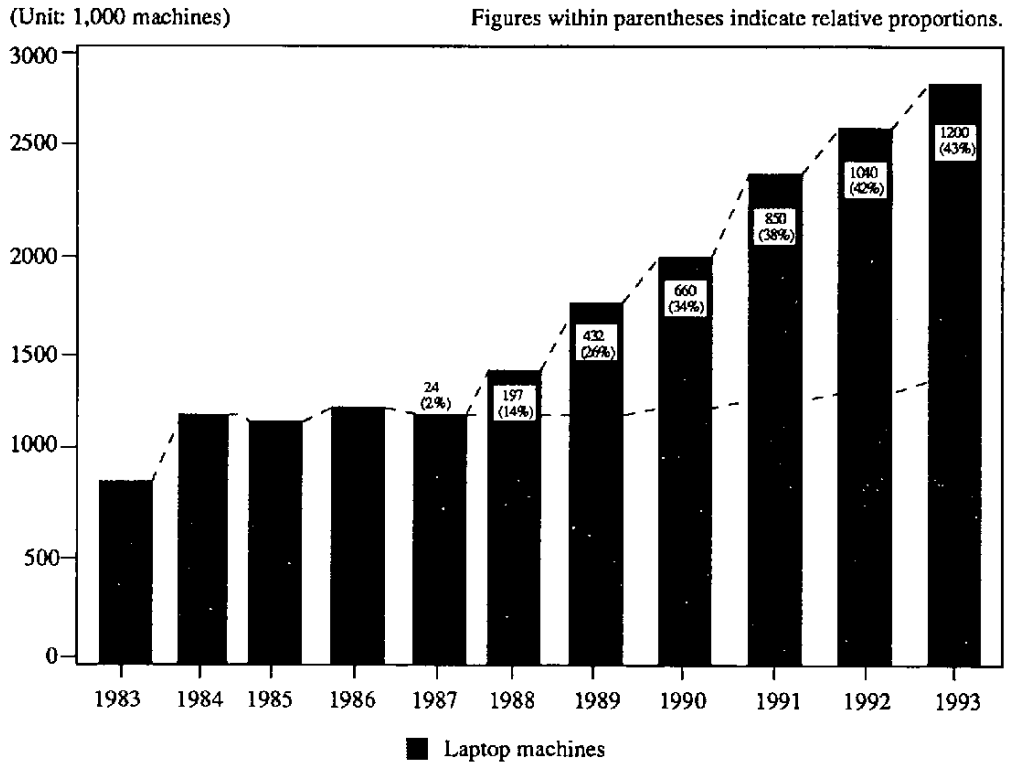
At Toshiba Corp., Hitachi Ltd., and Mitsubishi Electric Corp., as well as at a few other personal computer manufacturers, laptop machines already make up over 50% of per-

sonal computer shipments. This ratio exceeds 30% even at NEC Corp, which has the largest share of the domestic personal computer market, and also at Seiko Epson Inc., which produces personal computers which are compatible with NEC's.

At the beginning of each fiscal year, JEIDA releases its shipment estimates for the next five years. It is possible, however, that their estimates for fiscal year 1991 and following years may require substantial revisions.

Growth stimulated by notebook-sized machines

The first laptop personal computer to debut in Japan was the J-3100, released by Toshiba in 1986. Compatible with the international IBM PC/AT standard, this was the Japanese language version of the highly rated T-3100 Series marketed overseas. Indeed, it was the overseas popularity of the T-3100 (PC Magazine, an influential U.S. periodical, called the product "The King of Laptops") that encour-



(Figures for 1991 and 1992 are as projected from JEIDA's survey of March 1990. Figures from 1983 through 1989 reflect actual performance. Those relating to 1990 onwards are forecasts.)
Source: JEIDA

Figure 1. Shipment trends of personal computers (with the contribution of laptop machines)

aged Toshiba to introduce the J-3100 in Japan as well. Domestically, the J-3100 has sold better than any previous Toshiba personal computer.

NEC followed Toshiba in this market by releasing the PC-98LT laptop computer that same year. With a price tag of 238,000 yen, the lowest for any 16-bit personal computer at that time, the PC-98 became a strategic product for NEC. However, its lack of total compatibility with the NEC PC-9800 Series desk top computers was a disadvantage that prevented it from achieving rapid marketability.

Toshiba and NEC's initiatives spurred other manufacturers into action. Starting in 1987, the very next year, new laptop personal computer products from different manufacturers began to appear on the market in quick succession. This was the time that skyrocketing land prices in Tokyo and surrounding regions were making it necessary for office staff to consider ways to use the space available to them more efficiently. The demand for laptop machines, which can be put away in drawers when not in use, rose in comparison to desktop machines, which tend to occupy entire desks. Today, laptop computers are a part of the product lineup of all personal computer manufacturers.

Something which nudged up the demand for laptop personal computers even further was the appearance of notebook-sized machines. The pioneer in this area was Toshiba's Dyna-Book, unveiled in June, 1989. Other manufacturers, including Seiko Epson and NEC, soon followed Toshiba with their own notebook-sized models. Most of the principal personal computer manufacturers now offer notebook-sized computers.

Notebook-sized computers: what are they?

A clear definition of notebook-sized personal computers is needed in order to study the market trends for these machines. Notebook-sized personal computers are generally speaking no larger than an A4 sheet of paper in size (210 x 297mm), and weigh less than 3 Kg. They are supposed to be more easy to carry around than the laptop machines already in use.

JEIDA says that it is retrospectively treating notebook-sized personal computers as a separate category of machines starting from the first quarter of fiscal 1990. For its surveys, JEIDA defines notebook-sized machines to be those that (1) conform to its definition of a laptop personal computer, (2) are approximately the size of an A4 (210 x 297mm) sheet of paper (3) can be battery-run, and (4) have been registered as notebook type personal computers. JEIDA's four-fold requirement does not define the weight or the price range for notebook-sized computers, so any machine that satisfies the above conditions is categorized as a notebook-sized personal computer by JEIDA.

Notebook-sized personal computer naming convention

For reference, we will also touch on the history of the naming convention for notebook-sized computers.

The first notebook-sized personal computer hit the market in November, 1988, under the name "The Book." It was an offering from the venture capital enterprise Microsystems, Inc. The name was chosen to match the

product's size, which was no larger than a book. It was an IBM PC/XT compatible portable personal computer priced at only 250,000 yen which ran on dry cell batteries. It weighed less than 3 Kg (or, more precisely, 2.5 Kg), and may be viewed as the prototype for today's notebook-sized personal computers.

The next notebook-sized personal computer to debut was Seiko Epson's PC-286 Note Executive, unveiled on June 10, 1989. The product inherited its name from "Wordbank Note," a commonly used wordprocessor.

This was followed by the first hit product in the notebook-sized personal computer market, Toshiba's DynaBook. With it, the term "book-sized personal computer" gained currency as the generic name for machines of this type. However, in October of the same year, NEC, which has the largest share of Japan's personal computer market, introduced its PC-9801N. Popularly referred to as the 98 Note, this machine helped the name "notebook-sized computer" take root.

Thus, the words "note" and "book," tagged onto the two best-selling products, started creating confusion. The two manufacturers were both ill-disposed to concede to the other in selecting a name for the product genre. Personal computers are mainly used for the purpose of data retrieval, so the products in question deserve the name "book," Toshiba claimed. NEC retorted that the name "note" was more appropriate, saying that such products are used mostly for creative purposes and for the writing of data.

Around this time, Fujitsu's FM Notebook made its appearance on the market, and its name seemed to be the most appropriate choice. The mass-media, too, started uniformly referring to small, lightweight machines as notebook-sized personal computers. The most acceptable name for these personal computers, therefore, emerged from a contest between the choices "book" and "note."

More recently, personal computers even smaller in size than the notebook-size have begun to appear. The pioneer in this region was Sony, which categorized its products as "palmtop" personal computers. However, Sony's use of the name as a registered trademark for its personal computers led to creation of other names, such as "refill size" (Kyocera) and "handy type" (NEC). These activities seem to presage another naming convention rivalry, as in the one sparked earlier by the appearance of "notebook" sized computers.

Manufacturers set huge sales targets

Notebook-type computers, led by Toshiba's DynaBook, soon secured a place in the market as a major personal computer product. One factor that helped this to occur was that the machines were priced under the 200,000 yen level. The DynaBook was a 16-bit personal computer priced at 198,000 yen. In addition to this, of course, the rapid advance of these machines was hastened by their small size and light weight: these A4 (210 x 297mm) sized machines weigh only about 2.7 Kg. Indeed, at less than 200,000 yen, machines no larger than an A4 sized sheet of paper now offer a functional level equivalent to that of 16-bit desktop personal computers priced over 300,000 yen.

The manufacturers' product strategies also earned high user acclaim. Marking a departure from the usual practice, Toshiba started

taking orders for DynaBooks during the period between the end of June, when the model was first unveiled, and the end of July, when it started shipment. The result was a volume of orders far exceeding the manufacturer's initial estimates. Thus, immediately after DynaBook shipments commenced at the end of July, Toshiba revised its sales target to 90,000, up 50% from its initial target of 60,000. At the same time, to cope with demand, Toshiba equipped its Ome works, the company's main production base, with an additional production line devoted to DynaBooks. This boosted the volume of shipments to 120,000, double their initial estimate. This knocked to pieces the myth that the only architecture that could penetrate Japan's 16-bit personal computer market was NEC's PC-9800 Series.

NEC, of course, followed Toshiba with its 98 Note, a 248,000 yen machine. They highlighted the machine's compatibility with the PC-9800 Series as part of their sales strategy. The result was that, like Toshiba, NEC soon faced a shortage in supply of these personal computers. Eventually, the new notebook-sized machines accounted for 150,000 out of their annual sales target of 800,000 PC-9800 personal computers. Notebook computers have thus come to occupy an unexampled market share for a tribe of products from a new genre.

The weight of notebook-sized personal computers in NEC's performance statistics continued to grow even after that, however. In the first half of 1990, NEC sold 120,000 98 Note machines, 45,000 32-bit 98 Note SX (PC-9801NS) machines, and 20,000 98 Note SX 20 (PC-9801NS-20) machines, a model incorporating a hard disk. The three models together totalled 185,000 machines, 35% of NEC's PC-9800 Series' total sales of 530,000. It must be added that the total sales of NEC's notebook-sized personal computers during that period were constrained by a massive shortage in supply of the 98 Note SX 20 (PC-9801NS-20), the model with a built-in hard disk. A smoother supply of this model would probably raise the proportion of notebook-sized personal computers in NEC's PC-9800 Series' sales to above 40%.

This remarkable performance led manufacturers other than Toshiba and NEC to unveil notebook-sized personal computers as well. Indeed, a characteristic feature of this product genre is the bold sales targets manufacturers have been encouraged to set by the performance example of these two forerunners.

Table 1 provides an overview of the shipment targets of various manufacturers for notebook-sized personal computers. Such targets are specified in various ways, and may be (1) annual sales targets set at the beginning of a business year, (2) business year targets set following the appearance of a new product, or (3) a yearly target starting from the time of announcement of a new product. In any case, the table provides yearly targets for 1990. Only IBM Japan, Ltd. refrained from disclosing sales targets. However, based on statements by the company's agents, one can infer that IBM Japan is planning to put more effort into notebook-sized personal computer sales than into laptop personal computer sales.

The figures in the table reveal that manufacturers have set targets 20 to 50% higher for notebook-sized personal computers than for desktop or other types of conventional machines. Moreover, the sum of these targets far

Table 1 Sales targets of leading manufacturers for notebok-sized personal computers

Manufacturer	Machine	Sales target
Toshiba	DynaBook	210,000 machines
NEC	98 Note	270,000 "
	98 Note SX	90,000 "
Seiko Epson	PC 286 Book	100,000 "
	PC 286 Note	50,000 "
	PC 386 Note A	50,000 "
Fujitsu	FM Notebook	50,000 "
Sharp	All in Note	60,000 "
Mitsubishi	Maxy Note	30,000 "
	Maxy Note 386	20,000 "
IBM Japan	Online Note	—
Sony	QL/Note	12,000 "
Oki Electric	if Note	20,000 "
Matsushita	Panacom Pro Note	50,000 "

(Survey: Business Computer News)

exceeds JEIDA's yearly shipment estimate. Of course, not all machines can be expected to reach their sales targets. However, the figures do serve to reflect the degree of effort the manufacturers are exerting in notebook-sized personal computer sales.

Software products sustaining spread of notebook-sized machines

In addition to their attractive hardware, the quick rise in the sales of notebook-sized personal computers was sustained by the appearance of suitable, low-priced software for these machines.

A software package that emerged side by side with DynaBook was Busi Compo, by Creo. This is a product comprising a set of five functions, namely, scheduler, wordprocessor, spreadsheet, database, and telecommunication functions. The full set of five functions costs 40,000 yen, and singly, the functions retail at 9,800 yen each — far below the price level users have been accustomed to so far.

