

1983

Jipdec Report

Japan Information Processing

Development Center

'RUN' Personal Computers/

No. 52

Jipdec Report

1983

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No. 52

NOTE: There are no official statistics available in Japan on personal computers. For this reason, the figures contained in the following articles vary according to the authors and their particular sources of data. JIPDEC has not attempted to standardize these figures for fear of giving

the reader the impression that they are indeed based on official statistics. Furthermore, it should be noted that the opinions expressed by the various contributors to the JIPDEC Report do not necessarily reflect those views held by JIPDEC.

Japan Information Processing Development Center (JIPDEC) was established in 1967 with the support of the Government and related industrial circles. JIPDEC is a non-profit organization aimed at the promotion, research and development of information processing and information processing industries in Japan.

The Jipdec Report has been prepared with the assistance of the Japan Keirin Association through its Machine Industry Promotion Funds. These funds are part of the profits that the association earns via the sponsoring of bicycle races.

Publisher Yoshihito Shimada
Editor Yuji Yamadori

Jipdec Report is published quarterly by Japan Information Processing Development Center, Kikai Shinko Kaikan Bldg., 5-8, Shibakoen 3-Chome, Minato-ku, Tokyo, 105, Japan. Annual subscription: ¥12,000 (Japan), US\$85 (Other Countries) Subscription order must be submitted to:

Fuji Corporation
Busicen Bldg., 5F, 5-29-7, Jingu-mac, Shibuya-ku, Tokyo
150, JAPAN
Phone: (03) 409-6291 Telex: 0242 5496 FUJICO J.

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Translated by John McWilliams
Printed by Seibunsha Co., Ltd.
Printed in Japan, January, 1983

Trends in Personal Computer Usage in Japan

Kenkichi Takahashi
ST Office

Sixty Times More Personal Computers Now Than 4 Years Ago

Shipment of personal computers in Japan during 1978 came to a little less than 10,000 units. By 1982, however, these shipments were estimated to have risen to 600,000 units¹. In other words, shipments of personal computers have grown 60 times what they were just 4 years ago. The question then is, what brought about such fantastic growth in so short a time?

There are two reasons for this phenomenon. The first is that personal computers differ from other computers in that they are extremely inexpensive. The second reason is the fact that anyone can operate a personal computer. From the aspect of cost, in particular, there are personal computer systems for hobby use that can currently be purchased for less than 50,000 yen, and other systems for use in business applications that go for less than 200,000 yen. These personal computer systems are definitely within the financial reach of the individual consumer. From the standpoint of operation as well, personal computers can be mastered by just about anyone without the

need for specialized knowledge. The appearance of simple programming languages and software packages has contributed significantly to the recent rapid spread of personal computer usage in Japan.

Whatever the case may be, however, it's a fact that personal computers have been enjoying a boom in Japan ever since they were first marketed here. Let's take a closer look now at some of the trends in personal computer usage that have been evident in Japan.

Trends in personal computer usage in Japan to date can be divided into three phases. Phase 1 saw the emergence of personal computers used as hobbies primarily by people enthusiastic about computer technology itself. This was followed by Phase 2, which ushered in the personal computer for business use, i.e. the small business computer. It was during this period that more practical applications became the norm. We are currently witnessing the transition to Phase 3 of personal computer utilization wherein both business and hobby applications are spreading and the personal computer is coming to be used by more and more people from all walks of life.

Phase 1 – Computer Buffs Start a Craze (1975 – 1978)

The “personal computer as a hobby” era, i.e. Phase 1, can be seen as beginning around 1975 and continuing through to about 1978. Starting around 1975 do-it-yourself one board microcomputer assembly kits began to gain popularity among hardcore computer enthusiasts. It was also about this time that stores specializing in one board microcomputers began to spring up in the electric appliance discount shopping areas of Tokyo and Osaka, Akihabara and Nipponbashi respectively.

The one board microcomputers popular then differed considerably from the personal computer games presently on sale at the toy counters of department stores. These one board microcomputers weren’t sold as finished products, but rather as kits which the user assembled himself. For the computer buff this assembly process was half the fun. Needless to say, most of those who purchased such kits were hardcore computer enthusiasts with a considerable knowledge of both computer hardware and software.

Probably the most representative of the assembly kit personal computers available in Japan is the “TK-80” manufactured by Nippon Electric Company (NEC). Development of these kits began in 1975 but they didn’t appear on the market until 1977. But once marketed they sold like hotcakes, being said to have achieved sales of 10,000 units the first year. This assembly kit personal computer craze lasted from 1977 to 1978, reach-

ing its peak at the end of the latter year. Following this came the appearance of more practical machines.

Phase 2 – Business Demands Create a PC Boom (1978 – 1981)

The Phase 2 period where personal computers were put to more practical, business applications can be seen as extending from around the end of 1978 to 1981. While Sord Computer Systems announced its “M-200” small business computer in 1977, this type of machine didn’t really begin to sell well in Japan until 1978. This was because it wasn’t until that year that various personal computers capable of both hobby and small business use began to appear on the market and attract the attention of large numbers of people.

The principal personal computers marketed during 1978 were the “TK-80 Combo BS” by NEC, the “MB-6880” by Hitachi and the “MZ-80K” by Sharp, among others. The major imported machines consisted of Commodore’s “PET 2001,” Apple’s “APPLE II” and Tandy Radio Shack’s “TRS-80.”

Thus, 1978 might be called the first year of the small business computer in Japan. This proved to be a trial period for Japanese manufacturers of small business computers since up to 90% of all such computers sold in Japan during 1978 were foreign made models. In other words, in this first year of practical, small business computers in Japan, domestic production of said was still in its infancy.

This can be attributed to the fact that,

with the exception of Sord's "M-200," practically all of the domestically produced personal computers sold in Japan until 1978 were simply improved versions of the hobby machines aimed at computer buffs. There were no real business-oriented personal computers being manufactured in Japan then. By contrast, the three major American brands imported at that time were all designed for business applications.

The following year, in 1979, however, Japanese manufacturers began in earnest to market personal computers designed for use in small business operations. Principal among these were Sharp's "MZ-80B," Logic Systems International's "IBEX 702," Hitachi's "BM-II," Ai Electronics Corp.'s "ABC-24" and NEC's "PC-8000." All of these models were aimed at both the small business and hobby markets and large numbers of those who purchased them did so for the purpose of utilizing these machines in their work. Just for the record, the total number of personal computer shipments during 1979 exceeded 40,000 units, of which more than 50% were "Made In Japan."

Upon entering the '80's and the onset of office automation (OA), personal computer utilization clearly moved in the direction of the company and small businessman. During 1980 and 1981, personal computers aimed solely at the business market appeared one right after the other. Oki Electric came out with its "if 800," Hitachi introduced its "BM-6890," Toshiba brought out the "BP-100," Canon marketed its "CX-1" and Fujitsu came out with its "FM-8" and "FACOM

9450" models.

Another Phase 2 'happening' that must be discussed here has to do with the development of truly simple programming languages. The appearance of a variety of programming languages that were easier to use than BASIC brought about a quantum leap in personal computer usage in Japan. In all, nearly 30 different such languages were announced during this period, principal among which were Sord's "PIPS," Otsuka Shokai's "PC-PAL," OBIC's "PLANNER 8" and Ai Electronics's "EASY-PRO." Thanks in good measure to these new, easier-to-use languages, the mainstream of personal computer usage during 1980 was clearly business oriented. Shipments of small business computers in 1980 reached 11,000 units, and more than doubled the following year to roughly 28,000 units valued at approximately 34 billion yen. A year-to-year growth rate such as this isn't something you see everyday.

Phase 3 — Personal Computers for Everyone?

The special feature of Phase 3 of personal computer usage in Japan is the increased utilization of these machines in more and diverse areas, from the company to the kindergarten. This trend has been picking up speed since early 1982 and is expected to continue at a rapid pace through 1985. It has been helped along by the recent appearance of ever increasing numbers of 16-bit personal computers, replacing the older 8-bit machines. Compared to the 8-bit personal

computers so common up to 1982, the new, 16-bit machines are considerably improved in terms of processing speed and storage capacity, and offer the same ease of operation that made the 8-bit models so popular.

The new, 16-bit machines also have the advantage of being able to be hooked up on-line to form personal computer networks or function as host machine terminals. Additional capabilities such as these are expected to contribute towards their increased utilization in the world of business. These new, high-performance business machines weren't the only thing 1982 had to offer, however. It was also a year when popularly priced personal computers for use in hobbies, education and even as home managers were released on the Japanese market.

These kinds of machines are currently finding their way into every nook and cranny of Japanese life. They no longer possess the science fictional image attached to earlier computers, and just like the copy machine and calculator before them are becoming more and more accepted as essential pieces of equipment in offices throughout Japan.

Major Makers/Models Stimulating PC Usage in Japan

The previous section summarized the three phases or periods corresponding to the spread of personal computers in Japan. In this section we shall take a closer look at the major manufacturers and models that contributed to this phenomenon by period. There are cur-

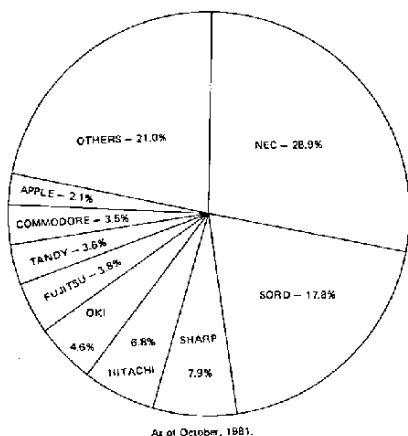
rently more than 130 different models of personal computers available in Japan and the number of companies engaged in the manufacture of these machines has risen to 40 in all.

NEC — "TK-80" & "PC-8000"

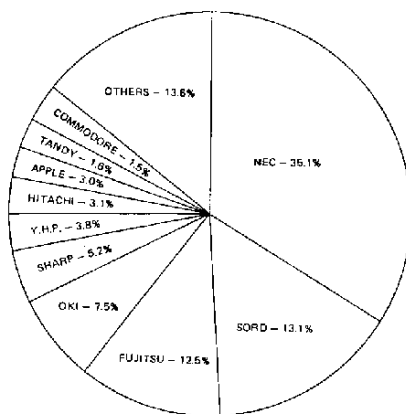
NEC has led the personal computer market in Japan from the days of the assembly kit one board microcomputers until today. According to the results of a study conducted by NIHON KEIZAI SHIMBUN in October, 1982, titled "Computer User Survey," NEC held a 35.1% share of the overall personal computer market at that time. This was up from the previous year's figure of 28.9%, further increasing NEC's lead over its nearest competition (See Figure 1).

Let's turn our attention now to a more detailed discussion of NEC's "TK-80" (Phase 1) and "PC-8000" (Phase 2), two of that companies leading products.

The early "TK-80" do-it-yourself computers and the "PC-8000" model are given special mention for their respective roles in establishing a decisive position for NEC in Japan's personal computer market. As stated previously, the "TK-80" was an assembly kit model marketed in 1977 and aimed primarily at the computer enthusiast. Its role in the propagation of personal computers was considerable. TK stood for "training kit" and 80 came from the fact that it used a Z80 microprocessor. The "TK-80" was originally manufactured to afford engineers a better understanding of computer hardware construction. However, once this kit went on the market, it met with



As of October, 1981.



As of October, 1982.

Figures obtained from Nihon Keizai Shimbun's "Computer User Survey," 1981/82.

Fig. 1. Major Manufacturers' Shares Of Japan's Personal Computer Market

unanticipated popularity, and paved the way for the personal computer age.

The "PC-8000" marketed in September, 1979, proved to be an extremely popular model that played a major role in establishing personal computers in Japan. It was popular even prior to going on the market, and within a few months of its being released demand was such that production could hardly keep up with incoming orders. Sales of the "PC-8000" have remained high to the present, with total cumulative shipments reaching 200,000 units as of December, 1982. The special feature of the "PC-8000" is the abundance of peripheral equipment available with it at the time of sale. This fact enables the user to freely select the most optimum system for his needs at the time of purchase, making for more efficient utilization right from the start. Furthermore, since its applications are complete, this machine can be utilized without the need for creating programs in BASIC. The "PC-8000" also possesses

word processing and graphic display functions.

NEC's current lineup of PC series computers includes the "PC-9800," "PC-6000" and "PC-2000." There is also the "N-5200 model 05" personal computer that has communication capabilities and can be used as a terminal.

Sord — "M200"

NEC is an integrated computer manufacturer. Sord, however, started out as a venture business similar to America's Apple Company and has made its name as a company specializing in the manufacture of personal computers. Founded in 1971, Sord has risen to the number two position in the personal computer market in Japan in just a little over 10 years². This company has made remarkable progress and continues to stay one step ahead of the industry. This fact becomes apparent when we look at Sord's achievements in the area of product development.

For example, Sord announced its first

Table 1. First Models Produced By The Major Manufacturers

Date Announced	Manufacturer/Dealer	Model	Date Announced	Manufacturer/Dealer	Model
May, 1977	SORD	M200	May, 1981	FUJITSU	FMB
April, 1978	APPLE COMPUTER	Apple II	August, 1981	SYSTEMS FORMULATE	BUBUGOMBO
April, 1978	COMMODORE, JAPAN	PET2001	October, 1981	NIHON UNIVAC	UP10E
August, 1978	TANDY RADIO SHACK	T125-80	December, 1981	NIPPON GAKKI	YIS10U
September, 1978	HITACHI	BM6580	March, 1982	FUJI XEROX	TALK530
May, 1979	NEC	PC-8000	April, 1982	MITSUBISHI ELECTRIC	MULT116
September, 1979	LOGIC SYSTEMS INTERNATIONAL	IBEX 7201	May, 1982	SONY	SMC-70
October, 1979	AI ELECTRONICS CORP.	ABC-24	May, 1982	CASIO COMPUTERS	FP5500
May, 1980	OKI ELECTRIC INDUSTRY	IF800	May, 1982	SANYO ELECTRIC	PHC20
December, 1980	TOSHIBA	BP-100			
March, 1981	CANON	CX-1			
March, 1981	PENTEL	PS850			

real personal business computer, the "M 200," in May, 1977 (Phase 2), and its simple programming language, "PIPS," in May, 1980. A brief chronological check shows that both these developments were announced at least a year before similar developments were apparent by other manufacturers. Sord was also the first to announce a portable small business computer (the Sord "M 20") as well as personal computers featuring liquid crystal displays.

This company's M series of personal computers now consists of some 20 different models, reflecting its versatility as a personal computer specialist. Sord's top model in the M series, the "M 343," can be said to be on a par with the mini-computers put out by other makers.

This leading Japanese personal computer manufacturer came out with yet another new model in October, 1982, the "M 5." This machine is aimed at the education and entertainment markets and is expected to prove a leader in these areas as Phase 3 of personal computer usage in Japan progresses.

Fujitsu — "F 9450"

Fujitsu, long the top shareholder in the field of general purpose computers, has also recently entered the personal computer market. This company was rather late getting started, not introducing its first personal computer, the "FM 8," until May, 1981. However, just a few months after that, in October of the same year, it came out with its second model, the "F 9450." A little better than a year later, in November, 1982, Fujitsu announced its "FM 7" and "FM 11" machines, bringing its lineup of personal computers to a total of four models.

The most noteworthy of these Fujitsu personal computers is probably the "F 9450" (Phase 3). This is a 16-bit machine which also features functions that enable it to communicate with a host computer. In the midst of the current move toward office automation, small business computers are going to be used more and more in the following three ways. The first is as section machines. By this we mean that a small business computer is assigned to each section of a company for

the exclusive use of the members of those sections. In other words, they are used as stand alone units. The second way they are being used in business is as host computer terminals. The small business computer as terminal functions as a kind of data exchange, exchanging information with the host to which it is connected. Thirdly, there is the method of connecting a number of small business computers together to form a network for the rapid exchange and distributed processing of information.