Let us see how these prices compare with more conventional products. The standard price for the word processing program Ichitaro (a Just System product) is 58,000 yen. Lotus 1-2-3 (Lotus), a spreadsheet software package, is priced at 98,000 yen. My Talk (Intersoft), a telecommunications program, retails at 28,000 yen. Thus, for notebook-sized personal computers, the price of software dropped from this level to the under-10,000 yen level in one fell swoop.

The availability of this low-priced software kept the price of a DynaBook along with the necessary software to below 250,000 yen. Moreover, in actuality the sales price works out to 200,000 yen for a system comprising both hardware and software. Busi Compo is often referred to as the standard DynaBook software. More than 70% of those who bought DynaBook immediately after the machine's debut reportedly purchased Busi Compo simultaneously.

As for the 98 Note, a boost to its sales came from a software series released by Ashisuto, Inc. Assist-word, Assist-calc, and the other members of the series retail at 9,700 yen each.

The appearance of these software products encouraged other software houses to come up with low-priced products also. Just System,

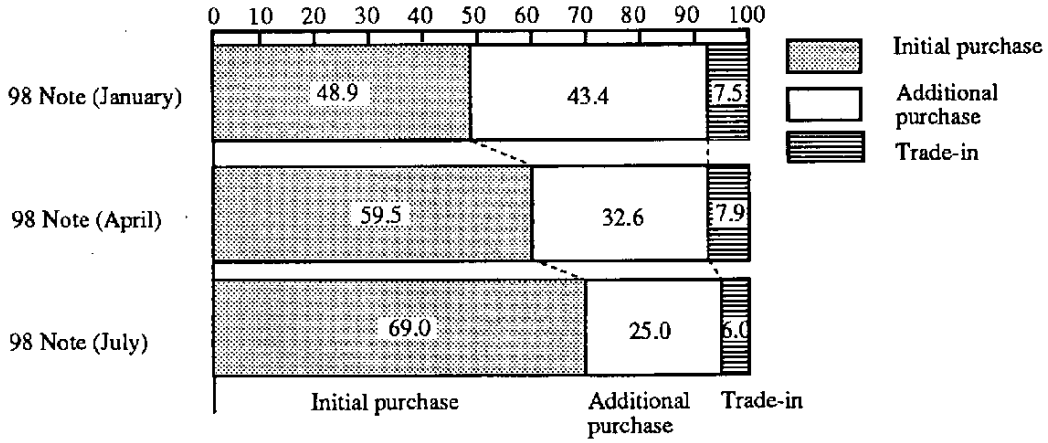
which enjoys the highest shipment record in wordprocessor software products, released "Ichitaro Dash," a monochromatic version of its best seller "Ichitaro," at 39,000 yen, approximately 70% of the price of the conventional product. Software products dedicated to notebook-sized personal computers are being released one after the other, with prices around 70% of conventional product prices.

However, this low pricing of hardware and software has also made it difficult for retail stores to ensure a high level of sales. Until 1989, a system consisting of a desktop personal computer with CRT display along with incidental software cost around 500,000 yen. A more or less comparable system dropped in price to the 200,000-250,000 yen range — in some instances below 200,000 yen — when notebook-sized personal computers made their appearance. For many stores, this depressed their sales level compared to the preceding year.

Notebook-sized machines create new strata of female users

An NEC opinion poll of its notebook-sized 98 Note personal computer users illustrates current trends in user distribution.

The distribution of notebook-sized personal computer purchases between different strata of purchasers for the three months of January, April, and July 1990 appears in Figure 2. As Figure 2 shows, less than 50% of the January purchasers were buying machines for the first time. However, many first machine purchases were made in the following months, and the ratio of these purchases leaped to approximately 70% (more precisely, 69%) in the July survey. A similar survey of desktop personal computer purchases showed a ratio of around 65%. Comparison of the two indicates that purchasers aspiring to learn how to use personal computers have been opting for the 98 Note as their first machine.



(Source : NEC)

Figure 2. Purchase of personal computers for private use

There are also significant differences in choices between different age groups. The distribution of desktop machine buyers is characterized by having a smooth curve distributed over the various age groups. However, with the 98 Note, a sharp concentration of young users is seen centering around the 19-22 age group. In the July poll, another concentration is seen among those using the machines in private homes (23.6%).

The rising proportion of women users is yet another characteristic. In the NEC poll, women are found to constitute 5.3% of the total desktop population, but 12.3% of 98 Note users. A major factor which may be attracting women to the machines is that they are small, lightweight machines of excellent design. Machines weighing less than 3 Kg are lighter than a new-born child. Therefore, women can easily carry the machines around.

A similar poll conducted by Toshiba about its DynaBook reveals equally interesting results. A striking aspect of the distribution of notebook-sized personal computers is the wide use of these machines in private homes. Among DynaBook purchasers, more than 50% use them at home. Close to 20% of users use the machines in transit. In other words, personal computer use is penetrating into new areas which were previously difficult to access.

Trends in notebook-sized machine technology

New technologies are quickly emerging, with new products offering features such as compactness, lightness, and low energy consumption.

In addition to using low-energy-consumption complementary metal oxide semiconductor (CMOS) chips in the central processing units (CPUs) of these machines, efforts are being made to increase the integrated circuit (IC) chip density, develop one-board designs, and apply special coatings.

The use of memory technologies matched to compactness and light weight is an important factor as well. Manufacturers are rivaling each other over the extent to which they can reduce the size of their floppy disk drives. A virtual two floppy disk drive design, based on the addition of a random access memory (RAM) drive, is favored by many as a space saving step. The 98 Note has a built-in floppy disk drive and a 1.25 Megabyte RAM, which allows the reading of programs and data from the latter. This has served to cut down on size, weight, and power consumption. Program execution speed and the operational characteristics of application software have been successfully improved. Besides a floppy disk drive, Seiko Epson machines provide a RAM drive and facilities for use of IC cards. By following JEIDA's recommended standards for IC cards, manufacturers have started showing signs of mutual cooperation.

Important tasks remain in the domain of liquid crystal displays. Right now, efforts are under way to make the displays thinner, with low power consumption and high resolution. Other attempts are being made to switch over to color liquid crystal displays. The possibility of mass-produced color liquid crystal displays is emerging in the laptop personal computer area, and the appearance of new products at prices acceptable by the market can be expected.

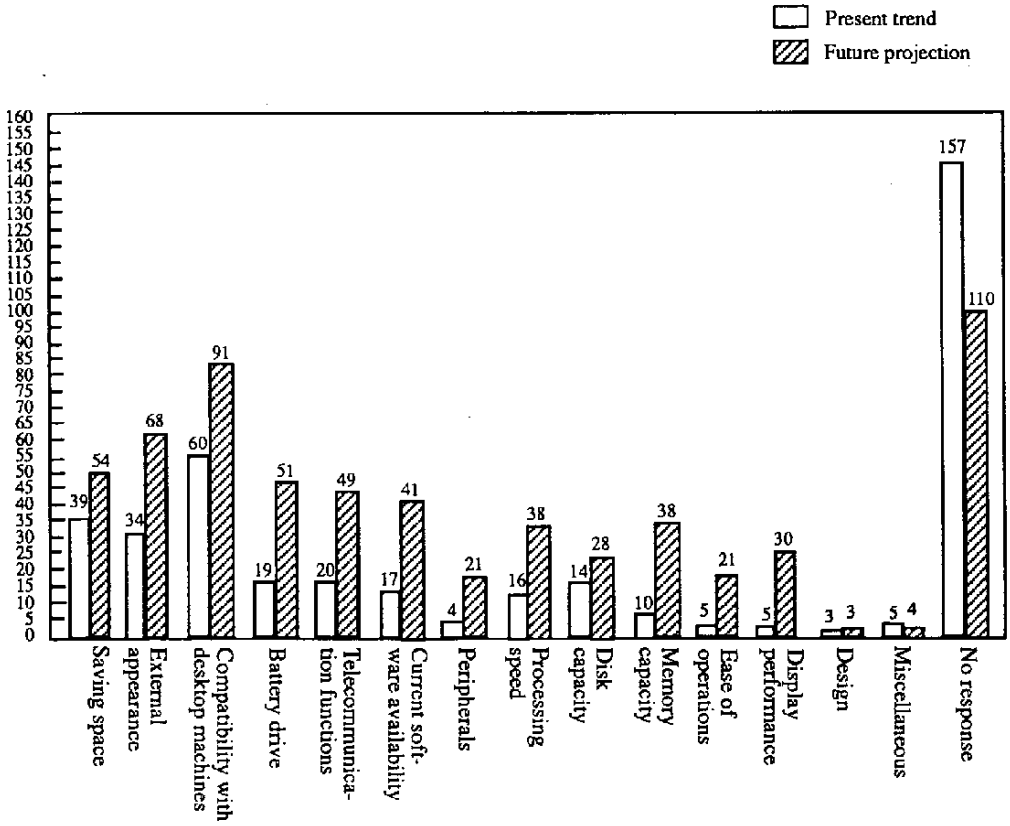
In addition, products with a resume function and machines with 2.5 inch and 2 inch disk drives represent new technologies that cannot be overlooked in the discussion of future notebook-sized personal computer trends.

Future of notebook-sized personal computers

JEIDA has released the results of a notebook-sized personal computer trends opinion poll of hardware manufacturers and users.

Let's take a look at user trends for these machines. JEIDA distributed 968 questionnaires to corporate and individual users. The respondents to the poll included 255 corporations and 132 individuals, for a total of 387 users. Figure 3 indicates the criteria used by corporate users to decide on the purchase of laptop and notebook-sized personal computers, as revealed by this survey. The current state is compared with a future projection for three years from now.

The criterion which is the most important in the purchase of notebook-sized personal computers appears, as of today, to be compatibility with desktop machines. As many as 60 respondents indicated that this is a determining



(Source : JEIDA)

Figure 3. Criteria used by corporate users in the purchase of laptop and notebook-sized personal computers

factor. Thus, a fourth of the corporate users were found to attach great weight to compatibility when considering the purchase of these machines. The next most important items appear to be saving space (39 respondents) and external appearance and weight (34 respondents). These are some of the intrinsic characteristics of notebook-sized personal computers, so that it appears that corporations are anticipating that they will be making efforts to save space and conduct mobile operations, and are making choices on that basis.

In three years (projected future trends), however, the criteria which are used may change. As the figure shows, compatibility with desktop personal computers will still continue to be the most important criterion in making a choice (91 respondents). However, here, external appearance and weight (68 respondents) pulls ahead of saving space (54 respondents). More or less the same number of corporate users as those who specified saving space chose battery drive (51 respondents) and telecommunication functions (49 respondents).

A common factor among the choices specified by users for both present and future has to do with the "movability," or portability of the machines. Apparently, corporations anticipate that with notebook-sized personal computers, they will be able to create a personal computer environment outside the company as well as within it.

JEIDA's survey also revealed that most users prefer the A4 (210 x 297mm) size, a thickness of 1-3 cm, and a weight of 1-2 Kg for notebook-sized personal computers. Most specified 8-10 hours as a desirable battery life.

Individual users: half are likely to use notebook-sized machines in three years

Another target of the survey was to determine the proportions of use of personal computers of different sizes.

Among individual users, 128 — that is, close to the total number of respondents — said that their use of notebook-sized machines accounted for less than 10% of their total personal computer use. This number dropped to only 31 individuals, however, when use was projected three years hence. Among the respondents, 44% said that the proportion of use of their notebook-sized machines will probably rise to 50-60%. None of the respondents said that they currently depend entirely on notebook-sized machines. However, six users said that they would switch over entirely to notebook-sized machines in the future.

The contrast between current patterns of use and projected future use was the sharpest for those users who use desktop machines exclusively. In contrast to the 105 exclusively desktop users of today, only ten indicated that in future they plan to only use these machines. The majority, 55 respondents, said that use would range from 50 to 60%.

Based on the results of the poll, an increase can be expected in the number of users who use notebook-sized machines around 50% of the time, and desktop personal computers the rest of the time.

Notebook-sized machines to occupy a third of the private home market

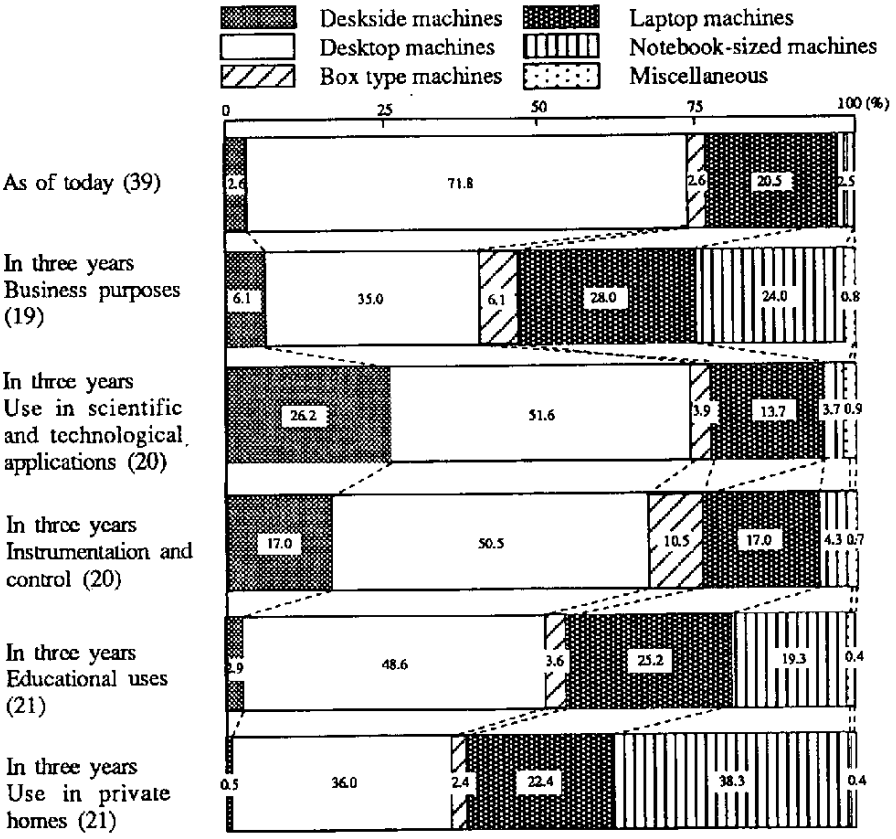
Next, let us turn to the results of another manufacturer opinion poll. The 24 manufac-

turers covered in this survey are all members of JEIDA. The survey's target was to predict the patterns of personal computer use among corporate users in three years.

The survey shows that in three years, 24.0% of the respondents will use notebook-sized personal computers in business applications. Taken together, laptop and notebook-sized machines will account for more than half, or, more precisely 52%, of such applications. Moreover, notebook-sized personal computers will account for 3.7% of applications in the scientific and technological area, 4.3% in instrumentation and control, and 19.3% in education.

Interestingly, notebook-sized machines are expected to make up more than a third — 38.3% — of the machines that will find their way into private homes. Together, laptop and notebook-sized personal computers will account for 60.7% of home use, the remaining third being desktop machine use.

The survey results suggest that the decline in prices will be large for notebook-sized personal computers, encouraging further home,



(Source : JEIDA)

Figure 4. Proportions of numbers of machines according to type

educational, and business use. Prices are likely to drop 14.9% for notebook-sized machines for use in scientific and engineering calculations and in instrumentation and control. However, a 24.3% decline is expected for those in business use, 26.8% for those in educational use, and 31.8% for those in private home use, where their propagation is expected to be the highest. It is expected that the popularity of notebook-sized machines will lead to a massive decline in the prices of computers in coming years.

Installation of Toshiba's DynaBook at Shiseido

Kohei Mori
Manager
Information Systems Division
Shiseido Company, Ltd.

1. Background for System Development

1.1 Overview and Sales Organization of Shiseido

Shiseido has been in operation for more than a century since it was founded in 1872. Nowadays the greater part of our business is the production and sales of cosmetics (See Table 1).

The sales and distribution organization for Shiseido cosmetics is as follows:
Shiseido ⇨ Shiseido Sales Companies (15 companies with 105 sales branches) ⇨ Retailers (independent retail stores, department stores, etc.) ⇨ Consumers

About 2,000 salespersons work at the Shiseido Sales Companies, providing sales assistance to retailers. The system we will describe here is primarily used in the transactions between salespersons and retailers.

1.2 System Development Objective

The role of the salespersons at the Shiseido Sales Companies is to make rounds of assigned retailers (15 to 20 stores per salesperson) and to provide back-up support for further expansion of sales opportunities at the stores, by offering new ideas such as sales aids and advice.

Company Foundation	Chozai Yakkyoku (Dispensary) was opened in Tokyo in 1872	
Capital	24,635,410 K yen (As of March 1990)	
Number of Employees	20,000	
Consolidated (Sales Results in 1989 fiscal year)	Sales	456.4 billion yen
	Current Profit	34.5 billion yen
	Net Profit After Tax	11.4 billion yen
Lines of Business	Cosmetics .....79% Toiletries .....13% Foods, Pharmaceuticals and Other Goods 8%	
Related Businesses	Restaurant, boutique beauty parlors, wellness, physical distribution service, etc.	

Table 1. Shiseido Business Outline

Amid increasing competition, the activities of our salespersons to win us an advantage over our competitors cannot begin and end with merely "selling our own products to retail stores." The salespersons and retail store owners must fully examine their methods, that is, they must examine how they are going to enable the retail stores to gain the support of customers and make company products be chosen by consumers. Thus, in addition to communications between manufacturers and customers, field marketing has been becom-

ing increasingly important.

However, their reporting and management work load has been increasing, and salespersons tend to merely sell products to retail stores without providing concrete retail support, such as services, to the "retail shops" which are the point of contact between consumers and products. Although they may be able to succeed in making a first sale in this way, if the goods remain idle at the retailers afterwards, they will not succeed in making a second sale by the "route sales" method.

Furthermore, even if we provide education and on-the-job training to salespersons, capabilities are largely determined by the capacity and experience of the individual salespersons, which causes a large variation in the quality of their activities. This variation further increases the gap between markets. Also, when salespersons rely too heavily on experience, and do not have a systematic grasp of the actual situation as it is reflected in data, they run a risk of having increasingly disappointing results.

In view of the current situation, and based on our reflections on current markets conditions, we are planning a change in our marketing support mechanism, from "Sale In," which primarily emphasizes selling our own products to the assigned retailers, to "Sale Out," which emphasizes sales results at the retail stores. We call this a change from a "Sales Company Orientation" to a "Retail Store Sales Orientation (See Figure 1)."

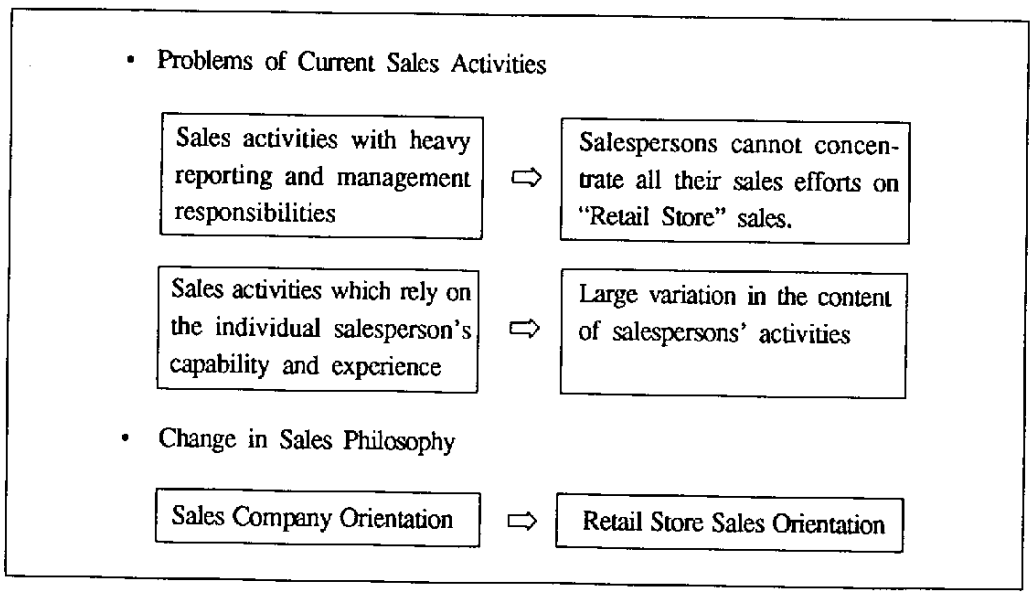


Figure 1. Change in Sales Philosophy

In order to provide concrete support for the change in sales emphasis stated above, our company has decided to give a Toshiba DynaBook PC to each salesperson, and has named the machine the "Shiseido Data Pocket." These PCs are used in our sales activity support system, as shown in Figure 2.

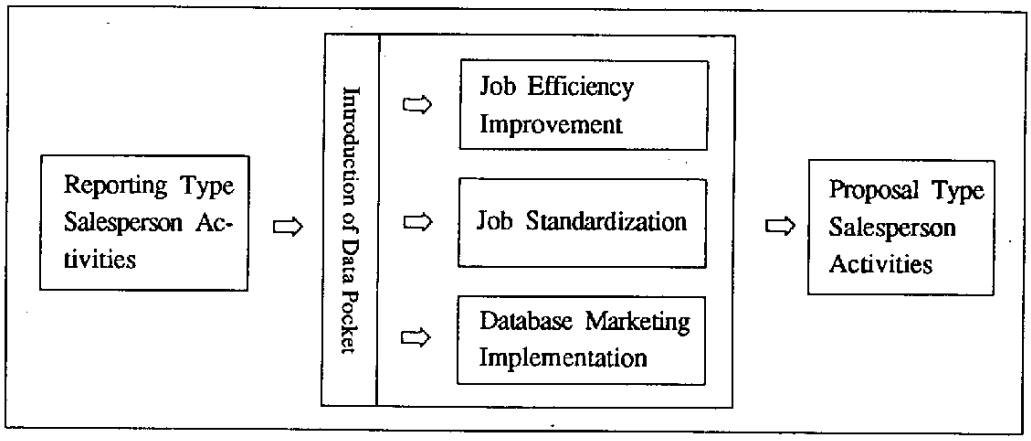


Figure 2. Sales Activity Support System

2. Outline of System

2.1 Hardware System Configuration

The system configuration is as shown in Figure 3.

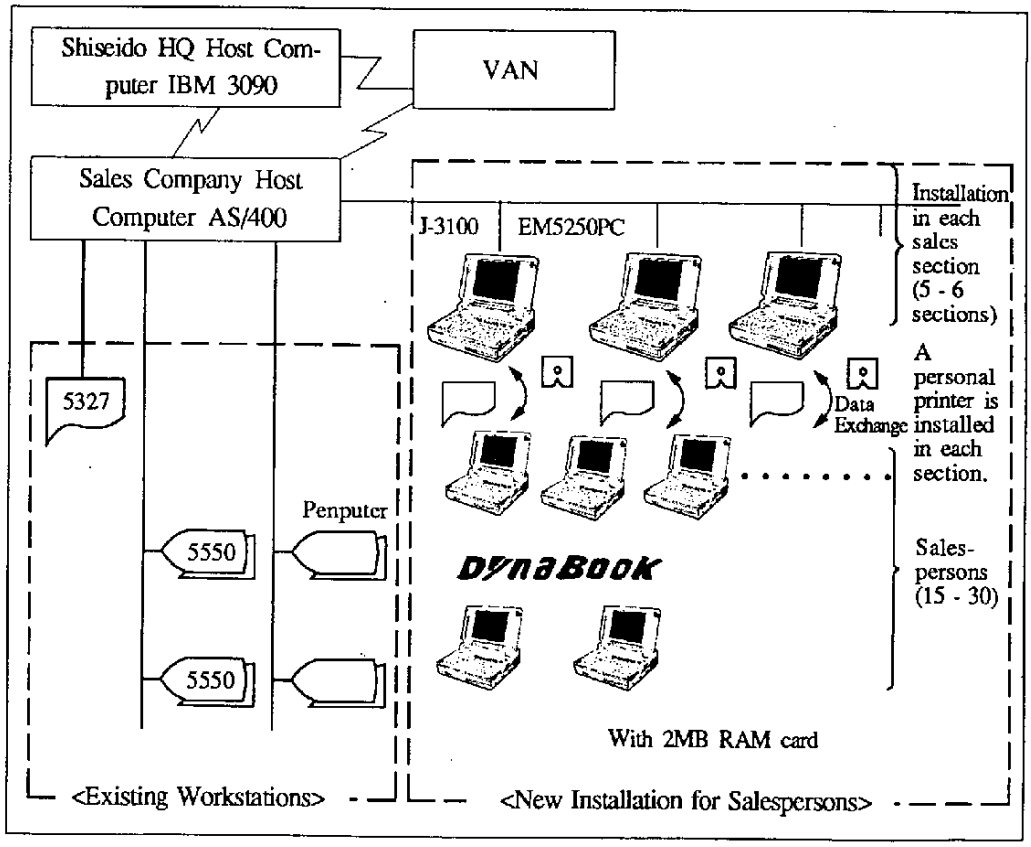


Figure 3. System Configuration

2.2 System Image

(1) Data Extraction

Each morning, salespersons extract daily data from the host computer, using the terminal of the department or section manager.