Of these three means of utilizing small business computers, the "F 9450" was designed primarily to meet the specifications of the terminal unit, but is quite capable of being used in either of the other two ways as well. Actually, according to the manufacturer, the thing that the "F 9450" has going for it that the "F 8," for example, doesn't, is the fact that it is most often purchased in groups of ten units each. This is because it is being utilized more as a terminal unit or network machine than as a stand alone section machine.

Then there is the "FM 11" which is also a 16-bit machine. However, this is basically a stand alone unit which was introduced as a subordinate model to the "F 7" and "F 8."

Oki Electric — "if 800"

Almost all manufacturers of personal computers boast an assortment of different models for a variety of uses starting with hobbies and moving on through business applications. Not so with Oki Electric, however. Oki had business ap-

plications in mind for its personal computers right from the start. Its "if 800" (Phase 2) model was first marketed in May, 1980. It wasn't until after this time that considerable progress was made in the development of a number of simple languages and applications. Nevertheless, sales of the "if 800" have been very good.

The special features of this "if 800" personal computer by Oki is that everything — CPU, display, storage device, printer — comes in one, integrated package. This "all-in-one" personal computer sells for a little more than one million yen and was designed for ease of use even in the smallest of offices. While primarily a small business computer, the "if 800" can also be utilized in numerically controlled systems and for scientific and technical calculations.

Sharp — "PC 3200S"

Sharp was well known as an electric home appliance manufacturer long before it decided to enter the personal computer field. It has been making good use of this background in electrical appliances to produce a variety of personal computers that answer almost every need. Sharp now has some 10 different personal computers available ranging from its "MZ-80K," "MZ-80B" and "MZ-80K2E" through to its "PC-3200S" and "PC-3100S" models.

The first personal computer announced by Sharp was the "MZ-80K" (Phase 2) in December, 1978. This machine, together with NEC's "TK-80BS," helped pave the way for the utilization of personal computers in business. However, the most

widely used Sharp personal computer has to be the "PC-3200S." This computer was slated for use in small business operations and comes available with a rich assortment of operator commands and statements. The "PC-3200S" also features a complete array of software packages.

Imported Models – "PET200", "APPLE II", "TRS-80"

We mustn't forget those machines imported from abroad such as the "PET200," "APPLE II" and "TRS-80." As stated above, these small business computers were first imported into Japan in 1978 and had a big influence on the development of the domestic small business computer industry. Although their share of the Japanese market is rather small now, these machines still receive high points from users who are knowledgeable about computer hardware. In fact, the "APPLE II" and "TRS-80" computers being imported today are the same models that were imported back in 1978.

This concludes our summary of the major machines and manufacturers that have most influenced the spread of personal computer usage in Japan to date.

How Personal Computers are Utilized

Simply put, in Japan personal computers are being utilized in all those fields where they are necessary. If we had to name one area in particular where personal computers are being the most widely used, we would have to say the field of

business. The following is an outline of each of the various applications to which personal computers have been put in Japan to date.

Early Computer Hobbyists

As described in the previous section, the first people to call attention to the personal computer in Japan were the computer buffs. These early computer hobbyists differed considerably from their counterparts today who enjoy 'playing' with computers rather than actually building them. The computer buffs of the mid-seventies really understood what personal computers were all about and made the construction of such machines their hobby. These hardcore enthusiasts form the minority of today's computer hobbyists.

Expanded Use in the Field of Science and Technology

Personal computers were recognized for their useability and actively applied in the field of science and technology long before they gained their current status. In other words, this is the first field in which personal computers were actually utilized as computers. This utilization most often took the form of setting up a personal computer system in one corner of the laboratory or incorporating these machines into other devices. The use of personal computers in the field of science and technology is little known, but will most likely continue in future as well. Actual applications consist of the control of machines and processes, analysis of data, monitoring

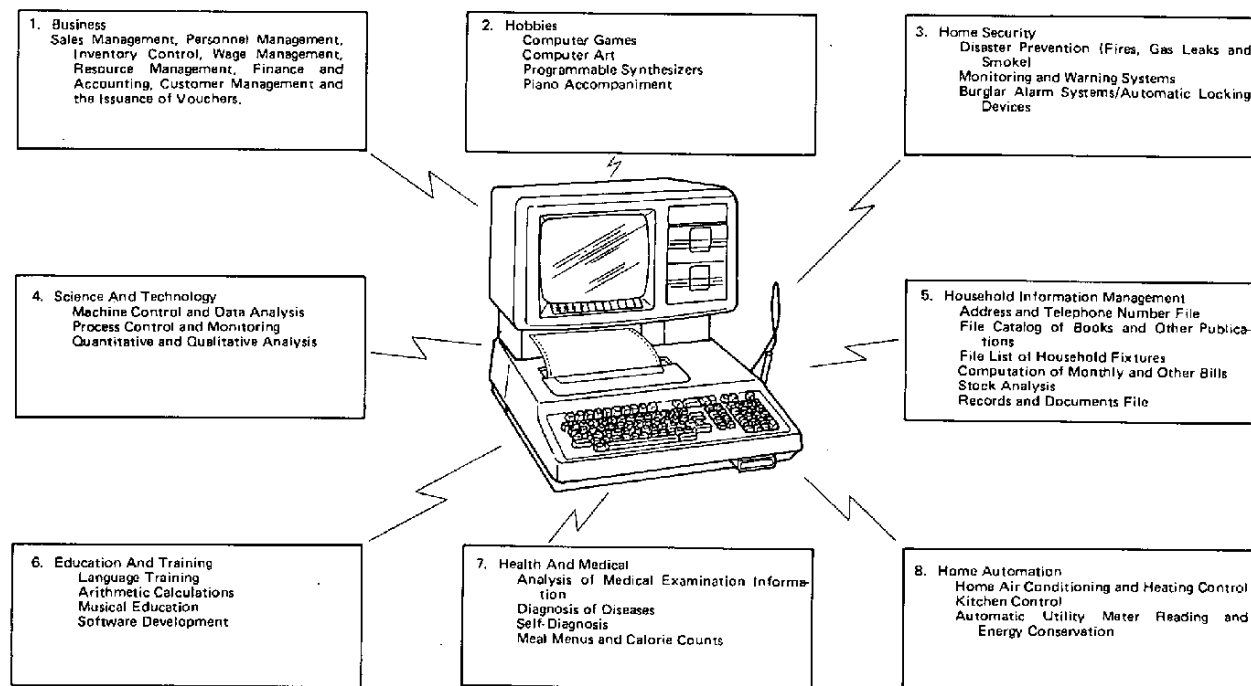


Fig. 2. How Personal Computers Are Being Utilized

functions, quantitative and qualitative analysis and the conduct of all kinds of experiments and tests.

The Business Field

It is estimated that more than half of all the personal computers installed in Japan today are being utilized in business. In addition, more than half of the 40 companies engaged in the manufacture of personal computers have the field of business as their principal market and are developing products that meet those needs. Whatmore, practically all of the simple programming languages and packaged software being developed for use on personal computers is aimed at the field of business. It's obvious from these facts, then, that personal computers in Japan find their widest application as small business computers. The principal jobs to which these small business computers are being applied include sales and personnel management, inventory control, payroll management, finance and accounting, customer management, the issuing of vouchers, control of stock purchases, product control, cost accounting, supply management, the recording of performance results, name card control, ABC analysis and scheduling, among others.

Recently, in addition to being used as stand alone machines, small business computers are being increasingly utilized to form networks and as host machine terminals. The latter forms of utilization are rapidly increasing in line with the appearance of more and more 16-bit machines. The utilization of small business computers in Japan will more than likely in-

crease even further from here on out as a result of this phenomenon.

Hobbies and Entertainment

The use of personal computers as and in hobbies, i.e., personal computer games and instrumental accompaniments, has become quite popular lately. The biggest factor contributing to the increased use of personal computers for entertainment purposes has been the appearance of extremely low priced machines. Since children are also interested in computer games, there is a strong possibility that personal computers for entertainment use will increase significantly in future. This area, therefore, deserves equal attention with that of business.

Personal computers are also being put to a number of other uses. These include such areas as education and training, household information management, and home security systems. Future utilization is expected to increase in all of these fields. In fact, it's quite likely that the scope of personal computer utilization in education and training and household information management will exceed that in business and entertainment before too long.

Trends in Personal Computer Technology

Personal computers are currently being used in a wide range of areas, from hobbies and entertainment to the control of machines and equipment. The performance capabilities of these machines themselves have also been improved considera-

bly in line with advances in technology. The rapid development and growth of personal computer usage in Japan is due in large part to their increased utilization in business. It's no wonder, then, that the number of business-oriented capabilities possessed by these machines has also been on the increase. Let's take a look here at the major performance capabilities of recent personal computers.

Standardization of KANJI Processors

A portion of those 8-bit machines that have been on the market for some time now as well as most of the recently developed 16-bit computers are equipped with KANJI (Sino-Japanese characters) processing functions. It is essential that small business computers in particular possess both KANA (Japanese phonetic symbols) and KANJI capabilities³. The displaying of customer and product names in KANJI on vouchers composed primarily of numerals cuts down on errors in the processing of these forms. What's more, there is a strong demand for the further standardization of personal computer KANJI processing capabilities so that these machines can be more widely used by people other than computer experts.

Word Processing Functions

The 16-bit computers are being equipped with both KANJI and word processing capabilities. This has been made possible by the fact that the processing speed and storage capacity of these machines are considerably improved over those of conventional 8-bit computers. It won't

be long now before integrated data and word processing functions become standard on personal computers. The integration of these two separate functions in personal computers is extremely attractive from the standpoint of business and will probably encourage the increased utilization of these machines in private enterprise.

Graphic Display Functions

The conversion of numeric data into graphs is an essential function of the personal computer in just about all of its applications. This capability was built into even the earliest small business computers and has been remarkably improved in the more recent models. It has become possible to display a number of different shapes such as circles, broken lines and bar graphs on a single screen, enabling several types of displays to be indicated in any one graph. Improved printer capabilities now means that these graphs can be printed out just as they exist in graphic form on the display screen, quickly and accurately. Certain machines even possess functions that enable the operator to instantly convert numeric data appearing on the screen into a graph by simply pressing a button.

Strengthened Software Functions

Two points in particular can be raised here. These are the perfection of simple programming languages and packaged software. As for simple programming languages, these now principally number around 40 in all. The majority of all personal computer users in Japan are pre-

Table 2. Principal 16-Bit Personal Computers Manufactured to Date

Model	Manufacturer	Market Date
N5200/05	NEC	July, 1981
F9450	FUJITSU	October, 1981
MULTI16	MITSUBISHI ELECTRIC	December, 1981
AI-M16	AI ELECTRONICS CORP	May, 1982
MB16000	HITACHI	May, 1982
MBC4000/5000	TOKYO SANYO ELECTRIC	May, 1982
M20	NIHON OLIVETTI	May, 1982
JB-3000	MATSUSHITA ELECTRIC	May, 1982
M343	SORD	September, 1982
UP10E	NIHON UNIVAC	September, 1982
AS-100	CANON	October, 1982
Pasopia 16	TOSHIBA	October, 1982
IBEX9000	LOGIC SYSTEMS INTERNATIONAL	October, 1982
PC-9800	NEC	October, 1982
FM-11	FUJITSU	November, 1982

sently utilizing one or another of these simple programming languages in some form. When it comes to software packages, there are currently more than 2,500 of these available for business applications alone. Software packages for use in games are so numerous that their exact numbers cannot even be determined. As with the simple programming languages, the majority of personal computer users today have experienced using one or another of these software packages.

You might be asking yourself just why it is that these simple programming languages and software packages are being produced and utilized in such large numbers. Well, the answer to this is the fact that putting together programs in BASIC is simply too difficult for most users of personal computers. Thus, it's quite likely that even more simple languages and

software packages will be developed in future as well.

The Move Toward 16-Bit Machines

We are now entering the age of the 16-bit personal computer. Actually, the majority of users are now operating 8-bit machines, but as the number of small business computers continues to grow, so will the number of 16-bit machines. This is because the limitations of 8-bit computers from the aspects of processing speed and storage capacity will become more and more evident as personal computer usage grows more advanced.

The biggest advantages of the 16-bit machines is that their main storage capacity alone is 4~5 times that of 8-bit machines and they are capable of processing data at roughly 6 times the speed of conventional 8-bit models. This means that

in addition to being able to be equipped with both KANJI and graphic display functions, these 16-bit computers also possess strengthened communication capabilities. Functions such as these are indispensable from the standpoint of business applications, and even though they only reflect improvements in computer hardware, will probably bring about a change from 8- to 16-bit small business computers.

Another key point that must be brought out here is the fact that the movement to standardize software has grown stronger as the number of 16-bit machines on the market has increased. The reason for this is that 16-bit computers possess enough storage capacity to be equipped with complete operating systems, something 8-bit machines lack. This in turn has led to the marketing of special operating systems for these bigger machines. The best known operating systems for 16-bit computers currently available on the market are the "MS.DOS" system put out by America's Microsoft company and the "CP/M-86" system produced by America's Digital Research company. Just about all 16-bit machines produced in Japan utilize one or the other of these two operating systems. This can be seen as a de facto move towards the standardization of basic computer software. If standardized basic software becomes a reality, then we can look forward to the development of applications to go along with it.

Diversification of Peripheral Devices

Peripheral devices have been playing a

major role in the increased utilization of personal computers in Japan. In future even more than now it will become increasingly important that processed data and texts be capable of being expressed easily and in a variety of forms by the non-specialist user. In line with this, some truly amazing printers and plotters have been developed for use with personal computers. Particularly noteworthy among these are those plotters capable of creating color graphs and pictures easily and quickly. These plotters are finding uses not only in the world of business, where of course they are quite useful, but also in such applications as child education.

The preceding has been a look at some of the major improvements made to personal computers recently from the standpoint of performance capabilities. These improvements have, of course, also contributed towards the spread of personal computer utilization in Japan.

Problems that Need Solving in Future

Finally, we'd like to point out some of the main problems that currently exist with personal computers. The first of these has to do with compatibility. The problem of incompatibility has become especially evident with the recent trend towards creating personal computer networks. More specifically, printers and disc drives put out by company A, for example, can't be connected to computers made by company B. Nor can the CPUs of different makes of personal com-

puters be hooked up to operate on-line, and of course the exchange of information between these different machines is impossible. Making computers produced by different manufacturers compatible with one another is technologically feasible and large numbers of users are demanding that this type of compatibility be made a reality. However, this compatibility problems has yet to be effectively addressed let alone solved.

The second major problem that exists with personal computers concerns the applicability of software packages. Software packages designed for use with personal computers currently number some 2,500 in the field of business alone. Of these, the ones most often used are pay roll packages and the like. Similar such packages are, therefore, rather numerous. In spite of this, however, software packages suitable to the application for which

they were designed are extremely rare. Thus, it is often the case that a user will purchase a package that most closely resembles the application he needs and then attempt to modify that package to meet his exact requirements. This process requires considerable effort, however, and since such modifications are difficult, it's not uncommon to find users who adjust their business to meet the software.

Some other major problems have to do with the nonstandardized nature of BASIC and the difficulties this poses in program preparation, incomplete service and maintenance systems and the demand for more 'programless' and Japanese language programs. This indicates that the number of problems that need solving as far as personal computer utilization in Japan is concerned remain quite numerous indeed.

Footnotes

1. These figures were obtained from the Japan Electronic Industry Development Association (JEIDA).
2. This information was obtained from the results of NIHON KEIZAI SHIMBUN's "Computer User Survey,"

1981/82.

3. The Japanese writing system consists of a complex combination of these KANJI, i.e. Japanized Chinese characters, and KANA. The latter is sometimes referred to colloquially as the Japanese 'alphabet.'

Distribution of Personal Computer Hardware /Software in Japan

Toshiaki Hidaka
Business Computer News

Hardware Distribution

There are currently about 40 major computer hardware manufacturers in Japan who supply personal computers to users via a system of some 1,200 personal computer shops. Included among these 40 major makers are roughly 5~6 foreign manufacturers headed by Commodore, Apple and Tandy. The popularity of foreign-made personal computers has diminished recently, however, and the number of personal computer shops that don't handle imported machines has increased.