- Daily data acquisition
  Purchasing data from the stores, messages
- Monthly data acquisition
  Time series purchasing data, various input master files on a monthly basis
- As required
  Retail store sales analysis data

(2) Data Input

Salespersons call on the retail stores with their "Data Pocket," and use the machine to input necessary data.

- Daily input
  Product sales information, primarily store sales by retail store and date

- Input on specific days
  Store sales for each 10 day period, receipts of orders for products to be shipped directly from the plant, receipts of orders for commission sales

(3) Proposal Activities

Using this systematically collected data, salespersons make plans for future sales expansion at each retail store, check the sales discussion agenda and perform follow-up activities.

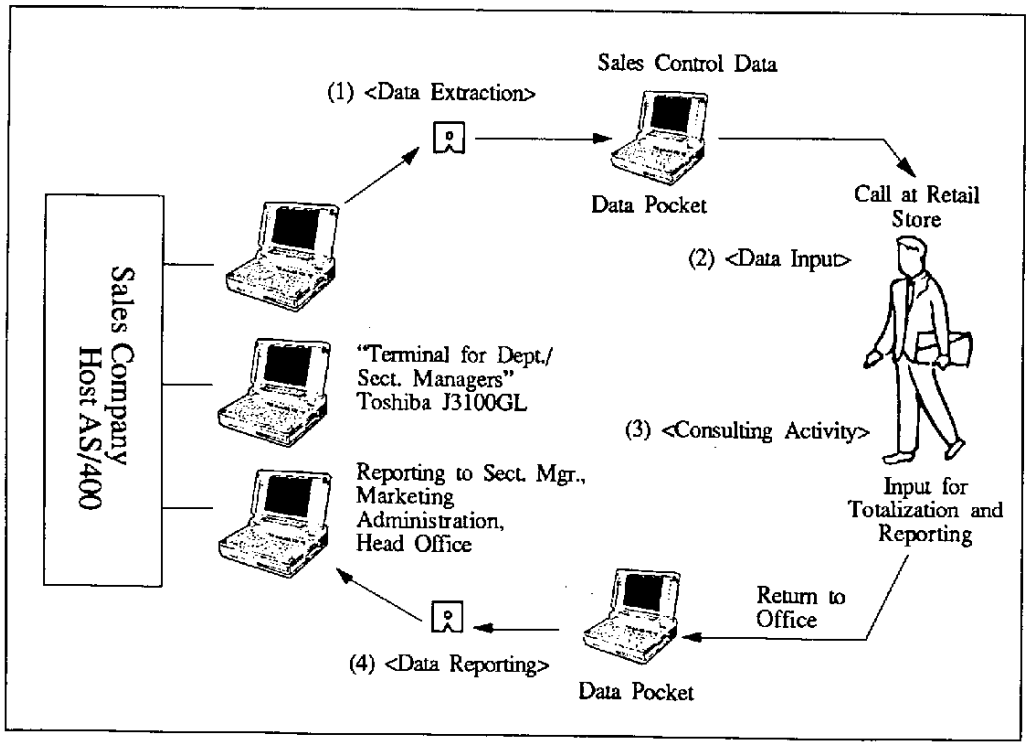


Figure 4. System Image

(4) Data Reporting

The data collected in the Data Pocket is then reported.

- Daily reporting
  Retail store information, by store and date (Retail store sales, sales contest products)
- Reporting on specific days
  Retail store sales information for each 10 day period, information on orders directly shipped from the plant, information on orders for commission sales

The image for the entire system is as shown in Figure 4.

2.3 Total Configuration of Applications

The total configuration of all the applications is as shown in Figure 5.

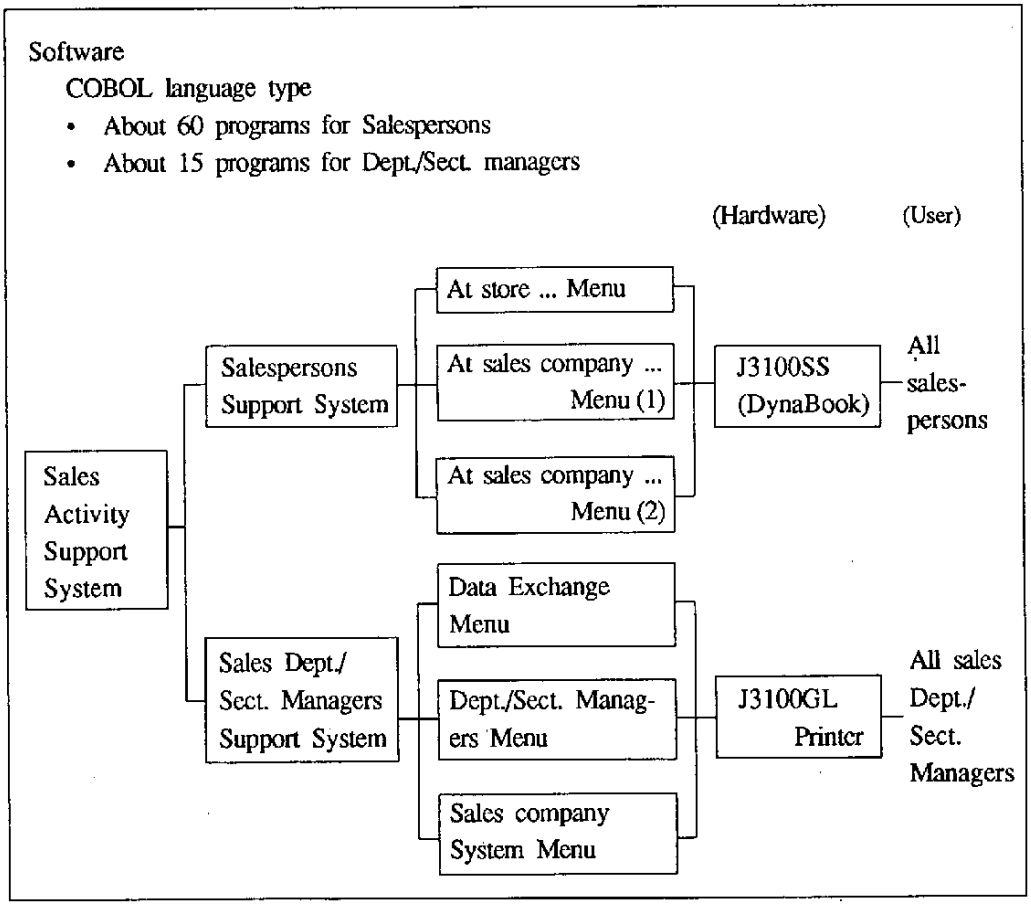
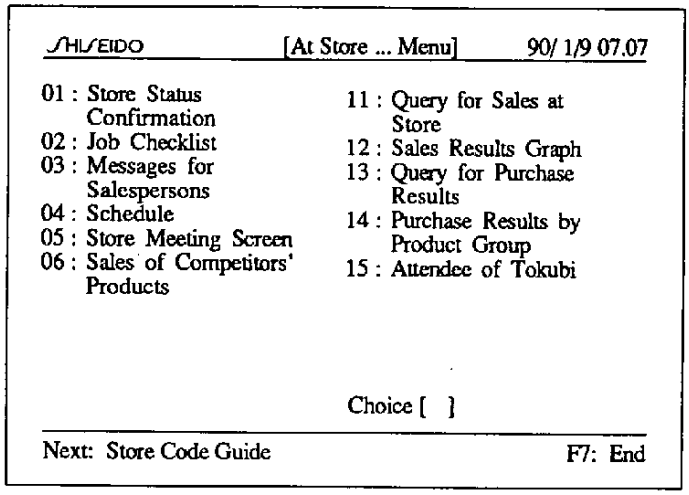


Figure 5. Applications Configuration

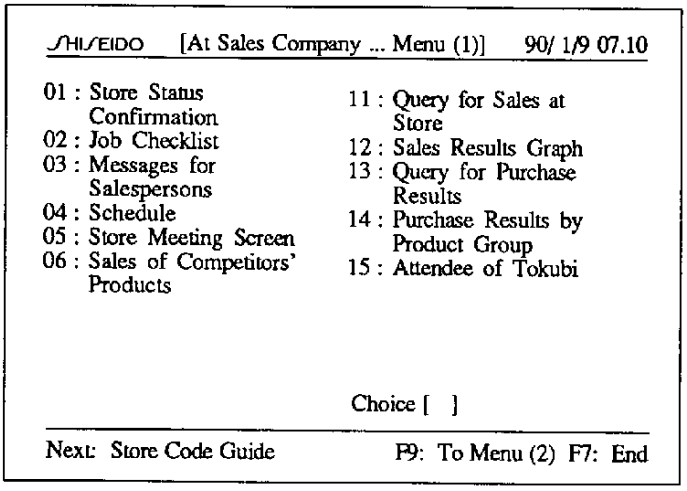
2.4 Content of Program Menu

2.4.1 Salespersons Support System

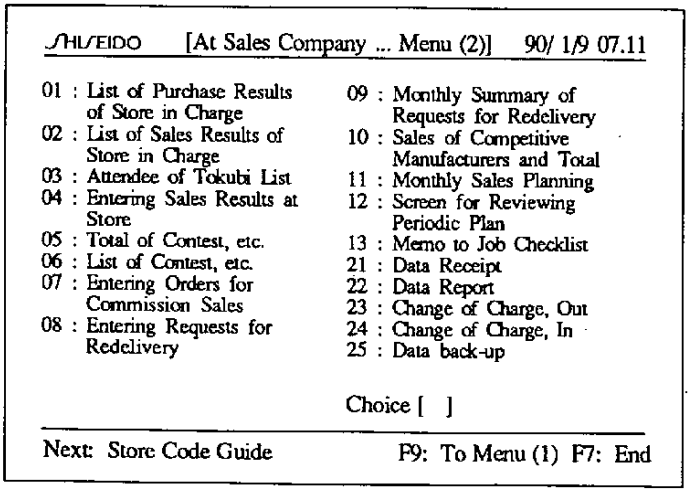
The program menu of the Data Pocket is composed of three parts (See Figure 6). The jobs in each screen menu have fixed format tables and graphs which can be displayed.



[At Store Menu]
The At Store Menu is used at the retail store. Therefore, the specified store can only see specific information displayed on the screen, so that information about individual stores is not disclosed to other stores.



[At Sales Company Menu (1)]
The At Sales Company Menu (1) has the same menu as the At Store Menu. This is used at the sales company for planning and confirmation of sales results.
Here, we can change stores using the same program.



[At Sales Company Menu (2)]
The At Sales Company Menu (2) includes a program which totals collected data in order to view the assigned market as a whole, a program to input data to be reported, and a program for planning and data exchange.

Figure 6. Program Menu of Data Pocket

2.4.2 Sales Dept./Sect. Managers Support System

The sales department and section managers' system is used to extract problem points in the markets they are responsible for, make decisions about important items concerning the markets for each section, and to support the salespersons' meetings with customers and provide them with guidance. These applications are based on data reported from the "Data Pockets" of the salespersons and data sent daily from the host computer.

3. System Use by Salespersons

Data that is incorporated in individual job menus will be reflected in other jobs as well. Here, we will show the job flow relating to "Business Meeting for Each Store" and "Follow-up of Business Meeting Results", which are the most important activities for salespersons (See Figure 7). In addition, we will show a concrete screen image for "Material for Business Meeting for Each Store", as a reference (See Figure 8).

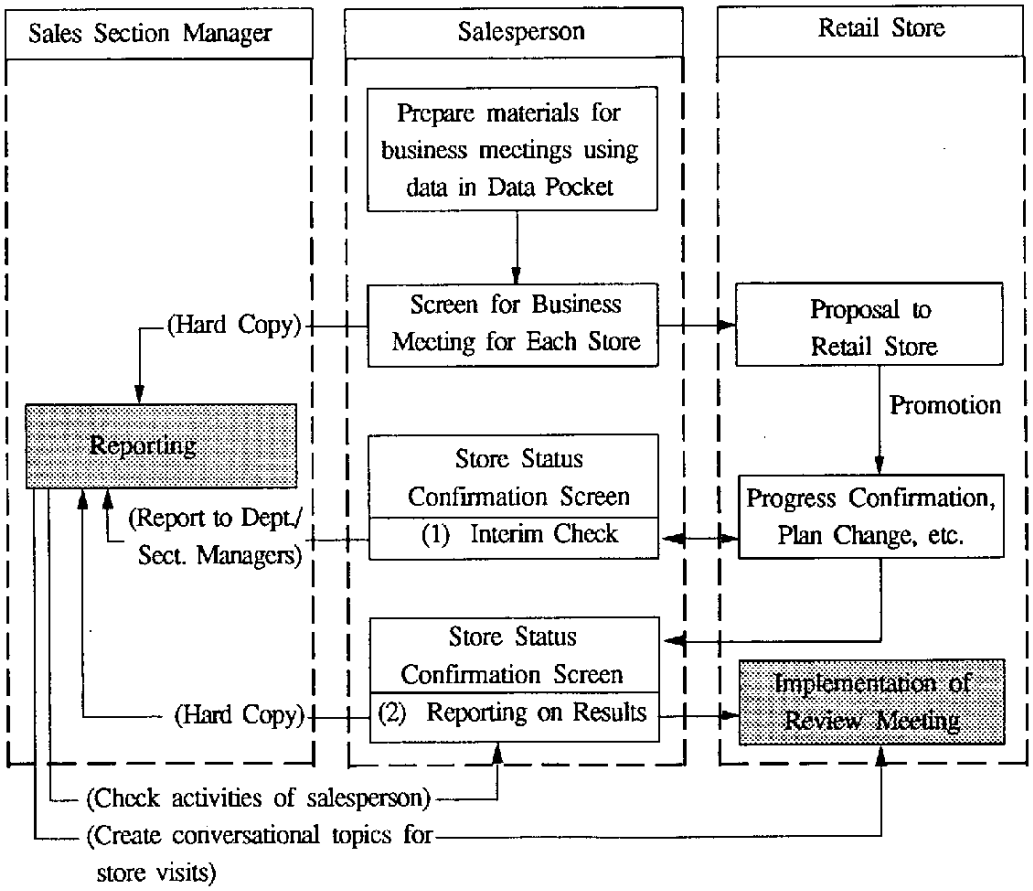


Figure 7. Promotion of "Business Meeting for Each Store" and "Follow-up of Business Meeting Results" using Data Pocket (Example)

06 / 90 **[Material for Business Meeting for Each Store]**

071 Star Cosmetics 90/ 7/30 21.19

1. Retail Store Sales Plan/Results (Prev.: Plan Input, Next: Revision Input)

Month		90 / 4	90 / 5	90 / 6	90 / 7	90 / 8	90 / 9	This month's total	Period Total
Prev. Yr. Results		321	224	293	311	263	244	838	1656
Current Year	Plan (Revision)	340 324	240 266	310 (252)	330 (330)	280 (280)	270 (270)	890 (842)	1770 (1722)
	Difference Actual vs. Plan	324 16-	266 26+	148 162-	197 133-	— —	— —	738 152-	Change in Plan from Prev. Yr.
	Change from Prev. Yr.	100.9	118.7	50.5	63.3	—	—	88.0	106.8% (103.9)%

2. Previous Year Results

Retail Store Sales		2.93 M yen	
No. of Buyers	Member	180 person	7,500 yen/person
	Free	719 person	2,197 yen/person
	Total	899 person	3,259 yen/person

3. This Year's Plan

Sales Goal		2.52 M yen	Change from Prev. Yr.	86%
No. of Buyers	Member	200 person	Progress in Term	48%
	Free	750 person	Period in Prev. Yr.	100%
	Total	950 person	New Member:	10 person

• Primary Products

_____	0 units	000	0%
_____	0 units	000	0%
_____	0 units	000	0%
_____	0 units	000	0%
_____	0 units	000	0%

• Primary Products

All Skin Care	320 units	000	0%
All FD	160 units	000	0%
High Grade	45 untis	000	0%
Sun Screen	60 units	000	0%
_____		000	0%

• Memo

• Memo

Aperio Mate Acquisition Challenge
(3/21 - 6/20) Target: 10

F1 : Write F3 : Screen Cancel F5 : Change Date

F9 : Next Screen F7 : End

Figure 8. Screen Image (1/2)

06 / 90 [Material for Business Meeting for Each Store]

071 Star Cosmetics 90/ 7/30 21.19

4. Previous Year Project Results

	Month / Day	–	Month / Day	Sales	People Mobilized	(Remarks)
•		–		000	0	
•		–		000	0	
•		–		000	0	
•		–		000	0	
•		–		000	0	

5. Current Year Project Plan

	Month / Day	–	Month / Day	Sales	People Mobilized	(Remarks)
•	5/25	–	6/ 1	000	0	Thanks Campaign (6000 yen or over)
•		–		000	0	Parasol (Polka dots and floral pattern)
•	5/30	–	5/31	000	150	D.J.Wagon
•	5/21	–	6/20	000	0	Retail sales 110% challenge
•	5/21	–	6/20	000	0	Whitess sales expansion challenge

6. Current Year Sales Plan by 10 Day Period

	<21 – month end>	<1 – 10>	<11 –20>
Plan by 10 Day Periods	1350 K yen	950 K yen	800 K yen
Cumulative	—	2300 K yen	3100 K yen
Monthly Structure Percentage	43.5%	30.6%	25.8%
Prev. Yr. Results	1340 K yen	2340 K yen	750 K yen
Comparison with Prev. Yr.	100.7%	40.5%	106.6%
Cumulative Total Change from Prev. Yr.	100.7%	62.5%	105.8%

F1: Write F3: Screen Cancel F5: Change Date

F10: Previous Screen F7: End

Figure 8. Screen Image (2/2)

4. Tasks for the Future

The current application as it has been released is still at a low level. In it, the minimum requirements for work in the field have been systematized in a simple fashion. Simple accumulation of individual store information is not enough to frame a "market strategy" in order to develop the retail stores and achieve a competitive market advantage in operations in the small teritory the salesperson is responsible for. In this context, the viewpoint for the salesperson's activities must be expanded from the individual store to the area. And, to do this, a system must be developed that can prepare a strategic design for the market in question. The next step we will take will involve collecting secondary data to be used to get a grasp on market potential, and storing this data in the Data Pocket system. Preparing this version for the next step of development will be a great undertaking.

At present, the most important thing is to establish a place for the existing system in all sales activities. The reality is that the more experienced and more dependent on intuition the salesperson is, the more he tends to have difficulty in handling even this level of system operations.

Finally, I would like to comment that "form can change thinking." I believe that this type of application system is the most straightforward method that has been offered for use as a concrete tool thus far. What shape sales activities should take should be understood through "Steady, Sound Education" on the one hand, and "concrete standardization of business activities" on the other. "Dyna-Book" is expected to function as a strong supporter of one of these two important tasks.

Installation of IBM's ON-LINE NOTE at Naigai Clothes

*** Company Profile**

According to a 1989 survey, clothing sales in Japan total 16 trillion yen per year. However, the country's clothing market has not been growing as smoothly as the computer and electronics high-tech product markets. Closer observation reveals that clothing market growth has mainly been a result of rising unit prices, stimulated by the growing attraction of consumers to expensive products; the total production of clothing in Japan actually seems to be on a decline. At the same time, Japan's clothing manufacturers are now facing severe competition from the newly industrialized economies of the Association of Southeast Asian Nations. International boundaries are crumbling away and traditional distinctions between manufacturers and retailers are gradually disappearing. For example, general trading companies today produce their own brands of clothing and even market them. In this manner, clear distinctions between different business activities are gradually disappearing. Harsh and unrelenting, today's market is compelling Japan's existing clothing manufacturers to keep themselves posted with precise, up-to-date information as to what products in what locations are enjoying brisk demand and, conversely, what products in what locations are moving slowly.

In order to achieve success in this demanding market, Naigai Clothes Co., Ltd., under the guidance of President Yasutaka Nishizaki, is developing an in-house information system using notebook-sized personal computers.

Naigai Clothes has produced clothing ever since its establishment in 1941. In 1990, the company posted approximately 30 billion yen in sales. Naigai Clothes' mainline products include men's, women's, and children's underwear and nightwear. Chain stores, department stores, and retail stores across the country comprise the company's sales outlets.

Naigai Clothes provided its marketing personnel with the IBM 5499 ON-LINE NOTE in December, 1989, immediately after the machine was released on the market. Underwear and nightwear, which make up 75% of the firm's total production, are products concerning which consumers are not as insistent about buying well-known brand names as they are when it comes to purchasing suits or dresses. These products also have lower prices, retailing at 600 yen per item on the average. To gain an edge on its rivals, therefore, Naigai Clothes is emphasizing "marketing approach" rather than "distinctive product features." This, indeed, was the aim President Nishizaki had in mind when he introduced the ON-LINE NOTE at his company. His strategy, in short, has been to reduce operational losses rather

than dealing in deluxe products. Naigai Clothes has taken a revolutionary step in the use of the machine by providing it to its home-based salespersons.

*** Introduction of the ON-LINE NOTE**

About ten years ago, Naigai Clothes began to supplement its 100 regular sales staff members with around 100 home-based salespersons who operate from their homes. These home-based salespersons supply Naigai products to retail outlets in their prefectures. Naigai, which is headquartered in Osaka, has branches in Tokyo and Sapporo. In the past, the head office and the two branches sent their sales staff all over Japan to visit their customers. This led to large business trip expenses for the company and also wasted time. At first, the company considered the possibility of increasing the number of branches as a way of improving supply to the retailers. However, this would have burdened the firm with huge capital requirements. This is what led Naigai Clothes to appoint sales personnel all over the country who would operate from their own homes, and to install terminals directly connected to the firm's computer system in their homes. Naigai Clothes introduced its original online network in 1983. On returning home after a day's work, a home-based salesman could use his terminal to enter orders and record his day's sales activities. This relieved the salesperson from the troublesome and often inaccurate task of having to telephone the head office or a branch office every day and confirm the inventory.

However, this did not completely solve all problems. The stock confirmed by the home-based sales personnel often ran out midway during a sales tour. Thus, there was a need for a realtime system to keep the sales personnel constantly posted on the inventory position and to rapidly indicate shipping of products ordered by the retail store buyers at the Merchandise Centers. Naigai Clothes' products reach retailers directly, that is, without passing through wholesaler intermediaries. Thus, Naigai Clothes has to maintain a very large number of direct customer contacts compared to trading companies, which rely on wholesalers for the distribution of their products. The advantage of this is that Naigai Clothes is in a position to obtain valuable information through retailers in the form of user comments that it can utilize in its sales strategy. To use it effectively however, the flow of such information must not have any interruptions. This obviously called for enabling a sales person to carry his or her terminal to the actual spot where sales are negotiated. Indeed, it is this sort of demand that has triggered the rapid appearance of notebook-sized PCs one after the other starting in 1989.

President Nishizaki, who quickly became aware of this trend, started contemplating the possibility of introducing them in his company. Here is what he says about the choice of IBM's ON-LINE NOTE.

"Notebook-sized PCs are offered by a number of manufacturers besides IBM, and Naigai Clothes obviously considered using domestically manufactured machines for its system. However, Japanese manufacturers of notebook-sized PCs mainly target users who want the machines for personal use and have designed them mainly for word processing and spread-sheet use. Unlike computer enthusiasts, however, when a large company contemplates the introduction of a large number of these machines, it will con-

template using them as portable terminals for a network, not as 'expensive stationery equipment.' Consequently, Naigai Clothes chose IBM's ON-LINE NOTE with the idea of eventually using the notebook-sized PCs as online terminals, as substitutes for desk-top machines."

*** Effects of introducing the Online Note machines**

As of today, members of Naigai Clothes' sales team, including home-based sales personnel, carry around IBM 5499 ON-LINE NOTEs, not just to do inventory checks, but also to obtain necessary product-related information to carry on their sales activities. They can even use the terminals for order entry. Unlike in the past, therefore, today the flow of information to the sales personnel is uninterrupted. This has relieved the sales personnel of a considerable burden and has improved Naigai Clothes' service to retailers. As already mentioned, ON-LINE NOTEs help Naigai Clothes salespersons, wherever they are, to check the inventory and shipment positions, make order entries, maintain sales records and customer data, and use the electronic mail function to send the host computer information about promising products and products which are not moving, as well as complaints from customers.

Use of the notebook-sized PCs in home-based sales activities and as network terminals has, of course, streamlined Naigai Clothes' sales operations. In addition, however, the machines can be locked up in drawers when not in use, thereby saving office space. Furthermore, the machines are helping Naigai Clothes cope with Japan's skyrocketing land prices. Jobs that can be performed away from the center of cities are being transferred to the suburbs where land prices are relatively low.