Although we count some 40 companies among the leading manufacturers of personal computers in Japan, Nippon Electric Company's (NEC) share of the market is overwhelming, amounting to nearly 45% overall. For this reason, then, when we talk of the distribution system for personal computers in Japan, we are referring primarily to the operations of NEC. This company's PC series of personal computers consists of five types of machines ranging from inexpensive 8-bit machines aimed at the hobby and entertainment markets to higher priced, higher performance 16-bit small business computers. Of the computers that make up this series, the "PC-2000," "PC-6000"

and "PC-8000" are the low priced models and are marketed by an affiliate of NEC called NEW NEC, while the top models, the "PC-8800" and "PC-9800," are distributed directly by NEC itself. In other words, NEC's distribution system consists primarily of two different routes, its own and the home appliance route of its affiliate NEW NEC.

In addition to four Bit-INN wholesale houses, each with approximately 10 wholesale dealers under them, NEC's direct distribution route includes another 200 some personal computer shops nationwide which sell directly to the user. NEW NEC's distribution route is made up of 15 subsidiaries which provide NEC

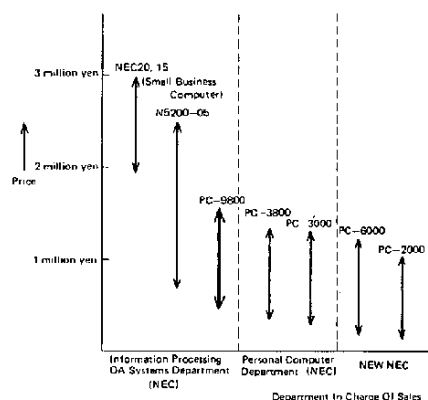


Fig. 1. Price Range of NEC Personal Computers

products to personal computer shops other than those included in NEC's direct route. Rounding out this system is yet a third distribution route that exists in between the two described above. This third route consists of a number of stores that sell NEC office automation machines and equipment under a special agreement with that company. Generally speaking, however, the basic distribution route for personal computers in Japan flows from the manufacturer to the wholesaler then down to the personal computer retail shops.

Out of the 1,200 odd personal computer shops located throughout Japan, approximately 30% fall into the category of specialty dealers, while the remaining 70% are direct company sales outlets. Typical among these shops are stores which originally specialized in ham radios and electric home appliances. Their reasons for starting to handle personal computers as well can be summed up as follows:

1. Ham radio operators were numerous among the early users of personal computers;
2. The market for ham radios and home electrical appliances entered a slow growth period giving rise to the need for product diversification;
3. These store could provide the minimum necessary sales space; and
4. The kinds of products already being handled and the types of customers who patronized these shops were similar in nature to personal computers and the people interested in them, respectively.

Personal computers come in a variety of shapes and sizes and are capable of answering the needs of an assortment of different types of people, from the dyed-in-the-wool computer enthusiast to the businessman and even the housewife. Is it any wonder, then, that the number of businesses dealing in personal computers has increased so rapidly over the past few years. Headed by the ham radio shops and electrical appliance stores, these newcomers to the field of personal computer sales include software houses, department stores, supermarkets, office equipment stores, car dealers, furniture stores, all sorts of schools and bookstores and even those who gave up salaried positions to go into the personal computer business for themselves. In other words, the number of newcomers to the field of personal computers has been and is increasing at a fantastic rate. During 1982 alone newly opened personal computer shops in Japan numbered no less than 300. This means that a new personal computer shop is opening practically everyday in some city or town in Japan.

Software Distribution

Personal computers were originally called "microcomputers" and were primarily aimed at that small population of individuals interested in electronics. During the past 2~3 years, however, all that has changed. These machines are now called personal computers for the most part and their utilization has rapidly spread into practically every nook and cranny of Japanese society. This fact has contributed significantly towards the

increased sale of personal computer software as well.

Japanese manufacturers of personal computers normally only offer language support for their machines. They rely on the importation of operating system and on outside software houses for their product application software (There are, however, certain manufacturers, such as Sord Computer Systems, who have developed their own simple programming languages which enable their computers to be operated using only command statements.).

Those enterprises in Japan which produce software include office computer (small business computer) companies, software houses specializing in personal computer software, personal computer shops and users of mainframe computers, among others.

The software developed and sold by these various producers is distributed primarily in one of two ways. The first of these is by means of software distributors such as the Nihon Software Bank, and the second is directly from the manufacturer to the personal computer shops. On a percentage basis, the former, i.e. the wholesale distributors, are estimated to handle between 70 and 80% of the software trade in Japan.

Standard software currently on the market in Japan consists of everything from cassette tapes for use in hobbies and entertainment that sell for about 3,000 yen each, to that stored on 5-inch floppy disks for business use which costs around 50,000 yen per disk.

Software designed especially for use in

personal computers is determined by the types of hardware available. Thus, software being developed and sold for use in NEC personal computers, which occupy about 45% of the total personal computer market in Japan, account for nearly 60% of all such software produced. As of the end of 1982 there were some 4,600 different software packages on the market. Of these, about 1,400 or roughly 30% of the total were packages designed for use in NEC's popular "PC-8000" model. If we include the number of software packages specifically designed for use in NEC's "PC-8800" and "PC-9800" models as well, this ratio climbs to 60% of the total number of packages available.

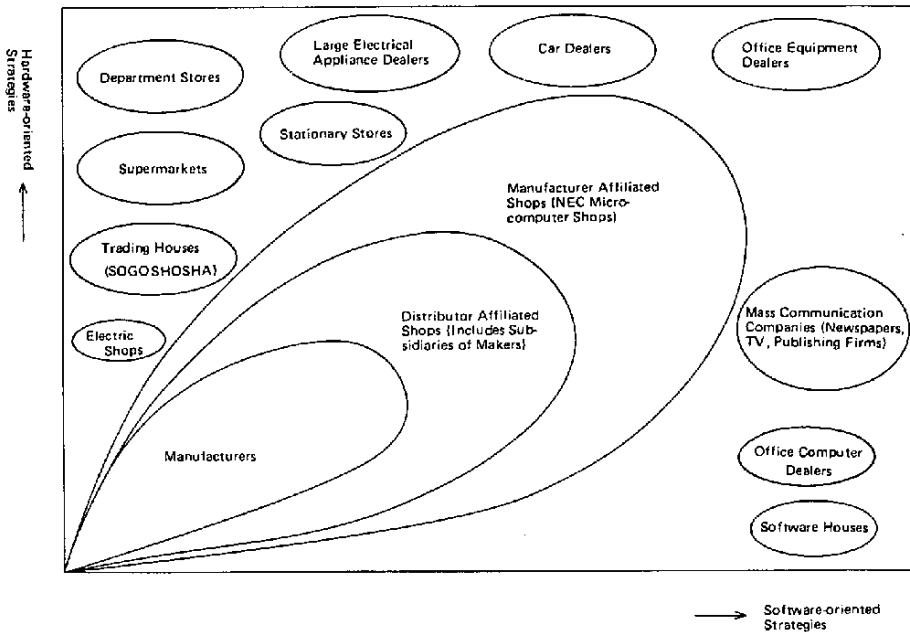
Trends in Hardware Distribution

Sales Strategies and Market Shares of Major Producers

The market shares of the three leading Japanese personal computer manufacturers as of the end of 1982 can be estimated at roughly 45% for NEC, 20% for Sharp and 15% for Fujitsu. This means that of the 40 some major manufacturers of personal computers in Japan, the top three occupy roughly 80% of the overall market (These figures are based on the number of units shipped. However, if we calculate market share by value, then we see that NEC and Sord are battling it out for top position.).

The life cycle of the personal computer as a product is rather short, meaning that the respective market shares of the manufacturers fluctuate dizzily from month to month. The figures given here-

Fig. 2. Manufacturers' Sales Strategies



in, therefore, reflect the average yearly shares of the top three makers. As for the market shares of those companies other than the top three, it's always a close race. Their respective average yearly shares don't differ all that much, however.

This violent fluctuation of market shares among the major producers can be attributed primarily to the fact that people rush to buy the newest products on the market as soon as they are announced, and often even before they are announced. Since innovations in technology and the resultant development of new machines is so rapid nowadays, users change to new models with considerable frequency. It is due to this phenomenon that the personal computer shops tend to handle more than one makers machines as a hedge

against sudden losses. But this doesn't change the fact that the manufacturers respective market shares continue to fluctuate with each new development.

In spite of this, however, NEC manages to retain its number one position in this market, followed by Sharp and Fujitsu, in that order. This would tend to indicate that its not all the doing of improved product performance, but that at least part of the secret lies in these companies' various distribution systems.

NEC

In 1976, NEC succeeded in cornering the early market for personal computers with the introduction of its "TK-80" one board microcomputer assembly kit. This proved to be the first step in that company's acquiring of its current large share

of the Japanese personal computer market.

The second major factor which contributed toward putting NEC in the number one position was that company's rapid capitalizing on the success of the "TK-80" to build up a solid distribution system. This effort consisted of expanding the number of NEC microcomputer shops. The first of these shops appeared in Hiroshima, Fukuoka and Sapporo, in that order, in 1978. The special characteristic of these early NEC microcomputer shops was the fact that they were all well known local ham radio and electronic equipment shops.

In the four odd years that followed the opening of these initial personal computer shops, the total number of NEC microcomputer shops nationwide has risen to nearly 200 in all. After passing the 50 mark, however, the company made the conditions for establishing such shops extremely more rigid than they were in the beginning. For example, in order to become an NEC microcomputer shop the dealer had to have at least 60 square meters of space available for the display and sale of its machines, had to display at least 10 NEC computers at all times, had to provide a personal computer classroom and had to ensure that the ratio of NEC machines sold accounted for no less than 80% of its total personal computer sales.

Another condition that has come about is that the display layouts in all NEC microcomputer shops have to more or less be the same. This is considered to be a move on the part of NEC to create

the image of a standard NEC personal computer specialty shop.

The enterprises most actively opening new NEC microcomputer shops at present consist primarily of those major electronic equipment trading firms which are authorized by the Nippon Telegraph and Telephone Public Corporation (NTT) to install telephones nationwide and which already have transactions with NEC. These firms are opening personal computer shops within the business offices they already have established in various regions of Japan. All the costs involved in making these shops into NEC microcomputer shops are borne by these firms themselves. The advantages of being able to call their personal computer shop an "NEC Microcomputer Shop" derive from the image it then commands as a specialty store of the manufacturer that boasts 45% of the entire personal computer market. NEC microcomputer shops are also favored from the standpoint of supply as well. That is, NEC treats its microcomputer shops better than it does other personal computer shops that carry its machines, giving them preference when stocks run low, delivering new models to them ahead of the others and providing them with better sales margins than their other outlets.

Sharp

The second leading shareholder in Japan's personal computer market is Sharp. Sharp has subsidiaries and affiliates in each of the 11 major regions of Japan. These enterprises serve as wholesale outlets for Sharp personal computer

products and their operations are on a par with those wholesalers which make up the NEC distribution system. Each of these Sharp distributors has between 6 and 26 service stations and or service branches under it, for a total of 168 in all.

The distribution of Sharp personal computers along this route flows from the manufacturer (Sharp) to its various wholesalers and on to their respective service stations or branches which then supply them to the personal computer shops where they are sold to the user. Although Sharp doesn't have any personal computer shops that can compare with the specialty shops that bear the name "NEC Microcomputer Shop," it does have a nationwide system of "Friend Shops" serving as sales outlets for Sharp electrical home appliances which come pretty close. There are roughly 6,000 of these Sharp Friend Shops located throughout Japan. However, the ability of these Friend Shops to compete effectively in the area of personal computer sales isn't all that hot.

One important aspect of Sharp's personal computer sales strategy that should be pointed out here is its personal computer classrooms in 10 different locations nationwide. While these personal computer classrooms are not directly involved in sales promotion activities, they are located inside various influential enterprises and organizations such as national, local and technical newspaper offices, television stations, special computer schools and a variety of other educational institutions. From the standpoint of

public relations this approach is fairly effective. The total number of such Sharp personal computer classrooms in Japan is 53.

FUJITSU

Compared to those of NEC and Sharp, Fujitsu's network of dealers is rather weak. However, the Fujitsu "FM-7" released in November, 1982, is proving to be quite a popular model, and if this company keeps on like its going, it could well beat out Sharp for second place in the personal computer market during 1983.

Fujitsu's FM series of computers are being distributed to personal computer shops nationwide by a total of 9 wholesale houses. These consist of three affiliated firms, Fujitsu Facom FIP, Fujitsu Kogyo and Uchida Yoko, plus six independent companies, including Asta International, Kanto Denshi Kiki Hanbai, Daiko Denshi Tsushin, Tsuzuki Densan, Nissei Denki Seisakusho and one other company. However, although it operates a number of personal computer classrooms in 30 different locations throughout Japan, Uchida Yoko actually contributes very little towards the sale of FM series machines. Thus, for all practical purposes, the total number of Fujitsu distributors comes to only 8 in all.

The most noteworthy of these 8 wholesale outlets is Asta International. This firm's franchise operations consist of some 24 dealers nationwide who go by the name of Cosmos. Cosmos chainstores are located in Japanese cities such as Hakodate in the extreme north, Sendai,

Koriyama, Niigata, Maebashi, Akihabara, Shizuoka, Fuji (Shizuoka Prefecture), Nagoya, Osaka, Kobe, Himeji, Akashi, Okayama, Matsue, Hiroshima, Tokushima, Kochi, Takamatsu, Matsuyama, Fukuoka, Oita, Nagasaki and Kagoshima in southern Kyushu. These Cosmos stores are on a par with the NEC micro-computer shops in that they are capable of providing both hardware and software support. However, unlike the NEC microcomputer shops, Cosmos stores aren't strongly affiliated with one maker and handle a number of personal computers from manufacturers other than Fujitsu.

Fujitsu has a number of direct sales outlets located in Osaka, Nagoya and the Toranomon and Akihabara districts of Tokyo. These stores are called "Micro-computer Skylab," and are capable of providing users with technical advice and software support as well as dealer assistance. The 'Skylab' to watch, however, is the roughly 80 square meter shop opened in Tokyo's Akihabara in December, 1982. Akihabara is the personal computer "Mecca" of Japan, and as such boasts dozens of personal computer shops all huddled together in one relatively small, well-defined area. It is also the main base for NEC's Bit-INN wholesale distributors. The recent addition of Fujitsu's 'Skylab' here is almost certain to intensify the trade war already being fought out everyday in this shopper's paradise.

The distribution mechanisms or sales strategies of the top three manufacturers are representative of Japanese

personal computer makers in general. The following is an attempt to highlight some of the main features of these distribution mechanisms as they exist throughout the industry.

First of all, the strengths and weaknesses of the products themselves quite naturally carry considerable weight from the aspect of sales strategy. NEC's "PC-8000" series has enjoyed strong popularity since its release in 1979, a fact that has contributed considerably to that company's current share of the market. If it hadn't been for this particular model, NEC most likely would not hold the position it now does in the personal computer industry.

The second major distribution mechanism is pricing. This must be done taking both the average user's ability to pay as well as the wholesalers' and retailers' profit margins into consideration. If the manufacturer attempts to raise the profit margins of its distribution agents, the price of its personal computers will exceed that of other companies, leading to reduced competitive power. Should the maker lean toward the user and attempt to price its products lower, however, it will suppress its agents' earnings and most certainly invite their ire. The dealers of personal computers are quick to admit that computer hardware is a small profits and quick returns product, but nevertheless, the pricing mechanism is designed to satisfy both the users and the distributors.

By way of example, the standard sales price of personal computers in NEC's "PC-8000" series is 168,000 yen,

and for those in the 16-bit "PC-9800" series, 298,000 yen. In general, wholesalers lay in stocks of these machines at between 68 - 70% of the standard sales price, and retailers purchase them from the wholesalers at between 72 - 74% of that price. Certain manufactures require that retail outlets purchase their machines at as high as 80% of the standard sales price. This can differ according to the computer model as well.