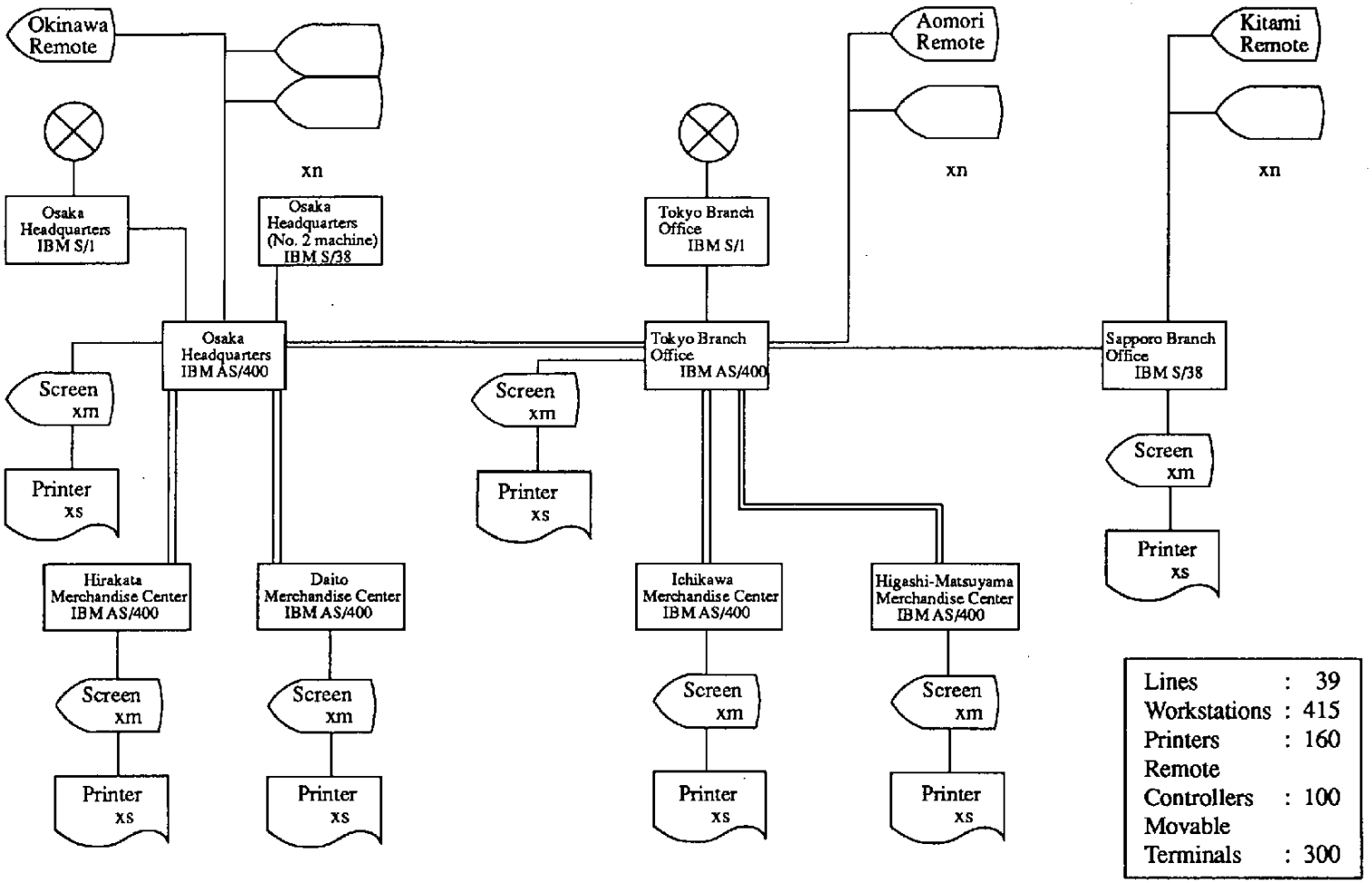
*** System configuration**

Figure 1 shows a view of Naigai Clothes' system configuration. Distributed processing had drawn the attention of Naigai Clothes quite early. Accordingly, in 1983, the company switched over from Japanese machines to IBM computers capable of performing distributed processing. As shown in the figure, it installed seven AS/400s, and a Series 1 and System 38 as host computers, in its Osaka headquarters and in the Tokyo and Sapporo Branches. A network now connects the company's product centers, factories, and home-based sales personnel. It is relevant to add here that Naigai Clothes has a principle of only allowing persons with business experience to run its computer division. This is because the company realizes that, no matter how well one knows computer technology, one cannot make full use of the available system functions without being conversant with the problems presented by the jobs to be performed. It is even likely that a constant awareness of the problems in question will naturally suggest technical needs. In fact, President Nishizaki believes that a technological revolution can occur even in situations where computer engineering experience is somewhat lacking.

*** Changes brought about by the ON-LINE NOTE**

Introduction of ON-LINE NOTE PCs did not only change operations at the actual locations where transactions occur, it also changed the mode of work in general and even the lives of the employees.

Figure 1. System Configuration



Japanese companies today are facing an acute labor shortage irrespective of industrial field. Maintaining the necessary work force through making attractive offers, such as increasing the number of holidays for employees, is an important task. However, in the textile industry, where sales have already reached their upper limit, a five-day work week system cannot easily be implemented. So-called "shutter" holidays — working at the company with the shutters pulled down while one is supposed to be on holiday — are not unusual in this industry. At Naigai Clothes, two Saturdays a month are workdays, and these two days account for 1.5 billion yen out of the 30 billion yen posted by the firm in annual sales. Thus, as it stands today, the firm cannot easily increase its number of days off. Right now, Naigai is trying to implement a five-day work week system by raising annual profits in the Monday-Friday period by 1.5 billion yen. In fact, increasing the number of holidays without sacrificing productivity is a target held not only by Japan's textile industries, but also by all companies nationwide. "The fact that Japanese manufacturers are able to maintain a healthy market, free from inflation, even in this situation can be attributed to the introduction of factory automation and robots to cut labor costs," says Nishizaki. He adds, "However, distributors and retailers seem to be lagging behind in this respect. The latent demand for online systems comprised of notebook-sized PCs must be high in small- and medium-sized industries that face the necessity of raising productivity through improved information systems."

It is relevant to mention here that a five-day week does not prevent an employee from thinking about work while at home. Indeed, bright ideas may well flash through one's mind while one is relaxing away from work. An employee with a conventional system would have to wait till the next working day to access the necessary files to give shape to such ideas; however, if an online terminal is available at home, it can be used to work on an idea right away, when it comes to mind. This can hasten decision making by at least half a day. Moreover, immediate accessibility to necessary data helps employees understand their jobs much better than is possible otherwise. Periodic printing out and distribution of data among employees, as has been done conventionally, tends to divert attention to a specific area only. Thus, Naigai Clothes provided a workstation to each individual employee and aimed at breaking down organizational barriers by opening up access to information company-wide. The hope was that this step would stimulate an overall consciousness of the problems to be resolved. Treating and sharing information as a common asset is also expected to activate the company from within. So far, sales techniques have primarily been associated with individual know-how, but online terminals make it possible to share individual experiences with all employees. Also, revealing unwelcome information to the employees, such as complaints (which used to remain known only to a few certain individuals), has helped trace the source of problems and has made it possible to acquire fresh knowledge. Therefore, the advantages of an information system are immeasurable.

*** Added benefits and future problems**

Strategic use of notebook-sized PCs in Naigai Clothes led to added benefits that became available not only to the textile industry but to others as well. For example, connectors were

needed to connect the notebook-sized PCs to both two- and four-wire telephone circuits at business locations and hotels across the country, wherever the sales personnel were. In four-wire systems, two of the wires are for control and the remaining two for communication. Which of the lines are usable for communication depends on the type of telephone used, and some of the lines would not allow connection to notebook-sized PCs. In order to resolve these connection problems, Naigai Clothes developed its own connector, which has a switching arrangement to facilitate selection of lines according to the telephone in use. The company provided all its employees with this connector.

In the past, sales personnel had to carry couplers and connectors, and this tended to increase the burden on the individual. Naigai Clothes' own connector is about three centimeters in height, 4 centimeters in length, and 6 centimeters in width and weighs no more than 50 grams. They are easy to carry around and the company is now marketing them under the brand name Silox (Photo 1).

In addition, the ON-LINE NOTE application programs developed by Naigai Clothes can not only be run by textile firms. They can also be used for product distribution by companies engaged in other activities. Naigai Clothes is currently commercializing connectors as well as journal printers and other peripheral devices for use of software or ON-LINE NOTEs on networks.

Naigai Clothes' original aim was survival in the textile market, a market that seems to have already reached an upper limit. It

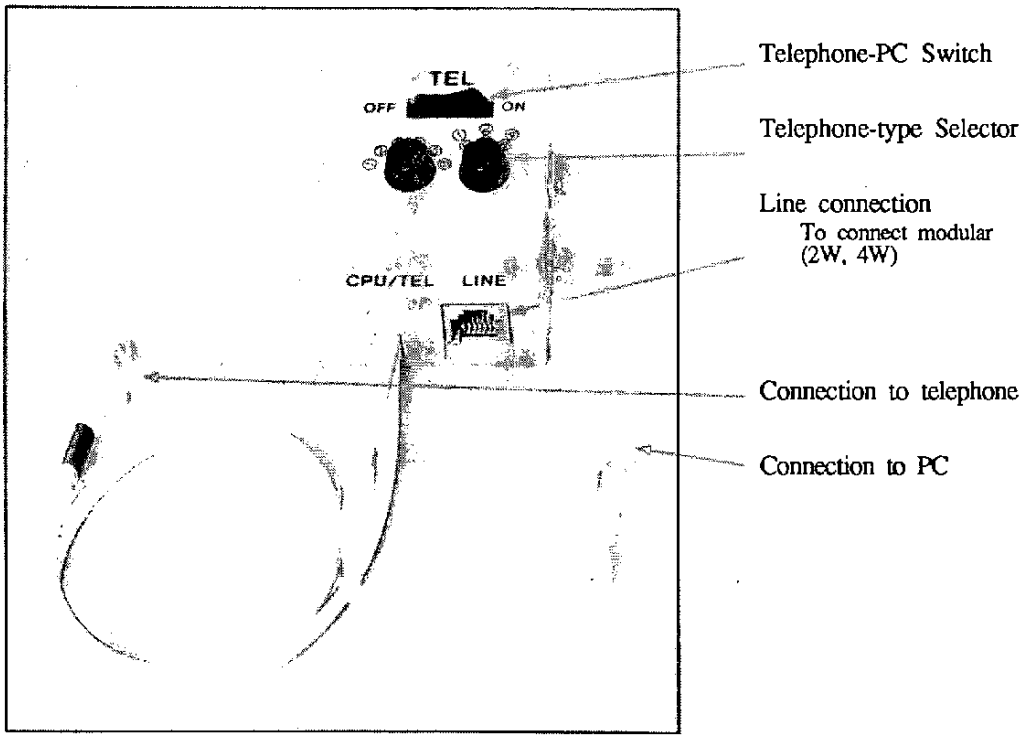


Photo 1. Connector developed by Naigai Clothes

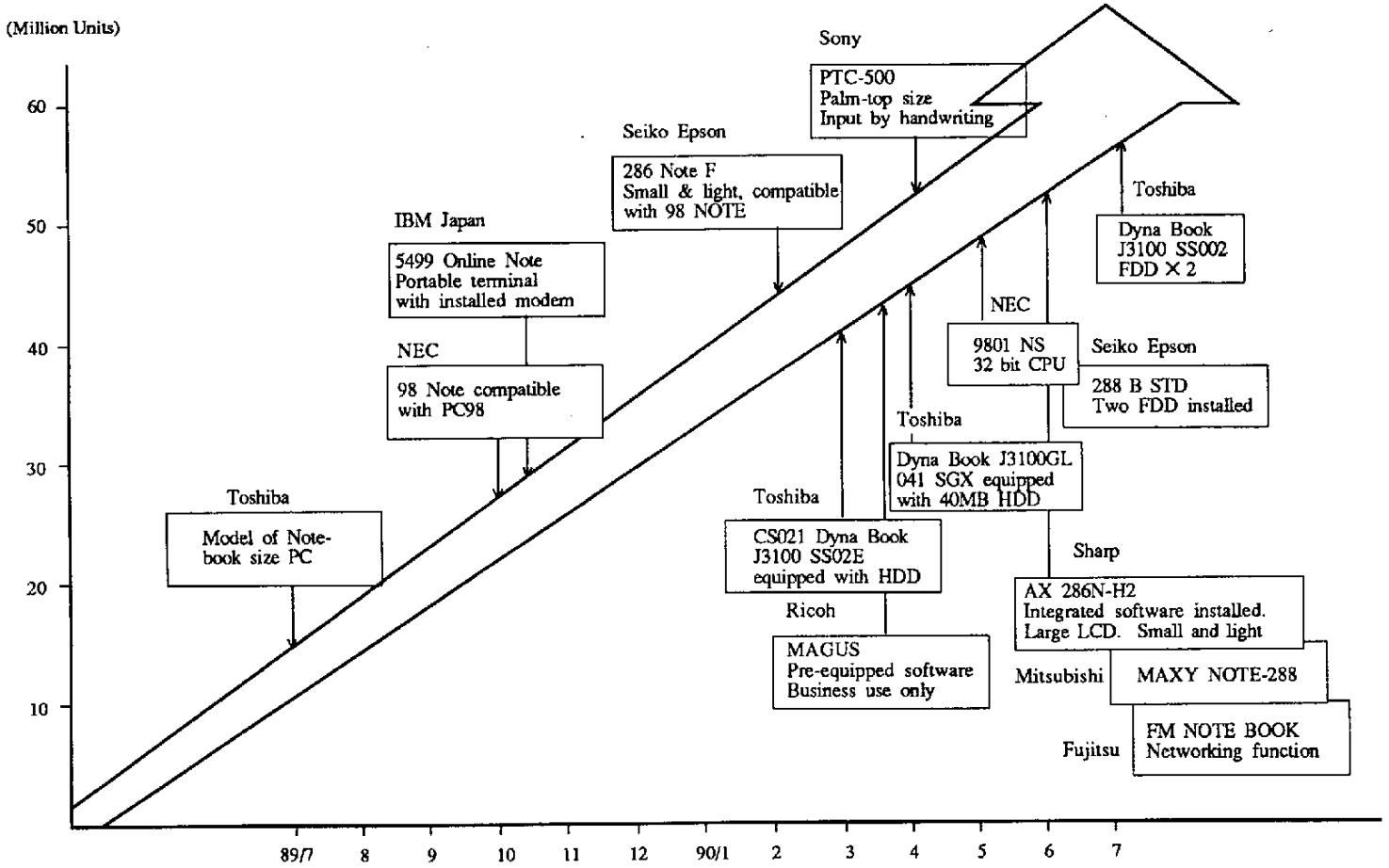
launched an all-out drive to do this, and the result was beneficial to not only textile makers but to others as well. In February, 1990, Naigai Clothes set up Silox Fashion Pte., Ltd. in Singapore. It is expected that a decline in the cost of international telecommunications will lead to worldwide use of ON-LINE NOTEs. However, as Nishizaki points out, "Such global proliferation will require the solution to a number of problems." He says, "Telephone systems are switching rapidly into the digital mode, but a comparable pace of digitalization has not been seen for computer terminals. For an overall change in the modus operandi of an entire company, each individual employee must have a notebook-sized PC and must use networks. This will call for the development of stronger interfaces between computers and telecommunication systems."