The third distribution mechanism has to do with the establishment of distribution networks themselves. Companies from a variety of fields are currently involved in the sale of personal computers. However, in the midst of the current computer hobby boom, the distribution channel comprised primarily of ham radio and electronic equipment dealers built up by NEC is far superior to the rest. In order for those manufacturers who entered the personal computer market late to increase their shares of that market, they are forced to offer more support for their machines than those companies who have been in the game longer and already have a strong distribution system set up, such as NEC. Should they attempt to open additional shops instead, there would always be doubts as to those shops' sales and technical capabilities.

In order to avoid this situation, domestic manufacturers are making good use of existing household appliances, audio and OA equipment stores and dealers to distribute their personal computers. Foreign manufacturers such as IBM Japan and Nihon Univac, however, have

launched upon a campaign to increase their sales in Japan by entering into direct sales contracts with existing users such as major corporations, computing centers and software houses.

Personal Computer Shops and Their Sales Strategies

There is believed to be roughly 1,200 personal computer shops currently in existence in Japan. These represent a variety of different businesses. For example, starting with the ham radio and home electrical appliance stores, there are a whole assortment of different types of enterprises engaged in the running of personal computer shops. These include department stores, supermarkets, computing centers, software houses, electronic equipment stores, manufacturers of measurement equipment, members of the mass communication industry (newspapers, TV broadcasting stations and publishing houses), trading firms (general trading firms, oil and gas companies), office equipment stores, telephone installation companies, educational institutions (special computer schools as well as a variety of other institutions of learning), small business computer dealers, bookstores, and those individuals that gave up salaried positions to go into the personal computer business on their own. And the list continues to grow.

Among these 1,200 some personal computer shops are small scale shops that do between 1 and 2 million yen worth of business per month, as well as large scale shops whose monthly turnover exceeds 100 million yen. Thus, the size

of these shops also varies considerably, ranging from those with as little as 4 square meters of space available for the combined sale of personal computers, ham radios and electrical appliances, to those massive shops with more than 3,000 square meters set aside for the display of computer hardware, software and related literature, personal computer classrooms and business offices. On the average, however, these personal computer shops are about 60 square meters in size, have a staff of between 4 ~ 5 people and do a monthly business of between 8 ~ 10 million yen.

A key point to be aware of in this situation is the fact that certain enterprises are running as many as 10 or even 20 such shops at one time. Certain of Japan's electrical appliance stores which deal in large volumes, some of the major electronic equipment sales outlets, department stores and supermarkets are among those that fall into this category. In brief, then, it isn't a case of one enterprise, one shop.

Let's take a look here at just how these 1,200 personal computer shops are distributed throughout Japan, as well as at the special market conditions that exist in each of those regions and how these effect the overall personal computer market and distribution system.

There are any number of ways of considering regional distribution patterns, but for our purposes here we have divided Japan into 11 major regions starting in the north with Hokkaido and working south through Tohoku, Kanto, Tokyo, Tokai, Hokuiku, Kinki, Osaka, Chugoku,

Shikoku and on down to Kyushu. The reason for including Tokyo and Osaks in this regional breakdown of Japan is due to the size of their respective markets.

Let's start with the Hokkaido region in the extreme north. The center of the personal computer market in Hokkaido is located in that islands major city, Sapporo. Most of the personal computer shops in Hokkaido are concentrated in this one city and they account for 7.5% of the total number of shops nationwide. There are three NEC microcomputer shops and one major Sharp wholesale agent located here. The future of this market looks hopeful.

The Tohoku region consists of six prefectures located in northeastern Honshu. These are Aomori, Akita, Yamagata, Iwate, Miyagi and Fukushima prefectures. There are an average of around ten shops per prefecture, with the highest concentration of said being in the city of Sendai, Miyagi Prefecture, where some 30 personal computer shops are gathered. The special feature of the Sendai market is the number of small and medium sized manufacturers of control devices and machinery as well as universities and colleges located there. The Tohoku region accounts for 9.2% of the total number of personal computer shops in Japan.

Next we have the Kanto region. Although Tokyo falls within this region geographically, we have chosen to deal with it as a separate market due to its size. For our purposes then we will consider the Kanto region to be made up of the nine prefectures surrounding

Tokyo, i.e. Niigata, Nagano, Yamanashi, Tochigi, Gumma, Saitama, Ibaragi, Chiba and Kanagawa prefectures. By so doing we find that the largest number of personal computer shops are located in Kanagawa prefecture. Even so, bordering Tokyo draws a larger percentage of users with its bigger market, and Kanagawa remains better known for its factory districts and bedtowns. Thus, Kanagawa Prefecture's personal computer market is still rather small by comparison. This tendency is even stronger in the other two prefectures that border Tokyo, Saitama and Chiba prefectures. The percentage of personal computer shops operating in the Kanto region amounts to 12.5% of the total.

Tokyo is the biggest market for personal computers in Japan, and the electrical appliance discount shopping area of Akihabara accounts for the majority of that business. Shops as small as 20 square meters are numerous, but nevertheless Tokyo's personal computer shops possess enough supplying power to keep even users from the surrounding prefectures satisfied. In one section of Akihabara there exist more than 60 personal computer shops within an area with a radius of about 100 meters. The recent trend, however, seems to be toward the augmenting of distribution points by opening new shops in the Ginza, Shibuya, Shinjuku and Ikebukuro areas of Tokyo as well. This phenomenon is proceeding apace with the increased demand for these machines. Although the headquarters of the department stores, supermarkets, high volume electrical appliance

stores and electronic equipment trading companies, etc., who run the majority of these personal computer shops are located in Tokyo proper, they are adding new shops called "key stations" to their lineups and locating these in the districts surrounding Tokyo, especially in those prefectures of the Kanto region. The percentage of personal computer shops located in the Tokyo market amounts to a big 25.0%.

The Tokai region centering around the city of Nagoya has 6.7% of the total number of personal computer shops nationwide. There is a building in the heart of Nagoya that was constructed by the leading personal computer dealers in Akihabara, Tokyo. There are three personal computer shops inside this building and several more in the area surrounding it.

On the side of Honshu facing Korea and mainland China is the Hokuriku region with 3.3% of Japan's personal computer shops. The Hokuriku market, together with that of the Kinki region wherein the ancient city of Kyoto is located, are expected to grow in future. The Kinki region currently has 6.1% of the personal computer shops in Japan.

The percentage of personal computer shops located in the Osaka region comes to exactly half that of Tokyo, or 12.5%. Most of the business-oriented shops can be found in the Umeda district near the national railroad station, while those shops concerned primarily with the hobby market are concentrated in the Nipponbashi district. The Umeda district is noted for its high number of

newly opened and/or refurbished shops. There are also a number of shops from Osaka which have opened branches in Tokyo as well.

The first NEC microcomputer shop to be opened in Japan was established in the city of Hiroshima in the center of the Chugoku region. The total number of shops in this region has just recently begun to increase, however. The Shikoku region of Japan, which comprises the entire island of Shikoku located off the southeast coast of Honshu, has less shops than the Chugoku region but is seen as growing in future. The respective percentage of personal computer shops operating in these two regions is 5.8% for the Chugoku region and 3.3% for the Shikoku region.

The Kyushu region, i.e. Kyushu island, is known as the "IC Island" and is that region where the plants of Japan's semiconductor manufacturers are gathered. This region is steadily growing as a market for personal computers, especially in Fukuoka Prefecture. If we include the number of shops located in Okinawa, the percentage of nationwide personal computer shops in the Kyushu region comes to 7.5%.

The preceding was an attempt to summarize the nationwide distribution of

Japan's 1,200 personal computer shops. Next, let's consider some of the sales strategies being employed by these various shops.

The top ten personal computer shops in Japan in terms of sales are headed by a shop which is run by an affiliate of a radio equipment trading firm. The other nine shops are located in and/or managed by a ham radio store, a high volume electrical home appliance store, a personal computer specialty shop, two facilities management firms, two more shops specializing in personal computers, an assembly manufacturer and another ham radio store, in that order (See the Table showing the top ranked 120 personal computer shops in Japan).

If we continue down the list to include the top 20 shops, we see that the lineup of different businesses represented by these shops doesn't change. It isn't until we go down ten more slots to include the top 30 personal computer shops that we find those run by computing centers and supermarkets. By making note of the type of businesses these leading personal computer shops are being run by, it is possible to determine pretty much what kind of background and strategies these shops have.

The 120 Top Ranked Personal Computer Shops in Japan

(Monthly shop sales range from a high of 150 million to a low of 4 million yen.)

Points to keep in mind when reviewing this ranking list:

1. The shops listed herein are limited to those which Computer News contacted directly;
2. Only a representative sampling of those shops run by firms currently in the process of augmenting their operations are covered here, and even where all the shops of a particular firm were contacted, the data is often incomplete;
3. Monthly average sales were calculated based on data compiled during the most recent 6~12 month period; and
4. Due to the fact that the shops listed herein were contacted several months apart in some cases, and that personal computer sales can fluctuate considerably in the span a few months, it was decided best not to include specific sales figures.

1. KOMU (Chiyoda-ku, Tokyo) — Largest shop in Akihabara, with approx. 135m² of floor space. Sales include those for the entire group.

2. TSUKUMO DENKI Store 7 (Chiyoda-ku, Tokyo) — Noted for its 10 lovely "Personal Computer Ladies" who serve as sales clerks and demonstrators.

3. J&P (Naniwa-ku, Osaka) — Top volume dealer in the Kansai area. Opened by JOSHIN DENKI in October, 1981.

4. COMPUTER 11, TOKYO BRANCH (Takadanobaba, Tokyo) — Noted for its best selling "MULTI 16."

5. CSK SHINJUKU WEST (Shinjuku, Tokyo) — The best lineup of software in Tokyo.

6. MICROCOMPUTER SHOP CSK (Kita-ku, Osaka) — Located near the national railroad station, this shop has considerable drawing power.

7. SYSTEM INN, SAPPORO (Sapporo,

Hokkaido) — Biggest personal computer dealer in Hokkaido, noted for its supply of software.

8. SHINJUKU MICROCOMPUTER INSTITUTE (Shinjuku, Tokyo) — This shop's strong technical capabilities enabled it to develop its own local network system.

9. COSMOS AKIHABARA (Chiyoda-ku, Tokyo) — The first personal computer shop in Japan opened in 1976.

10. TOA ELECTRONICS SHACK (Naniwa-ku, Osaka) — Opened in November, 1979, this is a big technically-oriented shop.

11. BEST MICROCOMPUTER SERVICE (Fukuoka, Kyushu) — Has a yearly turnover of around 77 billion yen. Operated by BEST DENKI.

12. TSUKUMO DENKI, NAGOYA (Nagoya) — Roughly 165m² of floor space and increasing sales to individual

user.

13. **COMPUTER 11, YOKOHAMA** (Yokohama) — Just opened in July, 1982, but business is already in the black.

14. **RAM** (Chiyoda-ku, Tokyo) — Well-noted software distributor and one of the oldest shops in **RADIO HALL**.

15. **MICROCOMPUTER CENTER 60** (Toshima-ku, Tokyo) — Both mail-order and over-the-counter sales at bargain prices.

16. **TSUKUMO DENKI Store 5** (Chiyoda-ku, Tokyo) — A solid reputation built up as a long-time ham radio shop.

17. **OSAKAYA** (Sapporo) — The oldest personal computer shop in the region. Sales breakdown to roughly 80% over-the-counter and 20% "door-to-door," i.e. direct visits to prospective buyers.

18. **DAIICHI SANGYO HONTEN** (Hiroshima) — Volume dealer in electrical home appliances, with the biggest shop and best sales record in Hiroshima.

19. **SYSTEM SOFTWARE, FUKUOKA** (Fukuoka, Kyushu) — Founded as a software house in October, 1979, it opened a personal computer shop in September, 1981.

20. **SYSTEM INN KODENSHA** (Kita-ku, Osaka) — Increasing its sales of software developed in-house.

21. **WORLD ZEA** (Shinjuku, Tokyo) — This is a fashionable shop popular with the younger generation of users.

22. **NIHON MICROCOMPUTER INSTITUTE** (Kita-ku, Osaka) — Operated by **NIHON MICROCOMPUTER** and featuring a strong lineup of software.

23. **SATO MUSEN** (Chiyoda-ku, Tokyo) — Representative of the electrical home

appliance stores in Akihabara. Prices comparable with those of volume wholesalers.

24. **KANTO BYTE SHOP** (Chiyoda-ku, Tokyo) — Run by the big wholesale firm, **KANTO DENSHI**, and dealing primarily in Fujitsu products.

25. **SYSTEM NINE** (Sendai) — 100% business oriented. Parent company is a local software house.

26. **JUSCO SENDAI ICHIBANCHOTEN** (Sendai) — The largest of the shops in the Tohoku region, having over 300m² of floor space.

27. **SYSTEM INN AKIHABARA, UMEDA** (Kita-ku, Osaka) — Kansai base of the **KOMU** Group. Shop is located near the national railroad station.

28. **CSK SHIBUYA** (Shibuya, Tokyo) — Located in the **PARCO** department store in Shibuya, and caters to the "now" generation.

29. **YDK** (Shinjuku, Tokyo) — A pioneer in direct sales to business users. Shop is located in Shinjuku and has nearly 400m² of floor space.

30. **ROCKET HONTEN** (Chiyoda-ku, Tokyo) — Displays nearly 40 different machines and a complete array of peripherals in a shop with more than 160m² of floor space.

31. **SYSTEM INN SENDAI** (Sendai) — Run by **TOHOKU ELECTRONIC INDUSTRY** a manufacturer of measurement equipment. Also engaged in direct, "door-to-door" sales to companies.

32. **SEIBU IKEBUKURO COMPUTER PLAZA** (Toshima-ku, Tokyo) — Aiming at over-the-counter sales of OA machines from a department store location.

33. BUGHOUSE SHIBUYA (Shibuya-ku, Tokyo) – The first of those shops directly managed by NIHON SE and sells machines produced by that company as well.
34. MARTS DEMPA ITAYATEN (Hamamatsu) – The number one personal computer shop in Hamamatsu with its headquarters in Fukui.
35. SBC HANBAI (Yokohama) – A specialist in original software.
36. DAIICHI KATEI DENKI MICRO-COMPUTER SODANSHITSU AKIHABARA (Chiyoda-ku, Tokyo) – Completed construction of a 10 story personal computer building in November, 1982.
37. INTERFACE (Hiroshima) – A pioneer among the shops in Hiroshima. Also deals in software.
38. PULSE (Chiyoda-ku, Tokyo) – Has been dealing in audio equipment from the first floor of RADIO HALL since the end of WW II.
39. TANAKA DENKI (Chiyoda-ku, Tokyo) – Boasts a 30 year career in the sale of electronics equipment, especially communication equipment.
40. TACHIBANA SHOKAI (Nishi-ku, Osaka) – An integrated sales agent for Mitsubishi Electric. Also handles small business computers.
41. EREDE HAKATA KOTOBUKIYA (Fukuoka, Kyushu) – Located in the Kotobukiya Department Store in Hakata, Fukuoka. Sales of personal computers are growing.
42. PIPSINN IKEBUKURO DAIEI (Toshima-ku, Tokyo) – A leading SORD franchise shop.
43. HARD & SOFT NDK (Nishi-ku, Osaka) – Established in January, 1982, by NIHON DENTSU KENSETSU.
44. BASIC INN KANAGAWA (Yokohama) – 100% business oriented. This shop represents big trading company interests.
45. FUKEN DENSHI (Nakano-ku, Tokyo) – Concentrates on the sale of business systems and the original software to go with them.
46. PASCOTT INN SHIZUOKA (Shizuoka City) – This shop is operated by NIKKO TSUSHIN and focuses primarily on the business market.
47. COMPUTER WORLD (Kita-ku, Tokyo) – Serves as a special outlet for Mitsubishi personal computers and heads a number of affiliated shops.
48. SOGO ELECTRIC SUN DEPARTMENT STORE (Sapporo) – The first personal computer shop opened by Sogo Electric, it operates from inside one of that company's major electrical home appliance dealers.
49. ITEM (Fujisawa) – Currently dealing wholesale in four ITEM FDD models. Over-the-counter sales account for about 30% of overall business.
50. FUTURELAND (Chuo-ku, Tokyo) – Run by an affiliate of the GENERAL PETROLEUM Company and thus has considerable capital.
51. HOSHI ITO (Sapporo) – Specializes in IBM machines and on a profit basis is one of the tops in the industry. Operated by an integrated wholesale trading firm known for its pharmaceutical products.
52. KOJINSHA (Yokohama) – Develops its own original products such as its personal computer BLACKBOX.
53. PIPSINN OMOTESANDO (Minato-

ku, Tokyo) — Limits its operations to the business market and deals primarily in SORD products.

54. NICHIBEI DENSHI (Fukuoka, Kyushu) — Situated in the headquarters of the NICHIBEI DENSHI Company which is engaged in the manufacture, sale and repair of electronics equipment.

55. YURINDO (Yokohama) — Has been selling personal computers since 1978 and entered the export market in 1982.

56. ODAKYU PERSONAL COMPUTER SHOP (Shinjuku, Tokyo) — Founded by the Shinjuku Branch of the ODAKYU STORE and managed by KOMU of Akihabara.

57. URBAN DENSHI (Hiroshima) — one of ASTAR's (Tokyo) chain stores and the oldest shop in Hiroshima.

58. NAGOYA BYTE SHOP (Nagoya) — Founded in 1977 and run by KANTO DENSHI KIKI HANBAI.

59. SUPER BRAIN HONTEN (Chiyoda-ku, Tokyo) — Deals in its own FDD brand of machines and its best product is its technical capabilities. One of the oldest shops in RADIO HALL.

60. SOFTOPIA TAKASAKI (Takasaki) — Operated by one of NEC's major electronics equipment trading firms, SATORI DENKI.

61. NAKAURA KOGU CENTER (Chiyoda-ku, Tokyo) — Specialist in the design of boards for use in the control of measurement equipment. Should become a big store.

62. SUMMIT (Kita-ku, Osaka) — Also handles the SUMMIT series of mainly small business machines that it produces itself.

63. SYSTEM INN UTSUNOMIYA (Utsunomiya) — An advantageously located shop run by SANWA COMPUTER SERVICE.

64. TOKYU HANDS (Shibuya-ku, Tokyo) — Offers a complete lineup of expendable items to go with its computers.

65. CORE YOTSUYA (Shinjuku-ku, Tokyo) — Parent company is KYORITSU KIDEN KOGYO, a major dealer in HITACHI industrial machines and equipment.

66. KATO ELECTRIC (Mito) — A major electrical home appliance dealer with seven stores located throughout Ibaragi Prefecture. Clientele are mostly in their early 20's.

67. OAS OSAKA (Kimen, Osaka) — Established by SENKO INFORMATION SYSTEMS in February, 1982.

68. SORD KITAKANTO (Kiryu) — This is the only shop in Kiryu and forms SORD's northern Kanto distribution base.

69. MATSUYAMA SHIKOKU DENGYO (Matsuyama) — Started selling personal computers in December, 1981. The business market accounts for about 40% of sales.

70. TOEI TSUSHO (Bunkyo-ku, Tokyo) — Manufactures and sells displays for popular personal computers.

71. OTSUKA OA CENTER OMIYA (Omiya) — Personal computer shop servicing the northern Kanto region with both over-the-counter and direct, "door-to-door" sales.

72. PASCOTT INN OMIYA (Omiya) — Opened in July, 1981, this shop is run by

NIKKO TSUSHIN.

73. ISHIDA DENZAI (Fukuoka) — Engaged in the development and sale of electric manufacturing equipment. Started selling personal computers in 1979.

74. REFRESHING BUSINESS (Toshima-ku, Tokyo) — This shop is managed by a car dealer and also has software capabilities.

75. GINTEZE (Kariya) — Established and run by the small business computer dealer C.O.S.

76. STRATFORD COMPUTER CENTER (Urawa) — Deals primarily in software for education purposes.

77. NTK SENDAI (Sendai) — NIHON TSUSHIN KENSETSU's personal computer shop in the Sendai area. Business oriented.

78. HONTA TSUSHO (Chiyoda-ku, Tokyo) — Sells various devices at reasonable prices. Also carries APPLE products.

79. SHOP SEAGULL (Sendai) — Founded in February, 1982, this shop specializes in management games.

80. HOKKO BIG MACHINE (Sapporo) — This shop has been operating on its own for about one year since it went independent from the office equipment dealer, HOKKO SHOKAI.

81. SYSTEM HOUSE MILKY WAY (Bunkyo-ku, Tokyo) — Deals in original software for financial use.

82. TOYOMURA UTSUNOMIYA (Utsunomiya) — This shop deals strictly in over-the-counter sales of ham radios and personal computers.

83. FUTURE INN GIFU (Gifu) — The first personal computer shop opened by CHUBU TSUSHIN KENSETSU.

84. TOYOMURA OMIYA (Omiya) — Strategically well located near Omiya's national railroad station, this shop deals only in ham radios and personal computers.

85. TOSHIBA PERSONAL COMPUTER SALON OMIYA (Omiya) — Run by TATENO SYSTEMS RESEARCH, this shop also sells direct to companies.

86. YUKO BUSINESS MACHINES (Kawasaki) — An OA trading firm affiliated with Toshiba that has been selling personal computers since March, 1982.

87. CROSSTALK (Hiroshima) — Open since June, 1981, this store is in the midst of expanding its operations. It already consists of two shops.

88. WING (Hiroshima) — A technically strong, business-oriented shop that's been in operation since October, 1981.

89. KANDENKI (Imabari) — A local electric home appliance dealer that's been handling personal computers since 1979. Sales really picked up in 1981.

90. KOCHI MICROCOMPUTER CENTER (Kochi) — Opened in July, 1978. Roughly 60% of sales accounted for by machines for hobby use.

91. VIVRE 21 (Fukuoka) — This shop was refurbished by NICHII's Fukuoka store in March, 1982, and began handling personal computers at that time.

92. ASAHI SHOKAI (Takasaki) — The top OA trading firm in Gumma Prefecture. Also sponsored by the GUMMA MICROCOMPUTER GROUP.

93. O&K MANAGEMENT SERVICE (Yokohama) — Opening up the market for simple programming languages.

94. COSMOS SENDAI (Sendai) — Deals

primarily in special order personal computers

95. **OA SHOP URAI (Mito)** – More than half a century in the stationary and OA equipment business. Established its 65th shop in December, 1982.

96. **MARUZEN HIROSHIMA BUSINESS OFFICE (Hiroshima)** – Forms one part of an MOA sales network. Also handles personal computer literature.

97. **SYSTEM INN SUNPLAY (Urawa)** – Opened in October, 1980, this shop sells both over-the-counter and direct to the company.

98. **TOYOMURA SHIZUOKA (Shizuoka)** – Advantageously located, this shop has been dealing in personal computers since 1980.

99. **DEGIC (Matsuyama)** – Founded in 1979, this was the first personal computer shop opened in Matsuyama. Especially apt at hardware sales.

100. **NIHON CONFAC (Matsuyama)** – Aimed primarily at the business market, but also features a complete education system. Sells directly to companies as well as over-the-counter.

101. **SHIKOKU TSUSHIN KENSETSU (Imabari)** – The biggest authorized dealer on Shikoku, its been handling personal computers since 1982.

102. **INTERFACE MATSUYAMA (Matsuyama)** – This shop has its base of operations in Hiroshima and is increasing sales of personal computers aimed at factory automation.

103. **MIYACHI DENKI (Kochi)** – Japan's fifth ranked wholesaler of electrical materials, this company began handling personal computers in April, 1981.

Direct sales.

104. **BUGHOUSE SAPPORO (Sapporo)** – Opened by the software house, NIHON SE, in June, 1982.

105. **SUNTECH (Yokohama)** – Sells personal computers in addition to Toshiba small business computers. Also has software capabilities.

106. **MICROCABIN YOKKAICHI (Yokkaichi)** – Went independent from an electrical equipment store to deal specifically in personal computers for hobby use.

107. **FURUMURA ELCON (Fukuoka)** – Second largest NEC microcomputer shop in Japan.

108. **SYSTEM INN NITSUKO HAKATA (Fukuoka)** – Founded in September, 1982, this shop is run by NITSUKO HANBAI.

109. **KOKEN (Toshima-ku, Tokyo)** – Founded by a group of engineers formerly with major software houses. Sells computer hardware directly to companies.

110. **BASIC HOUSE (Utsunomiya)** – The oldest personal computer shop in Tochigi Prefecture dealing primarily in machines for hobby use.

111. **HERTZ DENSHI KOGYO (Hamamatsu)** – Deals also in special order personal computers for local firms. A strong hardware base.

112. **NIHON MICROCOMPUTER CENTER OMIYA (Omiya)** – A subsidiary of TOPPAN MOORE BUSINESS SYSTEMS.

113. **SOKO SANGYO (Nagoya)** – This is a microphotography service shop that's been handling personal computers since August, 1981.

114. SYSTEM INN TAKARABUNDO (Sapporo) — Founded in August, 1981, by TAKARABUNDO, a trading firm specializing in stationary and office equipment.

115. MIE DENSHI KIKI HANBAI (Yokkaichi) — This is a Sharp OA equipment dealer. Personal computers handled by this shop are aimed primarily at the business market.

116. COMAS (Shibuya-ku, Tokyo) — This shop specializes in the development of basic software for personal computer manufacturers.

117. KURIMA DENKI (Maebashi) — One of the major electric appliance stores

in Tokyo that has one section of its floor space set aside for the sale of personal computers.

118. HIROSE MICROCOMPUTER PLAZA (Sendai) — HIROSE HAM RADIO AND ELECTRIC APPLIANCES' Sendai shop. Primarily aimed at the hobby market.

119. PASCOTT INN HAMAMATSU (Hamamatsu) — Operated by a local computing center, this shop also handles software.

120. MPK TANEMORI (Hiroshima) — Devoted to the development of hardware/software systems.

In other words, personal computer shops operated by ham radio dealers are leading the market with those run by high volume electrical home appliance stores in hot pursuit. Major ham radio dealers sell personal computers on both a retail basis, i.e. over-the-counter at the personal computer shops located in their various stores, and a wholesale basis. By dealing in large volumes, these companies can keep their margins low and still turn a decent profit. These big ham radio dealers are also increasing their number of direct sales outlets. These stores are usually about 60 square meters in size, employ a staff of 3 ~ 4 people and handle only ham radios and personal computers. With personal computers selling so well nowadays, there are also cases where these ham radio/personal computer stores drop ham radios from their inventory to deal exclusively in the sale of personal computers.

Those electrical home appliance dealers and supermarkets with adequate financial backing are currently in the process of establishing several really big personal computer stores. With their ability to attract large numbers of customers, there are quite a few of these electric appliance dealers and supermarkets that are going all out in their expansion efforts, opening shops with 300 square meters or more of sales space. These super personal computer stores will not only have various models from each of the major personal computer manufacturers on display, but will also make between 2,000 ~ 3,000 different software packages and from 500 ~ 1,000 separate volumes of related literature available. They will also feature between 1 and 4 personal computer classrooms capable of holding more than 20 people each.

Electronic equipment dealers and tele-

phone installation companies are also increasing their number of personal computer shops. Due to the fact that large numbers of the telephone installation companies' customers are already users of personal computers, however, these companies aren't limiting their efforts to over-the-counter sales alone, but are sending their salesmen around to their customers' places of business to deliver sales pitches as well.

There are also a few personal computer shops run by dealers in measurement instruments and OA equipment and machines which are also engaging in this kind of 'door-to-door,' or more specifically, 'company-to-company' salesmanship. However, these dealers find it more profitable not to limit their sales pitches to personal computers alone.

Future Prospects

New personal computer shops are currently being opened at a rate of more than 300 per year in Japan, and this trend is expected to continue for some time to come. Nevertheless, there are also those shops which are forced out of business for one reason or another. Like any other market, the one for personal computers as well can't be called all peaches and cream by any means.

In future, these personal computer shops are likely to fall into two broad categories. The first will be those shops with a lot of capital such as the ones operated by high volume electrical home appliance dealers. These shops will deal in volume, earning very reasonable profit margins while they pursue the

merits of scale. The other type of shop will be that which puts software to good use in the sale of hardware/software systems designed for the individual user. These kind of systems could be called order-made personal computer systems. As a matter of fact, this trend has already started and is meeting with considerable success.

Trends in Software Distribution

Software and Its Manufactures

The development of software for use in personal computers in Japan is being carried out by software manufacturers such as small business computer dealers, software houses, personal computer shops and mainframe users. These software manufacturers number around 150 companies in all and the number of software packages currently available on the market amounts to about 4,600.

This software is of two type for the most part, that for hobby use and that designed for business applications. That for hobby and/or entertainment use is estimated to occupy more than 60% of the overall market for software by value. This is due to the fact that there are more people using personal computers in and as their hobbies than their are companies employing them for business uses.

Hobby software can be broadly classified into two types, that for use in games and that for use in education. Whichever the case, the majority of these packages sell for between 3,000 and 5,000 yen, and sales are good. The best part of all this hobby software, be it for

games or education, is developed and sold for use in NEC's PC series of personal computers. Percentage-wise, this software accounts for about 60% of the total amount being produced in Japan. The major reason for this is the fact that NEC's share of the hardware market is so large. A special characteristic of the Japanese software market is the fact that software sales always exceed those of hardware, no matter how popular the machines might be.

The most representative of the hobby software makers in Japan are Hudson, ASCII and Software.

When it comes to software for business use, prices range anywhere from 10,000 yen to more than 200,000 yen per package. The most popular packages, however, run around 50,000 yen each. The manufacturers of business software are, for the most part, small business computer dealers, software houses and mainframe users. Mainframe user Omron Tateishi Electronics employs 1,000 personal computers in its day-to-day operations, and owns more than 2,000 custom-made software packages. As a result of this, Tateishi decided to open its own 3,000 square meter personal computer shop in the Ginza shopping district of Tokyo in December, 1982. This shop not only handles the personal computers of each of the major manufacturers, but is also going all out in its sale of original software as well. This trend will likely continue in future.

Forms of Distribution

Packaged software for use in personal

computers is distributed in Japan in one of three ways. The first channel flows from the software manufacturers to the distributors (wholesale houses) and then on to the personal computer shops (retailers) and finally to the users themselves. The second route is shorter and goes from the manufacturers straight to the retailers and then on to the users. The third form of distribution is the most direct of all with software going straight from the manufacturers into the hands of the users.

The personal computer software industry is currently doing a yearly business of approximately 10 billion yen. Of that, roughly between 60 and 70% of the software distributed nationwide follows the first route cited above. The second means of distribution accounts for about 30% of the trade and the last, most direct route is estimated to handle less than 10% of the overall software business.

Although there are software distributors who have been in operation for more than three years, the majority of these firms have been in business only around a year or so. By comparison to the distribution system in place for personal computer hardware in Japan, that for software is rather late getting established. This is attributable in large part to the fact that software for the early personal computers was written by the computer buffs who used those machines themselves. It wasn't until personal computers gained popularity with the non-specialist user that the need for ready-made software really grew strong.