Online terminals, which have been made compact and light-weight, are not only helping companies to combat labor shortages and to shorten working hours, they are also changing the very patterns of business transactions and life in general. Progress now hinges on technological innovations which will further harmonize telecommunications and computers.

Japan's Notebook-sized PC Market Analysis by ODS Corp.

Timing of Main Product Releases

No.	Supplier	Model	First Shipment
1	Toshiba	J3100 SS 001	1989. 7
2	NEC	9801 N	1989. 11
3	Seiko Epson	286 NOTE executive	1989. 10
4	IBM Japan	5499 Onlinenote	1989. 10
5	Microsystems	MS-21C-A	1989. 12
6	Seiko Epson	286 NOTE F	1990. 2
7	Toshiba	J3100 GS 021	1990. 3
8	Toshiba	J3100 SS 02E	1990. 3
9	Ricoh	MAGUS	1990. 3
10	Sharp	AX286N-H2	1990. 6
11	NEC	9801 NS	1990. 6
12	NEC	9801 NS-20	1990. 6
13	Seiko Epson	286 B STD	1990. 6
14	Seiko Epson	286 BH 20	1990. 6
15	Mitsubishi Electric	MAXY-NOTE 286	1990. 7
16	Fujitsu	FMR-50NB-1	1990. 9
17	Toshiba	J3100 SS 002	1990. 6

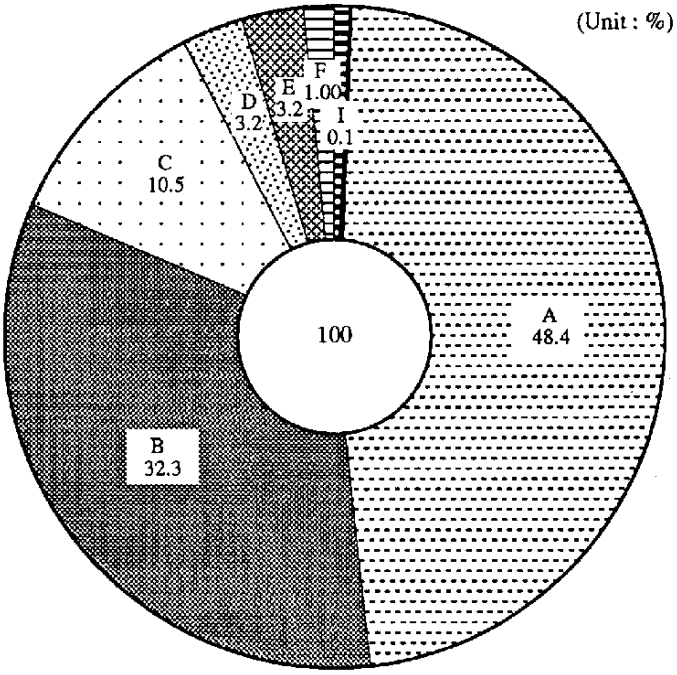


Timing of Main Product Releases

Production volume

No.	Supplier	1989 (Unit)	1990 (Unit)	VS '89	Remarks
1	Toshiba	120,000	200,000	166.7%	4 types in 1990: J3100 SS001, GS021, SS020, SS002
2	NEC	85,000	300,000	352.9%	3 types in 1990: 9801N, 9801NS, 9801NS-20
3	Seiko Epson	3,000	65,000	2166.7%	3 types in 1990: 286N, 286BSTD, 286BH20
4	Sharp	–	20,000	–	Shipments to start in June 1990
5	Mitsubishi	–	10,000	–	Shipments to start in June 1990
6	Fujitsu	–	20,000	–	Shipments to start in Sept. 1990
7	Others	2,000	620,000	295.2%	–
	Total	210,000	620,000	295.2%	–

Shares by Manufacturer (As of June, 1990)

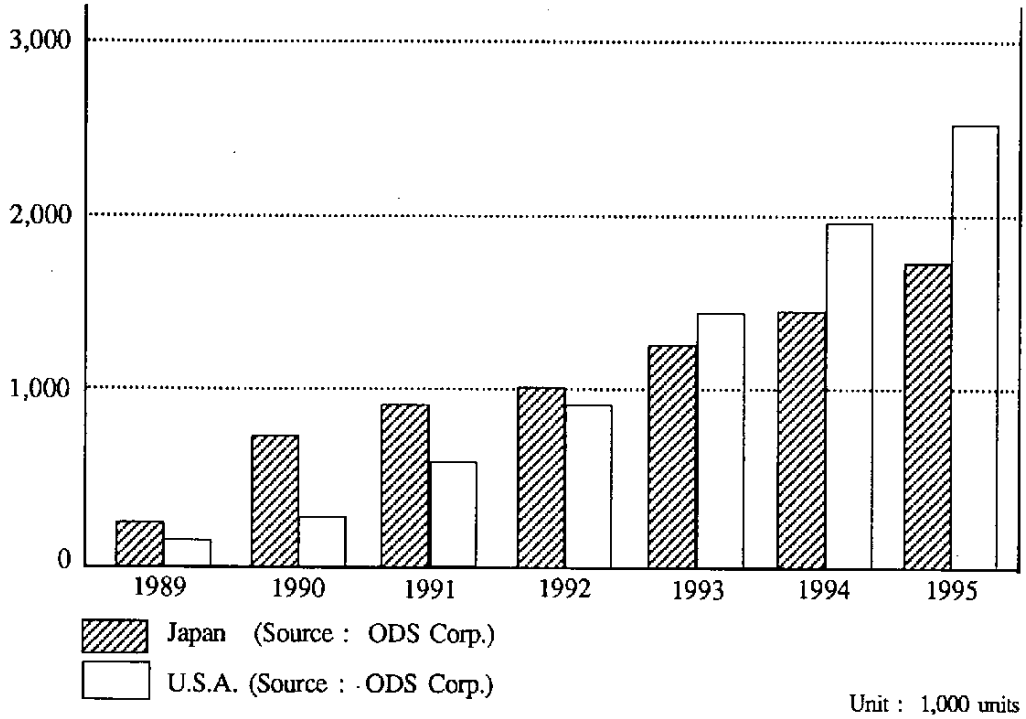


No.	Manufacturer	SHIP. VOL.	SHIP. VOL.
1	A NEC	300,000	48.4
2	B TOSHIBA	200,000	32.3
3	C SEIKO EPSON	65,000	10.5
4	D SHARP	20,000	3.2
5	E FUJITSU	20,000	3.2
6	F MITSUBISHI	10,000	1.6
7	G RICOH	3,000	0.5
8	H IBM JAPAN	1,500	0.2
9	I MICROSYSTEMS	500	0.1
G-TOTAL		620,000	100.0

Source : ODS Corp.

Market sizes in Japan & U.S.A.

(Unit: 1,000)



Unit : 1,000 units
(% vs previous year)

	1989	1990	1991	1992	1993	1994	1995
Japan	210 (-)	620 (295)	800 (129)	1,000 (125)	1,200 (120)	1,440 (120)	1,730 (120)
U.S.A.	130 (-)	230 (177)	570 (248)	940 (165)	1,410 (150)	1,980 (140)	2,470 (125)
G. Total	340 (-)	850 (250)	1,370 (161)	1,940 (142)	2,610 (184)	3,420 (131)	4,200 (123)

Specifications of Notebook PCs introduced at the 70th Business Show in May, 1990.

Supplier	NEC	Epson	Sharp/Mitsubishi	Fujitsu
Model	PC9801 NS-20 (98 Note SX)	PC-286 Book - H20	All in Note AX-286n-h21 MAXYNOTE286 M3121-AO2	FM Notebook R-50NB1
CPU	80386 SX (12MHz, No wait)	80 C286 (12 MHz, No wait)	80C286 (12/8/6 MHz) *2	80C286 (8 MHz, No wait)
Main Memory	640 KB (3.6 MB at max)	640 KB (4.6 MB at max)	1 MB (3 MB at max)	2MB including RAM disk (4MB at max)
RAM disk	1.25 MB	Option	Option	1.25 MB
Display method	STNLCD (Cold CRT back-light)	STM LCD with film (Cold CRT back-light)	STM LCD with film (Cold CRT back-light)	STN LCD with film (Cold CRT back-light)
Resolution	640 × 400	640 × 400	640 × 480	640 × 400
Gray Scale	8 scales/2 scales	8 scales/2 scales	8 scales	16 scales
3.5" FDD	1 M/640 KB installed	1 M/640 KB installed	1.44 M/720 KB attached (Option, 498,000 yen)	1 M/640 KB installed
HDD	one 20MB installed	one 20 MB installed	one 20 MB installed	None
Battery-charging time	1.4h *1 6 h while using computer 1.5h not using computer	Data not available 10h while using computer 2h not using computer	1.7h *5 2h not using computer	2.5h *6 8h while using computer 4h not using computer 1.5h using quick charger
Size	316 × 254 × 53 mm	315 × 298 × 63 mm	279 × 216 × 34 mm	297 × 250 × 44 mm
Weight	2.95 kg	4.3 kg	1.95 kg	2.7 kg
Price	448,000 yen	378,000 yen	398,000 yen	238,000 yen
Shipment starting	1990. 6	1990. 6	1990. 6. 1	1990. 9
Notes	Can be operated for 2.4h by using optional large volume battery. Model "PC9801 NS" without HDD, is available. The price is 298,000 yen.	with CRT outlet terminal Model "PC286 Book STD" with no HDD and two FDDs is available. The price is 258,000 yen.	MS-DOS Ver. 3.2, MS-Windows Ver. 2 pre-installed in HDD. (with optional mouse) "Business Mate" (Sharp software) with wordprocessor and spreadsheet	Has one slot for IC memory card based on JEIDA. Has resume function. Can be operated 5 hours in a row wing optional.

*1 Mitsubishi Electric is supplied by Sharp on an OEM basis.
*2 One wait cycle at 12MHz. No wait at 8/6 MHz
*3 When HDD usage is at 10%.
*4 FDD models, battery fully charged. The time will be 1.0 to 1.5 hours at FDD usage of 10%. The time varies depending on the back-lighting.
*5 When HDD usage is at 10%, back-light brightness is at 50% and CPU operation is at 100%.
*6 When only the main system is used, fully charged, and FDD usage is less than 10%.

Notebook-sized PC Software

(1) Major word processing softwares (As of June, 1990)

(Unit : Yen)

Product	List Price	Sales Price
Ashisuto Word (Ashisuto)	9,700	7,300 – 8,700
N Matsu (Kanri Kogaku Ins.)	38,000	24,000 – 28,000
Ichitaro dash (Just Systems)	39,000	26,000 – 33,000
Dyna Word (Nihon Softbank)	39,800	30,000 – 32,000
Shin Matsu (Kanri Kogaku Ins.)	58,000	34,500 – 43,000
P1. EXE Plus (DB Soft)	58,000	34,800 – 46,000
Ichitaro Ver 4, 3	58,000	34,800 – 49,000

The low cost (9,700 yen) software of Ashisuto made a major impact on the PC software market. The list price is so low that the discount rate is smaller than for other software; under 10% at mass merchandisers and under 25% at discount shops. Its sales results are evaluated highly especially at mass merchandisers.