Principal Software Distributors

	Special Characteristics
ASTAR INTERNATIONAL Address: No. 2 Dempa Bldg., 4th Fl., 2-14-10 Sotokanda, Chiyoda-ku, Tokyo Suppliers: 50/Retail Outlets: 200 Major Areas Of Operation: Kanto region with wholesale opera- tions nationwide.	This is a rather old firm as software distributors go, having gotten started in the business as early as the latter half of 1978. This company's brand of software carries the same name as its chain of franchise stores, COSMOS, and its operations include the wholesaling of hardware as well. ASTAR INTERNATIONAL has established its own distribution network which stretches the length and breadth of Japan. It currently handles some 1,200 different products, its principal suppliers being (1) HUDSON, (2) KOGAKUSHA and (3) ASCII, in that order. The ratio of hobby packages to business packages is roughly 85% to 15% by volume, and 2 to 1 by value.
ADOKOMU DENSHI Address: Saito Bldg., 4th Fl., 1-8-7 Tenjin, Nagaokakyo, Kyoto Suppliers: 100/Retail Outlets: 820 Major Areas Of Operation: (1) Tokyo, (2) Osaka and (3) Fukuoka.	Although located in the Kansai area, approximately 1/4 of this firm's wholesale operations are carried out in Tokyo. Established in 1979, ADOKOMU DENSHI is among the older of the soft- ware distribution houses in Japan. It currently performs the role of an East/West pipeline, supplying products made in the Kansai area to distributors located in Tokyo. It strengthened the distribution network for its own hardware and computer supplies by establishing a business office in Akihabara, Tokyo, in November, 1982.
KINKI SYSTEM SERVICE Address: Sumitomo Bank Nihonichi Bldg., 1-23-1 Nihonbashi-ji Minami-ku, Osaka Suppliers: 91/Retail Outlets: 250 Major Areas Of Operation: (1) Osaka, (2) Hyogo, (3) Kyoto and (4) Shiga.	This company commenced distributing personal computer software in August, 1981. Its sales personnel are noted for their direct visits to retailers to provide assistance whenever it is necessary. KINKI SYSTEM SERVICE has an overwhelming share of the Osaka market. Its strong connections with the personal computer shops that handle its products are due in part to its providing demonstrations of new products at these shops themselves and then following this up with adequate technical support as well.
NIDEKO Address: 1-3-10 Sotokanda, Chiyoda-ku, Tokyo Suppliers: 20/Retail Outlets: Over 100 Major Areas Of Operation: (1) Tokyo as well as other regions of Japan	This distributor handles roughly 1,000 different types of soft- ware, particularly that for use in Sharp personal computers. Its principal suppliers include COMPUTERLAND HOKKAIDO, HUDSON, TECHSOFT, PCA, MICROBRAIN YOKKAICHI and CSK among others. NIDEKO has a nationwide wholesale net- work, but its share of the market is especially strong in Akihabara.
NIHON SOFTWARE BANK Address: 2-1 Yonbanchi, Chiyoda-ku, Tokyo Suppliers: 120/Retail Outlets: 1,150 Major Areas Of Operation: (1) Tokyo, (2) Osaka and (3) Nagoya	This company was established in September, 1981, and belongs to the growing league of new software distributors. Through skillful marketing maneuvers, it has already managed to build up a nationwide distribution network. NIHON SOFTWARE BANK has a unique sales strategy in that it uses printed materials to directly awaken users to their software needs. This dis- tributor has contributed immensely to raising the level of soft- ware distribution to a major industry.
NIHON SOFTWARE RESEARCH Address: 2-12-15 Shibakoen, Minato-ku, Tokyo Suppliers: 100/Retail Outlets: 500 Major Areas Of Operation: Kanto region.	This firm didn't get started until April, 1982, but already its considered the second biggest software distributor in Japan right behind NIHON SOFTWARE BANK. In order to make its dealer support more innovative, NIHON SOFTWARE RE- SEARCH offers its retail outlets advice on the design and in- terior decoration of their shops as well. Its major retail outlets include KEIO DEPARTMENT STORES, Ikebukuro Tobu, and TAKASHIMAYA. It plans to begin developing its own original software in cooperation with its dealers soon.

Should the utilization of personal computers in business increase in future as expected, the need for software distributors will grow. These wholesalers are thus busy trying to get solid software distribution networks in place in preparation for that time.

At present, these software distribution houses purchase software from the manufacturers and sell it to those personal computer shops with whom they have contracts on a volume basis amounting to between one and two months worth of products at a time. Not all the software purchased by these distributors sells well. However, if just one or two packages out of every five laid in make a hit on the market, then the distributors are in business. A popular software package can sell hundreds of thousands of copies. There are even examples of extremely hot selling packages achieving sales of more than 800,000 copies.

It's usual for these software distributors to lay in stocks of game software at between 30 ~ 50% of the standard selling price and then sell these to the personal computer shops at around 70 or 75% of that price. When it comes to business software, the cost of laying in stocks increases to between 50 ~ 60% of the standard selling price, and the cost to the retailer rises to about 80% of that price. One of the biggest software distributors in Japan, the Nihon Software Bank, is supplied by approximately 120 manufacturers and wholesales to around 1,150 retail shops.

Those personal computer shops handling large numbers of software packages

might have as many as 2,000 packages on display at any one time. On the average, however, most shops display between 200 ~ 300 packages at a time. Software packages are usually displayed along the walls of a shop, and appear to be surrounding the hardware on display in the central portion of the shop. For those packages that have yet to make a name for themselves, the design and color schemes used on the cassette cases can make the difference between a good and poor selling product. With so much competition, it becomes very important to catch the eye of the prospective buyer.

Future Problems and Expectations

There is absolutely no way of telling if the software contained on a cassette tape or floppy disc is really any good or not just by looking at the package itself. Up to now there has been only one way for the personal computer shops and users themselves to determine the worth of a certain software package, and that's been to buy it and try it out themselves. However, with more than 4,000 different packages available on the market, this try-it-yourself-and-see method involves a considerable outlay of time and money. The need for a public organization dedicated to the evaluation of ready-made software packages has arisen.

In answer to this need the Japan Microcomputer Software Association was founded in November, 1982. This association has selected some 13 individuals from different fields who have no connections whatsoever with the distribu-

tion of software to serve as its software evaluators. Just how effective this association will be, however, remains to be seen.

In addition to software evaluation services, it will also be very important to establish a software copyright system in future. There was a case as recent as December, 1982, where a manufacturer of computer games was sued for an infringement of copyright laws and lost. This case made the front pages of every newspaper in Japan, but the plaintiff wasn't necessarily thrilled at his victory.

The principal reason for this is that the incidence of repeated fraudulent use and revision of software is on the increase. However, it is also a fact that numerous manufacturers refuse to make fraudulent use of software. Nevertheless, even though recent press coverage informs us that software has, at least tentatively, been recognized as a form of literature, it's going to take considerable time and maneuvering to come up with a copyright system especially designed to meet with the needs of the software industry.

Personal Computer Schools

Hideo Ozaki
ASCII Corporation

Circumstances Prior to the Appearance of Personal Computer Schools

The spread of microcomputers in Japan got its start in the discount electrical appliance shopping district of Tokyo called Akihabara.

Shortly following the development of the microprocessor, demand for these "computers on a chip" grew at a fantastic rate in the fields of measurement instruments, process control and desktop calculators. The cost of production rapidly decreased, lowering sales prices. Then, around 1975, microprocessors began to appear in electrical parts shops for sale to the general public. This ushered in the age of the do-it-yourself and one board microcomputers which early enthusiasts built and programmed themselves in machine language.

There was practically no technical data available on microcomputers in Japan then, however, and the special microcomputer magazines launched at that time served as the principal sources of information on this subject. These magazines introduced articles and papers from overseas as well as the most recent news they could obtain concerning software, hardware and product develop-

ment. Users hoping to acquire a technical understanding of microcomputers were forced to do so on their own, which could be one reason why early users were limited to a relatively few hard-core computer buffs.

The programming language known as BASIC proved to be the driving force behind the popularization of microcomputers in Japan. The first BASIC-oriented microcomputer to be marketed in Japan was the PET model put out by Commodore of the U.S. Sales of this machine began around 1976.

In 1979, Japan's Nippon Electric Company (NEC) came out with its best selling microcomputer, the PC-8001. This got the ball rolling in Japan, and soon microcomputers built to run on BASIC began appearing one right after the other. The sudden flood of these machines onto the market prompted their being renamed "personal computers." It was also during this period (1979~1980) that competition between domestically-produced machines and those imported from abroad grew intense, resulting in the present situation wherein foreign-made personal computers are taking a backseat to the more varied and cheaper Japanese models.

The Rise of Personal Computer Schools

The demand for personal computers capable of handling BASIC literally exploded and large numbers of personal computer shops were opened in major cities throughout Japan such as Tokyo, Osaka, Nagoya, Fukuoka and Sapporo. In fact, personal computer shops are still on the increase today, with the most prominent of them numbering well over 1,000 nationwide.

The market for personal computers is concentrated primarily in the big cities. But even with demand being what it is, it isn't always clear sailing for the shops dealing in these machines. Right from the start rivalry among shops was severe with each one trying to outdo the other by offering more and varied services to include discounts, maintenance and technical guidance. This in turn exacerbated the situation, resulting in extremely cutthroat sales competition.

It was due to this kind of intense competition, and to the fact that personal computers are completely different from ordinary electrical appliances, that "Personal Computer Clinics" and "Programming Clinics" began to spring up at personal computer shops in an attempt to attract customers. As the number of users increased, so did the degree of utilization of these clinics. It finally reached the point where personal computer shops were doubling as personal computer schools.

The very first personal computer school in Japan was opened in the Yaesu

district of Tokyo in September, 1978. This school was founded by Systems Formulate Co., Ltd., and was furnished with 50 of Commodore's PET computers. Two branch schools of relative size were also opened in Osaka and Umeda, thus signalling the start of personal computer schools in Japan.

With the rise of Japanese-made personal computers after 1979, this school replaced its PET computers with iF-800/20s from Oki Electric and BUBCOM-80s put out by its founder, Systems Formulate. There was a kind of BASIC boom in Japan then, and as the price of personal computers came down in line with technological advances, these machines became affordable to more and more people. As personal computer users increased, so did the operations of these schools. The number of such personal computer schools began to increase on a nationwide scale, the peak expansion period being reached in the fall of 1981.

The majority of these schools were opened by the personal computer shops themselves, but there were also numerous cases of unrelated businesses opening personal computer shops and then founding the schools to go with them. Principal among these were firms engaged in distribution such as automobile dealers, trading companies, department stores, supermarkets, office equipment firms and bookstores. This trend got somewhat out of hand, however, resulting in a situation where there were too many personal computer schools.

PC Schools Come under Attack

Roughly 1 million personal computers have been sold in Japan since they first made their appearance back in 1976. It is estimated that another 1 million of these machines will be produced and consumed during 1983 alone.

Supported by fantastic growth such as this from the personal computer market, it's hard to believe that personal computer schools are doing anything but prospering as well. However, following the peak in the fall of 1981, there isn't a personal computer school around whose attendance rate hasn't dropped. Schools experiencing financial difficulties are on the increase, with independent schools going bankrupt and those operated as a sideline being closed. In short, personal computer schools in Japan are experiencing some really rough weather right now.

When these schools were flourishing, there were said to be between 700 and 1,000 of them in operation throughout the country. In fact, Tokyo alone was supposed to have had anywhere from 200 to 300 personal computer schools during that period. Presently, however, the number of schools nationwide is estimated at between 400 ~ 600, and those still operating in Tokyo have dropped down to between 150 ~ 200. Most of those schools that opened after 1981 have since closed.

Just what caused this sudden deterioration in personal computer schools starting in late 1981? The reasons for this are numerous, but prime among them is the fact that the much lauded

BASIC proved a major disappointment for most users.

Early microcomputers had to be programmed in machine language, a fact which proved to be an obstacle to their growth. Realizing this, microcomputer manufacturers and dealers began to sell machines made to be programmed in BASIC. These microcomputers were advertised as all purpose machines that could be operated by just about anybody thanks to their being made to run on BASIC. Microcomputers suddenly came to be known as "personal computers" and large numbers of people with no experience in electronics whatsoever began to buy and attempt to use these machines. It wasn't long, however, before the layman realized that BASIC wasn't something that could be readily used by the uninitiated.

Personal computers are just one kind of general purpose computer. From the standpoint of hardware, these machines possess capabilities commensurate with those of the small- and medium-scale computers of 10 or 20 years ago. In the case of the latter, professional computer experts with long years of training and experience required considerable time to write programs and construct systems. It was obviously asking too much to expect that one, untrained layman working alone could accomplish the same task on his personal computer. This was true in the area of business in particular, where a whole series of tasks such as analyzing the work processes to be handled by the computer, devising

algorithms and preparing flow charts all had to be completed before programming in BASIC could even begin.

In order for personal computer schools to help their students solve these various problems, instructors had to devote an extraordinary amount of time and effort to the process. As for the companies that sent their employees to these schools to study, they had to be able to afford the manpower and monies necessary to have them learn enough to be able to carry out business related programming on their own. Even so, more often than not, these company students lost heart midway through the course and gave up. As this situation persisted and grew worse people started to complain that even if they took courses at personal computer schools they still couldn't learn to operate personal computers.

Another cause for the decline in student attendance at these schools had to do with the careless way they were run, their fragile financial foundations and the overwhelmingly large number of poorly thought out and even more poorly put together and executed curriculums. Also, compared to the rapid increase in personal computer users during the late '70's and early '80's there was a dire shortage of personal computer instructors. In order to meet the demand, however, the schools took on inexperienced instructors and the personal computer shops even had their sales personnel pose as teachers when necessary.

In addition to public opposition to the claims by personal computer manufac-

turers and dealers that "BASIC can be used by anybody," and the growing distrust in personal computer schools, open criticisms of these schools began to appear in daily and economic newspapers from around the summer of 1981 attacking them for losing students.

Thusfar we have concerned ourselves only with those direct causes of the difficulties experienced by these schools. There were also a number of indirect reasons for this situation, some of which we will take up here.

As BASIC-operated personal computers came into more widespread use, companies began searching for ways to put these machines to good use in the field of business. Personal computers (small business computers) began to appear in increasing numbers at more and more companies, and employees of those firms were sent to personal computer schools. This was all taking place when the newspapers were hot on the heels of these personal computer schools, publishing articles which stated that for every 100 individuals who attempt to learn BASIC, only a mere 3% ever really master it. Even so, they managed to turned out a goodly number of really excellent programmers, who, upon returning to their respective companies, were put in charge of developing in-house personal computer training programs.

According to a recent survey conducted by NIHON KEIZAI SHINBUN which targetted computer users listed on the first section of the Tokyo Stock Exchange, on the average there are better than 25 personal computers in-

stalled per company and 6 out of every 7 companies are utilizing these machines in their operations.

All these companies, it was learned, have established in-house personal computer clubs, study groups and schools as part of their personnel training programs. In this way they can raise the level of their employees capabilities without having to rely on outside personal computer schools.

In-house training programs such as these spelled out the beginning of the end for many a private personal computer school since the majority of those schools' students had been company employees. While figures differed slightly depending on the location of the school, on the whole, between 80 ~ 90% of the total number of students attending these schools were businessmen. The remaining 10 ~ 20% consisted of junior and senior high school students, college students and women not employed at major companies.

If private personal computer schools in Japan hope to continue to operate and grow in future, there seems only one course open to them. That is, they have to get the businessmen who contributed to their development in the first place to return to their schools to study. This will require that they completely overhaul their existing curriculums for a start. The schools that have managed to survive to date have been those with solid financial and administrative bases capable of taking the heat when the competition got tough. They are also the schools with the most well thought out

curriculums, those that offer courses that meet with student needs. In other words, the personal computer schools with the most lasting power are those that have a good grasp of the administrative and financial skills required to operate such schools.

The Situation Today

There are roughly 1,000 major personal computer shops nationwide at present. This figure is capable of being checked out with personal computer manufacturers and principal dealers. If we include the number of personal computer "corners" operating in bookstores, supermarkets, stationary shops and office equipment dealers, the total number of personal computer sales outlets is estimated at nearly 2,000 in all.

As one part of these shops' strategies to acquire new customers, they early on established "Personal Computer Clinics" and "Programming Clinics." Approximately 30% of the some 1,000 major personal computer shops in operation throughout Japan offer personal computer schools in addition to their sales activities or have such schools run by other companies or organizations located in their shops. These schools were preceded by the consultation and programming clinics mention above and, therefore, are means of attracting customers first, and training centers second. Most of these schools are small in size with only about half of them providing actual classrooms, desks, training manuals and computers. The majority consist of just

enough space in one section of the personal computer sales corner to accommodate the number of students enrolled. Instructors are also a problem at most of these schools, with sales clerks and even shop owners filling this role at times. The really good schools with regular classrooms, personal computers, good training manuals and other materials as well as first rate instructors are concentrated in the big cities and probably only number around 100 or so in all.

Places other than personal computer shops which offer training and/or courses in personal computer operation consist of the following for the most part.

1) Colleges and Universities — Lecture courses on personal computers have not been established at most institutions of higher learning as yet, but the machines themselves are being utilized as the subjects of study in various information processing courses. Personal computer clubs are also quite popular on most campuses in Japan.

2) Technical Schools — There is an increasing number of technical and special schools which offer courses on BASIC programming for personal computers as part of their regular curriculum. These schools include information processing, electronics and typing schools in particular.

3) Technical and Commercial High Schools — These kinds of high schools have had computer and information processing courses as a part of their curriculums for some time now. There are also quite a few of them which utilize personal computers as teaching aids and

which have started courses in BASIC programming as well.

4) In-house Company Schools — These schools fall primarily into two categories. The first is where the company itself actively promotes the utilization of personal computers and has a companywide training program for managers and workers alike. The second type of in-house personal computer school is one organized by the employees themselves. The latter are usually called personal computer clubs or study societies.

5) Independent Private Schools — Most of the private personal computer schools in Japan were established and are being run by businesses other than those related to personal computers which entered the field as a sideline. These enterprises consist of department stores, supermarkets and business machine dealers among others. Most of these schools have folded since the peak year of 1981. The principal reasons for this have been a lack of administrative knowhow, scarcity of qualified instructors, and poor quality curriculums. Above all else, however, there just hasn't been enough profit in personal computer education to sustain independent operations. These businesses would have been better off to open personal computer shops instead of schools.

6) Correspondence and Tutorial Courses Offered By Private Personal Computer Schools — Both of these types of training are still being offered, but the actual number of courses being taken hasn't been surveyed. They don't seem

to be all that popular, however.

7) **Schools Run By Personal Computer Manufacturers** — There are numerous personal computer manufacturers which sponsor seminars and hold both regular and irregular classes to promote the sales of their machines. Most of the courses offered by these makers are for the benefit of their own salesmen and dealers. Nevertheless, there are a few manufactureres such as Sord Computer Systems and Hitachi which have developed large-scale schools that offer personal computer courses to ordinary users as well.

The standard curriculum offered at personal computer schools nowadays consists primarily of beginner, intermediate and advanced courses on BASIC programming techniques. However, each of these courses only lasts an average of four hours a day for two days. Those students who complete all three can then go on to the business course if they so desire, but this too only covers a period of from two to four days. The business course generally focuses on operating procedures for disk systems and disk BASIC, two essential aspects of business applications. It will most likely also include lecture classes on operating systems such as CP/M and MSDOS.

No matter what the course, however, they are all extremely short in duration. This is due in large measure to the fact that companies that send employees to study at these personal computer schools don't allow them sufficient time or tuition, so that in the end, both the instrutors and the instructed wind

up racing through the material in an erratic fashion. Also, these companies figure that if their employees can learn even the rudiments of personal computer operation and the BASIC programming language at outside schools, they will have established a good basis in the subject upon which they can build via in-house study programs. The company is usually satisfied if the employees it sends out for training can acquire enough knowledge to tell it whether or not personal computers would really be of benefit to its operations.

For their part, the managers of personal computer schools figure that the situation boils down to one of losing students or just barely maintaining those they have. At any rate, with improvements in personal computer functions it's gotten to the point where new curses have to be incorporated into the primarily BASIC-oriented curriculums. These include courses in simple programming languages and graphics, two developments that have been steadily working their way into the spotlight since around 1981.

The Development of Simple Programming Languages

The most conspicuous articles to appear in personal computer magazines and economic newspapers starting about early 1981 have been those dealing with simple programming languages. These simple programming languages are being hailed as the new messiahs of personal computer utilization. They

became so popular by 1982 that dozens of such new programs were either imported or developed domestically. In fact, 1982 has been labelled the "Year of the Simple Programming Language."

The leading simple programming languages on the Japanese market are VISICALC (an 'electronic worksheet' produced by Visicorp of the U.S.) and PIPS, a language announced by Sord Computer Systems in 1980 and designed primarily for the preparation of tables. The latter has rapidly gained widespread popularity following its release on the market.

In addition to these two, there are presently a whole lot of other popular simple programming languages on the market in Japan. These include such varied programs as Supercalc, Multiplan, AP-1, PC-PAL, PARM, IRIS-80, Visiplot and STAT-80. The types of formats possible with these simple programming languages range from tables, files, and cards to graphics. Even though these programs are called simple programming languages, this title doesn't describe them adequately. Thus, they are also referred to by an assortment of other names such as "non-programming languages," "Programless languages," "user languages" and "general-purpose software."

Certain of the better personal computer schools have been quick to respond

to these new developments by starting simple programming language and business graphics courses. This in turn has helped them considerably in their battle to retain and even increase student enrollment.

Future Prospects

Personal computers are currently being steadily upgraded from 8- to 16-bit machines. In fact, there should be quite a bit of jostling for market shares between and among the various Japanese-made 16-bit machines alone during 1983.

Compared to the 8-bit personal computers prevalent up to now, these new 16-bit machines offer considerably more memory capacity. It will thus become possible to run both FORTRAN and COBOL, languages heretofore utilized primarily with medium- and large-scale general-purpose machines, on personal computers as well.

This trend would seem to indicate that it will be extremely important for the personal computer schools to establish new courses in addition to those for BASIC in future. Whether or not this will help them in their frantic struggle to maintain student enrollment remains to be seen, but if they don't create these new courses they are most certainly doomed to failure.

OMRON Tateishi Electronics Co.

— An Example of Personal Computer Utilization —

Shigeyuki Narita

OMRON Tateishi Electronics Co.

It all started with a memo that was circulated around the company one day. That memo read, "In line with a decision to create a companywide microcomputer environment, at least one personal computer will be installed in every section of the company, or one machine for every 5~10 employees. We are requesting, therefore, that all section chiefs make known the number of personal computers they will need in their respective sections by no later than December 5, 1980" This memo was put out by Hisashi Tazaki, managing director in charge of research and development.

The reasons for deciding to introduce personal computers into the daily work routine at OMRON Tateishi Electronics were (1) to upgrade thinking within the company from the old "every section for itself" approach to a more systematic,

"all for one, one for all" way of thinking; (2) to have personal computers perform the everyday routine jobs in order to free the company's human resources for more creative and rewarding work; and (3) to use OA (office automation) to prevent the company's administrative sections from getting too big, thus improving overall operations.

The total number of personal computers requested by the various sections came to 315 in all. This was at the end of 1980. It was estimated that within five years of that time this number would rise to around 1,000 units companywide as new applications for these machines were developed. To get the ball rolling, it was decided to introduce the 315 personal computers requested between April and June of the following year, 1981.

According to OMRON Tateishi, the

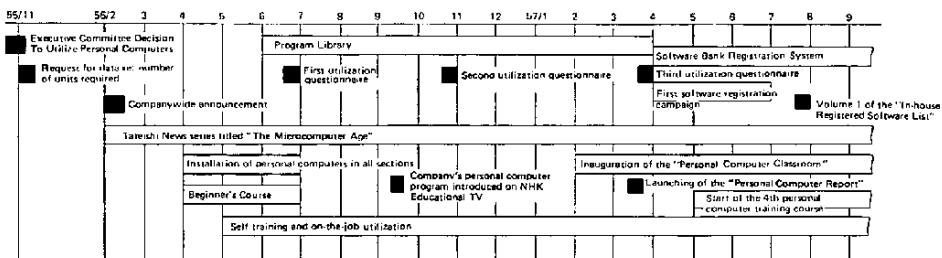


Fig. 1. Personal Computer Introduction Process at OMRON Tateishi

logic behind introducing such a large number of machines all at once was summed up as follows.

"With the coming of the age of micro-electronics, it is urgent that large numbers of individuals be trained to think in terms of systems and that a microcomputer environment be created within the company. But what's the best and fastest way to do this?

We don't have the knowhow necessary to train our human resources along these lines. What is more, if we were to try to develop such knowhow on our own, it would take so long that by the time we were done, what we had developed would probably already be out of date.

Thus, it would appear that our only alternative is to create the computerized office of tomorrow, today, within our own enterprise. Consequently, this means that we must all learn to use personal computers."

In short then, the company's thinking was to install a whole bunch of personal computers all at once and then have everyone try to use them. Its feelings were that actual hands on experience would be the best and quickest teacher.

Ordinarily, a company considering introducing personal computers into its operations would more than likely send a certain number of its employees to special outside computer schools for advanced training. Once trained these individuals would serve as a kind of corps of in-house personal computer training specialists whose job it would be to pass on what they had learned to their fellow coworkers. They would also be capable of en-

lightening the company itself as to the types of applications these machines could be put to and the kinds of benefits that could be expected as a result.

Not so with OMRON Tateishi Electronics. The theme here was, "It's better to get used to using a machine than to learn how to use it. Hands on experience is the fastest way to learn anything new." When you think of it, this was quite a bold approach.

The first large batch of personal computers arrived suddenly in April, 1981.

Hardware Selection Based on Software

Two models of personal computers were introduced into the company. One was Sord Computer Systems' M223-Mark IV with 350K bytes of main memory and two (2) disk drives that use mini floppy disks. The other was Sord's M223-Mark V computer with 1M byte of main memory and two (2) disk drives that are compatible with IBM floppy disks.

These two models possess different external designs from other Sord products, i.e. their exteriors were custom-made for OMRON Tateishi.

But just what prompted the purchase of these two particular Sord machines in the first place? The answer to that is software. These two personal computers operate on Sord's own simple programming language, PIPS, which can be mastered quickly by just about anyone.

This simple programming language, or 'non-programming language' as it is also so often called, allows the user to make

free use of prepared command statements to process information without the necessity of writing programs in BASIC. In particular, this means that the user can input both numeric and non-numeric (character strings) data to a table, any kind of table, be it one for inventories, budgets, sales performance or customer management, and then process that data using the prepared PIPS commands. The types of processing available with PIPS include a variety of calculation methods, correction, addition and deletion functions as well as sort, merge and retrieval capabilities. In short, just about all the processing functions an ordinary business would ever have need for.

In other words, PIPS offers a wide range of applications including everything from the creation and processing of management tables to name files. And all of these applications can be easily adapted to fit the user's particular job simply by memorizing the rules for creating tables and the limited number of commands necessary to process the data contained therein. Being so simple, PIPS is just the thing for the beginning user since it can be mastered in practically no time at all.

This is an important factor when it comes to getting employees with no experience whatsoever to suddenly begin utilizing microcomputers in their daily work. In this sense, then, OMRON Tateishi felt PIPS was just what they were looking for, and thus ordered machines on which it could be run.

Personal Computer Fever



If OMRON Tateishi Electronics' method of introducing personal computers into its operations was bold, then its training program for the utilization of these machines was even bolder.

The idea was to leave training up to the employees themselves as much as possible. The word from the top was, "Give these machines a try, even if it means just using them to play games at first. And when it gets so you can put them to practical use in the conduct of your work, well, that will be even better."

The actual training program itself consisted of holding brief meetings at each worksite as the personal computers arrived to explain the purpose for their introduction. Then representatives were picked from each section of the company to receive training in the operation of these machines. Upon completion of their training, these "personal computer leaders" were sent around to the various worksites to pass on what they had learned to the other employees who would be using these machines.

The training period was four days long and the course itself was given a total of 14 times at nine different branches and business offices nationwide. Classes were

held from 9 o'clock in the morning to 5 o'clock in the evening on each of the four days comprising the full training course. Since between 30 and 40 individuals attended each of the 14 courses held, in the end, OMRON Tateishi had turned out some 500 trained 'personal computer leaders.' Upon returning to their respective sections, each of these new 'leaders' enthusiastically set about teaching their coworkers what they had learned.

Each section put together its own training manual and formed small study groups to tackle the task of mastering the new machines. Young and old, men and women alike, training manual in one hand, began poking at the keys on the keyboards. It wasn't long before a kind of "personal computer fever" had spread throughout the entire company.

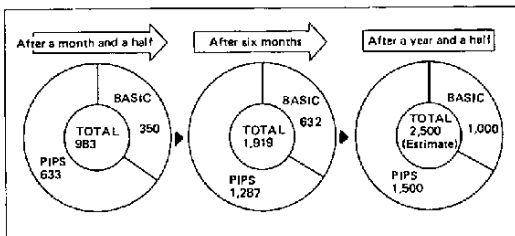


Fig. 2. In-House Personal Computer Users

As Figure 2 indicates, nearly 1,000 employees had learned how to operate the new personal computers within just a month and a half of their arrival. These numbers continued to grow thereafter until roughly a year and a half after the introduction of personal computers into OMRON Tateishi, an estimated 2,500 individuals are making use of these machines in the conduct of their daily jobs.

This means that at present the majority of the company's employees have become personal computer users. And PIPS isn't the only language being utilized. Some 1,000 individuals have also learned to put together their own programs using BASIC as well.

200 Million Yen Worth of Software

It's rather difficult to say with any conviction just what the results of introducing personal computers into the company's operations have been. Nevertheless, we will attempt to summarize some of the more obvious of those results for you here.

The number of programs developed for use on the company's personal computers to date total about 2,000 in all. If we assume that each of these has a sales value of roughly 100,000 yen, then OMRON Tateishi Electronics currently possesses about 200 million yen worth of microcomputer programs for business use that it can claim as assets.

If we break these programs down by department we see that R&D accounts for 18% of the total, Manufacturing for 20%, Sales for 17% and Administration for the remaining 45%. This clearly reflects the fact that nearly half of all the programs created during the past year and a half have been for use in non-productive, administrative jobs.

The ratio of BASIC programs to those written in other, simpler programming languages such as PIPS is 3 to 7, or 600 BASIC programs to around 1,400 simple language programs.

Another result of introducing personal computers into the company's operations that stands out quite clearly is the fact that now approximately 1/3 of all EDP done at OMRON Tateishi is processed via personal computers. The company's large-scale computers currently consist of one IBM 3031, an IBM 370-148 and two IBM 4331 Level II machines. After installing large numbers of personal computers, however, roughly 1/3 of the processing work previously handled by the main-frame machines was taken over by the much smaller, personal computers. Since the large machines are so expensive, it was felt they should be made to do only those big jobs for which they were intended, and with the coming of the personal computers this has steadily been brought about.

One more benefit derived from personal computer utilization at OMRON Tateishi has been the improvements made to day to day business operations.

For example, personal computers are capable of processing jobs formerly done by hand in about 1/3 the time it takes to do them manually. However, using personal computers simply to save time doesn't increase productivity or improve performance in any substantial way. Making good use of the time saved to process each job more thoroughly and completely, as well as to expand the scope of one's work responsibilities is using personal computers to raise efficiency and improve operations in a way not possible by hand.

To date, numerous small, routine jobs formerly performed manually and in an incomplete manner by a number of em-

ployees have been entrusted to individual employees operating personal computers with the result that this work is done not only faster, but more completely as well.

According to one female employee, "When I use a personal computer to do my job, I feel as if I've improved myself. The men are also more willing to entrust part of their work to us women now, and in this sense these machines have raised our worth as workers."

Thus, we can probably sum up the results of personal computer utilization at OMRON Tateishi as follows:

1. Roughly 2,000 business-oriented programs have been developed;
2. The number of employees capable of effectively using personal computers in their work has risen to more than 2,000 in all;
3. Approximately 1/3 of the processing work formerly done by the large-scale computers has been taken over by the much smaller personal computers;
4. More thorough, complete work has been made possible in much less time than it took to do the same jobs by hand; and
5. By making good use of the time saved with personal computers, the company has been able to expand the area of its operations.