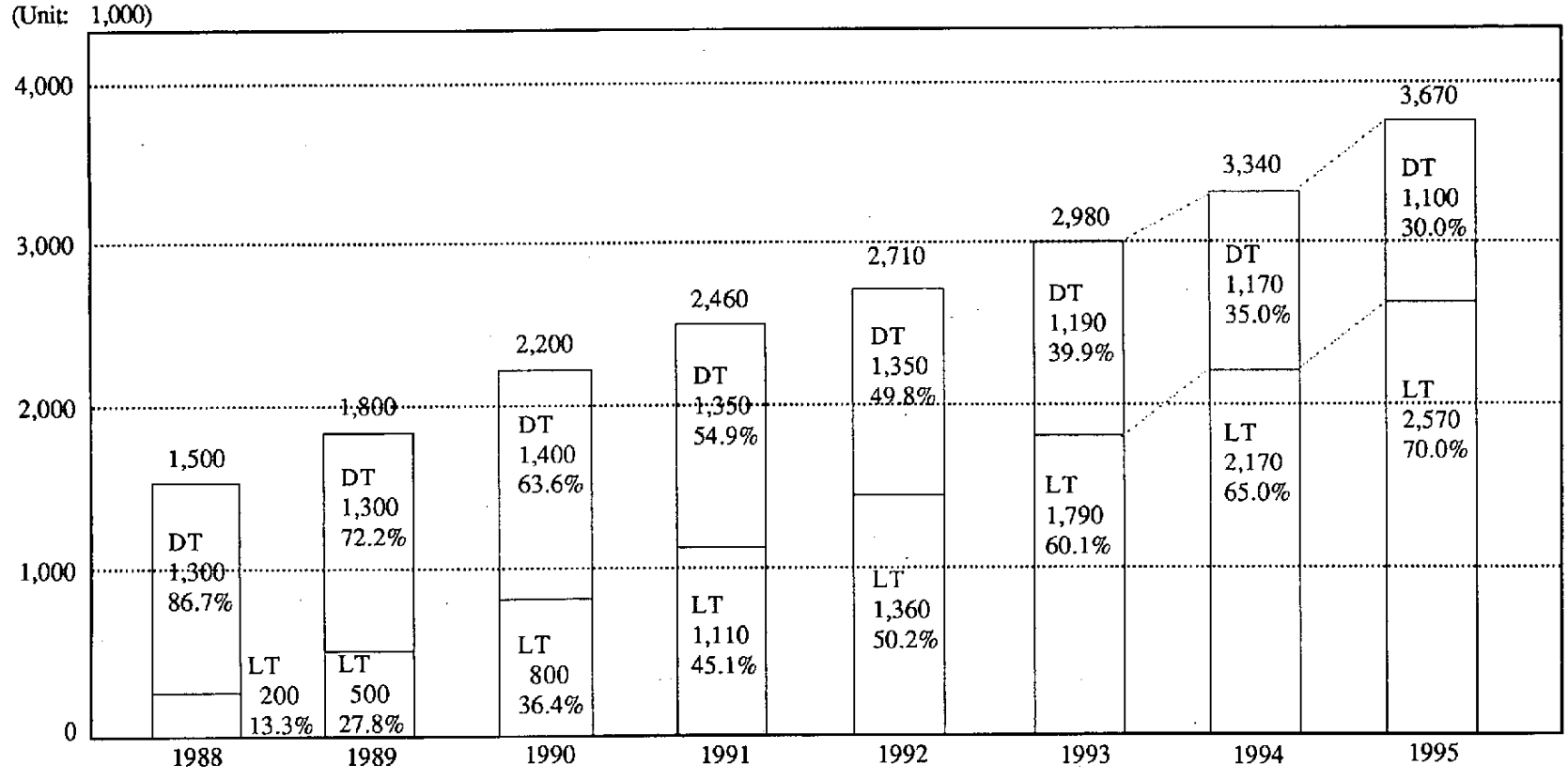
(2) Major data processing software (As of June, 1990)

(Unit : Yen)

Product	List Price	Sales Price
Ashisuto Calc (Ashisuto)	9,700	7,300 – 8,700
Ashisuto Card (Ashisuto)	9,700	7,300 – 8,700
BUSI COMPO (Creo)	40,000	25,800 – 31,000
The Card 3 (Ascii)	48,000	32,500 – 38,000
Multiplan 4.1 (Microsoft)	68,000	43,000 – 53,000
Kiri V2 (Kanri Kogaku Ins.)	98,000	59,000 – 73,000
Microsoft Excel (Microsoft)	98,000	59,000 – 76,000
1-2-3 R2:2J (Lotus)	98,000	56,000 – 73,000

Initial Notebook PC purchasers were mainly entry-level users.
However, after their initial introduction, more and more were purchased by PC users as a handy second machine. Accompanying this trend, the software has been up-graded from software specially designed for Notebook PCs to revised Desktop PC software (low-priced versions).
"Quadrille" of AI Soft (38,000 yen) and "All in One Note" of Tess International (39,000 yen) are examples of popular software packages.

Market Share Trends of Laptop PC and Desktop PCs (Shipments, in Japan)



LT includes notebook-sized PCs in its volume of shipments.

(Source: ODS Corp.)

Current News

• **PC-VAN Attains a Membership of 200,000**

PC-VAN, which, under the management of NEC is Japan's major PC network, attained a membership of 200,000 as of December 1990. PC-VAN began service in 1986, and had a membership of 100,000 by December 1989. Owing to the spread of notebook-type PCs, this network attracted attention as a powerful means of communication and increased its membership by an additional 100,000 during the following year. Thus, with its unprecedentedly high membership, PC-VAN has taken the lead over the other domestic PC networks.

Seizing this opportunity, NEC has announced its intention to extend the service coverage of PC-VAN. They will make it possible to transmit data from overseas personal computers more efficiently, through overseas international public packet switched networks. Furthermore, PC-VAN is now open to Venus-P, KDD's international public packet switched network. Eight new access points were established in Japan to extend the service areas which use local telephone charges. NEC also intends to start 24 hour service in April 1991.

• **Matsushita Electric Industrial ties up with Sun Microsystems**

Matsushita Electric Industrial has concluded an agreement with Sun Microsystems, the biggest WS manufacturer in the world, to cooperate closely in the manufacturing and sale of workstations. Under this agreement, Matsushita Electric Industrial will develop and manufacture Sun-compatible WSs, and will receive a license for the operating system (OS), including the Japanese version, and the design philosophy of the SPARC, the reduced instruction set computer (RISC) type microprocessors developed by Sun Microsystems.

Matsushita Electric Industrial will supply Sun-made WSs from Sun Microsystems, Japan on an OEM basis. These WSs will appear on the market beginning in April 1991, through Matsushita Computer Systems, a WS marketing affiliate of the Matsushita Group.

Matsushita Electric Industrial, which once retreated from the computer business in 1964, reentered the computer business on a full scale in October 1989, focusing its efforts chiefly on the WS field. At present, Solbourne Inc. (U.S.A.), a Matsushita affiliate, is manufacturing Sun-compatible WSs. This time, Matsushita Electric Industrial has clearly stated its intention to focus on a Sun-compatible line in the WS field as its primary target in the computer business.

• **NEC develops a bilingual Japanese-English interpretation system**

NEC announced that it has developed a "Bilingual Japanese-English Automated Interpretation System" capable of providing bilingual Japanese-English interpretation services through

recognition of the voices of many, unspecified persons. This system consists of a high-speed workstation, a voice analyzer, and a voice synthesizer, and is capable of recognizing some 500 words in the sentence mode, and 5,000 words in the separate word mode. This system can interpret an English sentence of about 20 words in five seconds. In contrast to conventional translation systems, which require a great deal of dictionary data because they use a direct transformation mode in word or sentence units, the present system is said to have the capability to cope with a variety of expressions with the aid of a relatively small amount of dictionary data, because sentence data is analyzed contextually. Allowing a lead time of four or five years, NEC intends to put this prototype system into practical use for limited purposes through the introduction of various improvements, such as increasing the number of interpretable words and making the system responsive to voices over the telephone.

- **Toyo Information Systems ties up with C&W in building an ISDN**

Toyo Information Systems, a major data processing service company, will build an ISDN using NTT and NCC (New Common Carriers) telecommunication lines in cooperation with Cable & Wireless (C&W), a British international telephone & telegraph company. Gross investments for this project are estimated at five to six billion yen, and will be financed on a fifty-fifty basis. Toyo Information Systems is to install network-dedicated local exchanges in principal cities such as Tokyo and Osaka. Toyo Information Systems also plans to provide Virtual Private Network (VPN) service over this network (with the intention of building up wide-area company communication networks by assigning a specific telephone number system to each user) as well as multi-media telecommunications service. By offering more sophisticated services, Toyo Information Systems will be able to better compete with NTT, which plans to establish its own ISDN network. Moreover, C&W has already invested in International Digital Communications (IDC), one of the new international common carriers. In step with the relaxation of regulations on international VAN business concluded at the U.S.-Japan Telecommunications Conference in August 1990, the present ISDN construction project will undoubtably fuel the keen competition for control of the telecommunications market in Japan.

- **NTT develops a world-class miniaturized portable telephone set**

NTT has recently developed a world-class light, compact portable telephone set called the 'TZ804.' This new model was developed by NTT in cooperation with NEC, Mitsubishi Electric, Matsushita Communication Industrial, and Fujitsu. The TZ804, which is only 150 cc in volume and 230 g in weight, is about one third the size and weight of conventional models. It was miniaturized by employing special-purpose high-performance IC devices for its wave amplifier, modulator, and controller. The TZ804's continuous waiting time (16 hrs.) and continuous talking time (45 min.) are both shorter than any of the conventional NTT models, yet its performance is superior to that of NCC models. TZ804 telephone service is scheduled to start around April 1991, at a standing charge which will not exceed the 19,000 yen per month charged for conventional models.

The number of subscribers to the NTT portable telephone network reached 129,500 in September 1990. Yet this figure is somewhat smaller than the corresponding figure, 166,300,

for the NCCs. It must be noted that the NCCs provide car/portable telephone service at rates about 20% lower than NTT, with call service charges 10% to 20% lower than NTT. NTT intends to regain its former market share by re-doubling its efforts to improve performance and marketing power.

Back Issues of Japan Computer Quarterly are as follows:

Published in 1990

No. 83: Distribution Information Systems in Japan
82: Computer Security in Japan
81: Financial Information Systems in Japan
80: EDI in Japan

Published in 1989

No. 79: Neurocomputers and Fuzzy Theory – R & D Trends in Japan –
78: Japan's Approach to Privacy Protection
77: State of CAL (CAI) in Japan
76: Software Industry in Japan – Striving for Increased Productivity –

Published in 1988

No. 75: Personal Computers in Japan – An Unabridged Account –
74: Globalization of Telecommunication Services
73: The Microcomputer Industry
– Training Engineers, Creating Applications –
72: Informatization – Handling Tomorrow's Problems Today –

Published in 1987

No. 71: Systems Security – The Fight Against Computer Crime –
70: The Informatization of Small and Medium Businesses
69: Expert Systems in Japan
68: Large-scale Projects in Japan

Published in 1986

No. 67: Information Services in Japan
66: IC Cards – Cards with Brains –
65: Database Services in Japan
64: Machine Translation – Threat or Tool –

Published in 1985

No. 63: EDP Certification ExamLand, Japan –
62: Liberalizing Telecommunications
61: VIDEOTEX: A Glimpse of The 21 Century
60: The Day of the Robot

Published in 1984

No. 59: Financial Revolution – Electronic or Plastic –
57: The PC Phenomenon
56: Information Services Japan '83

Published in 1983

No. 55: Electronic Money
54: On-line Systems
53: Computer Literacy
52: Personal Computer

Published in 1982

No. 51: Database Service in Japan
50: Industrial Robots

Exclusive Representative of Japan Computer Quarterly

ODS Corporation

TEL : TOKYO (03) 3400-7090
FAX : TOKYO (03) 3407-8035
TELEX : J26487 ODSTHINK
CABLE : ODSTHINKTANK TOKYO

Please send the ORDER FORM to:

GMS Div.
ODS Corporation
Dai-Ni Kuyo Bldg., 5-10-2, Minami-Aoyama
Minato-ku, Tokyo 107, JAPAN

ORDER FORM

Please send me the items checked below:

☐ Japan Computer Quarterly
Annual Subscription $ 105
(including air mail charge)

I would like to receive the following back copies:

No. _____ $ 27 per copy
(including air mail charge)
_____
_____
_____

☐ Bill me

Total: $ _____

Signature: _____ Date: _____

Name: _____

Position: _____

Company: _____

Address: _____

Telephone: _____ Fax: _____

Japan Information Processing Development Center