Plans to Increase Utilization

As stated previously, immediately following the introduction of personal computers into its operations, OMRON Tateishi conducted a beginner's course in the operation of these machines using

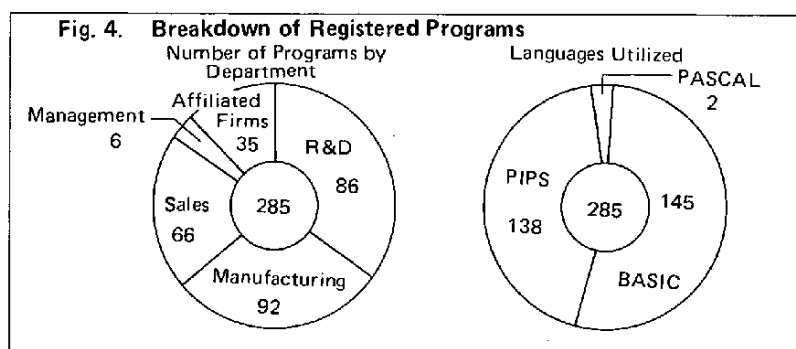
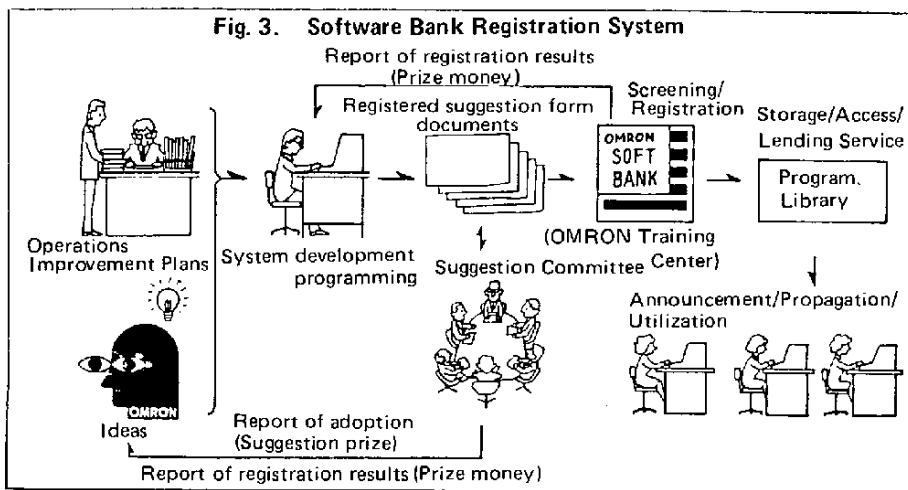


Fig. 5. Breakdown of Programs Developed by Department

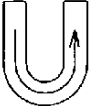



Common Programs	Research And Development
Suggestion Implementation Management	Technical Information Management
CRT Print	Amount of Chemicals Used Per Project
Planning and Management of Library Purchases	Mode Analysis
Program Development Management	IDT Parameter Calculations
Office Supplies Management	Bug Report List
Personal Computer Reservation Management	Design Management
Extra Duties Management	Trademark Registration Management
Business Classification	Test Center Entry Record
Data INDEX	Technical Materials Management and Retrieval
Individual Schedule Management	Standard Document File
Travel and Transportation Expense Management	Design Schedule Management
Overtime Management	Format Registration Ledger
Job Schedule Management	Patent Rights Evaluations
General Purpose Memos	Rollbook of Membership in Academic Societies
Costs Management	Outside Seminar Rollbook
Outside Group Membership Registration	Sales
Parking Lot Management	Market Information Management
In-house Education Classes Rollbook Management	Delivery Date Management
Ledger/Voucher Management	Catalogue Management
Manufacturing	Advertisement Management
Parts' Vouchers Management	Orders Received and Sales Statistics
Blueprint Management	Price Management
Parts Control	Budget/Performance Management
Inferior Parts List	Sales Management by Store and Client
Cost Calculations	Customer Management
Preparation Of Itemized Parts Accounts	Management
Aggregate Cost Price List	Company Regulations Distribution Management
Process Calculations Program	Yen/Dollar Calculations
Inventory Control	Home Loan Interest Calculations

both BASIC and PIPS. This course was given a total of 14 times and produced nearly 500 personal computer "leaders," who undertook the training of their fellow coworkers in the operation of these machines. Beginning in February, 1982, the company brought these "leaders" together and capitalized on their know-how and experience in training to put together a standard companywide training program. A program has gradually taken shape which includes basic, applied and management level courses. This program

has come to be known as the "Personal Computer Classroom." What started out as a more or less spontaneous "fever" has steadily progressed into a standardized training program.

The company has also started a software bank registration system. A movement was begun to create programs with the same specifications so that those made by individuals at one worksite could be freely used by employees engaged in similar operations at other work-sites. Those programs that have been

Table.1 Four Personal Computer Training Patterns

Pattern	Concept	Supplement I	Supplement II
	<ul style="list-style-type: none"> • Introduced from the top down • Managed from the bottom up 	<ul style="list-style-type: none"> • Explain the reasons for introducing personal computers as well as the uses envisioned for them to all employees. 	<ul style="list-style-type: none"> • Make sure all employees understand that this is the age of microelectronics.
	<ul style="list-style-type: none"> • Companywide personal computer "fever" 	<ul style="list-style-type: none"> • Involve the whole organization in the personal computer movement • Encourage all personnel to participate. 	
	<ul style="list-style-type: none"> • Training starts at the worksite and spreads out laterally as well as vertically. 	<ul style="list-style-type: none"> • Worksite leaders 	<ul style="list-style-type: none"> • All employees are able to operate personal computers • Eliminate "fear" of personal computers • Short, intensive training periods • Smooth introduction of personal computers into all sections
	<ul style="list-style-type: none"> • Gradual dissemination of knowhow 	<ul style="list-style-type: none"> • All employees take a part in applications planning 	<ul style="list-style-type: none"> • Small group activities • Utilization of existing systems

registered and stored in the software bank are open to use by anyone within the company at any time, and copies can even be made if necessary. The establishment of this kind of system has made it worth the company's while to encourage the development of programs from scratch.

Patterns for Establishing Personal Computer Usage

Various means of getting employees throughout the company to use personal computers in their daily work routines have been attempted since these machines were first introduced. These can be broken down into four main approaches which OMRON Tateishi has labelled the U,O,L and X patterns.

The "U" Pattern

As described earlier, the company felt it should make its reasons for introducing personal computers clear to all employees and then let them try to utilize these machines on their own as much as possible. In order for a business enterprise to deal with today's rapidly changing society, it must have a clear vision of the future and must formulate its policies in line with that vision. OMRON Tateishi realized the tremendous impact of microelectronics on the world of business and devised a policy to deal with that phenomenon. It has tasked personal computers with the handling of those small jobs unsuited for processing by its large-scale computers. The contents of these small, routine jobs, i.e. the work flow, exceptional processes, and bottlenecks to solving and improving

various problem areas in the various work processes, are best understood by the people actually engaged in the performance of these tasks on a daily basis. The "U" pattern enabled the company to get all its employees to participate in small group activities aimed at improving the contents of these various "little" jobs so that it could standardize and systematize these operations companywide.

The "O" Pattern

This pattern entailed involving the entire company and all its employees in the planning and actual utilization of personal computers and was aimed at bringing about a companywide "personal computer fever."

The "L" Pattern

This approach was basically concerned with developing personal computer applications via on-the-job leadership and training. To accomplish this, it was necessary to (1) dispel apprehensions regarding the utilization of computers; (2) create an environment wherein all employees have the opportunity to get hands on experience operating personal computers; (3) provide short-term, intensive training programs; and (4) introduce these machines into the work routine in as smooth a manner as possible.

The "X" Pattern

This pattern called for the gradual spread of personal computer utilization throughout the company by encouraging all personnel to take a hand in improving work processes making use of existing

systems and small group activities.

Ten Points to Ensure Success

(1) Make the Purpose for Introducing Personal Computers Clear

On the front page of the April 25, 1981 edition of the "Tateishi News," an in-house publication, the following headline appeared in bold print for all employees to see. It read, "The Purpose And Expectations Behind The Introduction Of Personal Computers. If it's a job that machines can do, then let the machines do it." The aims outlined in the accompanying article can be summed up as follows:

1. Change from a "discreet" to an "integrated" way of thinking, i.e. from an individual to a systematic work effort;
2. Have machines perform tedious, routine jobs so as to free human resources for more creative and rewarding jobs; and
3. Introduce Office Automation on a companywide scale to increase operational efficiency.

(2) Make All Personnel Aware That This is the Age of Microelectronics

Semiconductors and microprocessors have become essential to industry and are playing leading roles in the informationization of society. As far as business is concerned, then, the sooner microcomputers can be introduced into their operations, the more effective they will be. All employees must be made aware of these facts, and convinced of the need to use personal computers to bring about

those improvements necessary to company operations in order to effectively compete in this age of microelectronics.

(3) Eliminate Apprehensions Regarding Personal Computer Usage

A questionnaire survey was conducted at the Tokyo offices of the company in September, 1981. This survey included such questions as, "What are your personal feelings about computers?" Roughly 70 individuals, the majority of whom were women employees, were targeted in this survey. A representative sampling of the responses received are (1) computers are very complicated machines and can't be easily operated; (2) Since I don't have any specialized knowledge of these machines, I can't possibly hope to operate one; and (3) Only persons with special abilities can use computers. From this it would appear that people have their minds made up that they can't operate computers. Of course, this isn't true. But how does a company go about eliminating such apprehensions on the part of its employee? Well, the key to this is to keep its explanations concerning the operation of personal computers as simple and straightforward as possible. Special computer terminology should be avoided. When training employees with no experience in the field of microcomputers whatsoever, it helps to use terms that are familiar to them during the training process. For example, OMRON Tateishi had success substituting the word screen for display or CRT, referring to keyboard switches as buttons and calling the floppy disk drive a magnetic record

reading and writing device. Printer was already a familiar word to most trainees, so that was utilized as is. After hearing these familiar terms repeated over and over again and getting some actual hands on experience operating these "complicated" machines, the employees began to get a "feel" for them, and gradually started to comprehend just what a personal computer was all about and how it works. In addition to familiar terminology, it's also very important to use examples well suited to the individual or group undergoing training at the time. If the trainees are accountants, use examples of accounting procedures to explain the workings of the personal computer, and if they are clerks, clerical procedures and so on. If some people still don't quite understand what you are talking about, have them ask a nearby coworker who does to it explain it to them.

(4) All Employees Should Be Able to Operate Personal Computers

As stated above, in order to enable as many individuals as possible to operate personal computers, the company must first dispel their fears and apprehensions concerning these machines. To do this, the company should start off with simple programming languages such as PIPS that are capable of processing a wide range of different types of work. In other words, the software selected should be capable of (1) preparing tables, (2) filing and retrieving data, (3) comparing and arranging data, (4) performing computations, (5) carrying out simulations and (6) making accurate copies of documents.

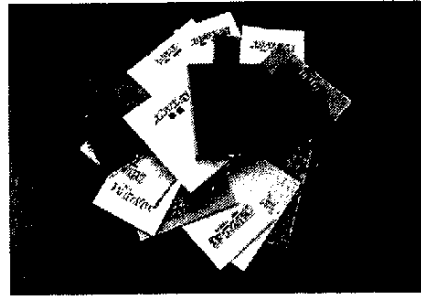
The next important point is that there be a sufficiently large number of personal computers installed right from the beginning. When a number of persons are sharing the same machine and the rate of operation exceeds 30%, the situation inevitably arises wherein someone is always using the machine when someone else wants to get on it. Even if a system of reserving utilization time in advance is employed, the situation is still awkward.

(5) A Short-Term, Intensive Training Program

It's imperative that the company put together a training program that is both interesting and practical. Such a curriculum should include plenty of opportunities for the trainees to consider how best the various machine functions they are studying can be applied to their own jobs. The aim here is to give them a chance to come up with operations and work processes to which personal computers can be effectively applied. Each stage or phase of this training program should be divided into classes that deal in depth with certain aspects of these machines, thus making the purpose for their utilization clear. And lastly, above all else, the curriculum should be designed to instill the trainees with the confidence necessary to operate personal computers effectively.

(6) A Smooth Introduction Process is Imperative

It only stands to reason that if a company's investment in personal computers is too high, it will be primarily concerned



Textbooks and Instructor's Manuals

with realizing early returns on its investment. This situation will most likely lead that company to utilize its machines in a way that will produce immediate results rather than long-term benefits. In the case of OMRON Tateishi, however, it was able to lease the required number of machines from its affiliate, T.G.S., for between 20 and 30 thousand yen a month per unit. Since roughly 10 employees share each personal computer, this investment worked out to around 2,000~3,000 yen per user. This has enabled section chiefs to evaluate the efficacy and efficiency of personal computer utilization from a long-term point of view. It has also meant that the machines themselves were more readily accepted as an integral part of the work routine. As for the investment per se, if a company considers it as part of its training costs then there is little if any trouble in justifying such expenditures.

(7) Link Personal Computer Usage to Existing Systems

A considerable amount of time and effort, plus the understanding and cooperation of all concerned is required to plan, implement and get any new endeavor off the ground. OMRON Tateishi started

Personal Computer Classrooms and Textbooks

			Beginner Course I	Beginner Course II	Intermediate Course I	Intermediate Course II
Personal Computer Skills	Catch Phrase		Let's get familiar with personal computers	Strengthen your knowledge of personal computers	Let's master personal computers	Expanding the realm of personal computers
	Level of Instruction		Master basic operation	Master PIPS	Fundamental skills required to operate BASIC; simple modules.	Introduction to orthodox usage (files, etc.); methods for expanding personal computer utilization.
	Course Aims		Students should be able to turn the machines ON/OFF and insert/remove diskettes as well as perform simple calculations, prepare simple tables, retrieve and rearrange data in PIPS.	Should be able to explain the hardware/software system configuration; use computers in convenient as well as most efficient applications; and understand automatic programs in PIPS.	Should be able to use fundamental BASIC syntax; understand hardware configurations; and write BASIC programs for table preparation, data input, print-outs and preparation of bar graphs	Should be capable of explaining the hardware/software aspects of floppy disks; writing programs in BASIC to create files, totalize, retrieve and sort data; performing debugging and error processing; exchanging data with main frame (host) computers; and operating a personal computer which is part of a network.
Developing Personal Computer Applications	Catch Phrase		Make good use of personal computers on the job	Develop PC "QC"	Do a more complete job with personal computers	Systematize your work with personal computers
	Level of Instruction		Grasping the outlines of one's own work to determine which parts can be applied to PC's	Understanding QC circles to give meaning to PC QC	Pursuing thorough job performance-	Relating one's work with that of other sections; systematizing the work in one's own section.
	Course Aims		Should be familiar with meaning of OA, the role of personal computers in OA and the company's methods for spreading in-house PC usage; (Practice) Know one's own job, and select those portions applicable to PCs; know the purpose of one's own job and express it in terms of PC processing.	Should know the various OA themes, the company's OA policies, and QC circle activities in order to make suggestions Re: PC "QC"	(Practice) Confirming the purpose of a work process, discover its inefficiencies and inadequacies, clarify their causes, design and formulate plans for the implementation of a new personal computer system to improve that work process. Should be capable of writing (preparing) documents.	(Practice) Outline roles and functions of one's own section, relate them to those of other sections and come up with procedures for constructing PC systems to deal with them. Should be able to prepare flow charts of work processes.

its personal computer utilization and program registration systems in June, 1981, by linking them up with the company's existing "suggestion box" system (The program registration system was changed to the software bank registration system in April, 1982.). This suggestion system includes a suggestion committee which

evaluates suggestions submitted by managers, supervisors and workers and furnishes prizes and awards monthly for the best suggestions received.

(8) Involve the Whole Organization

The cooperation of the entire company is necessary to promote the utiliza-

tion of personal computers. OMRON Tateishi informed all its employees of its intention to introduce personal computers into the daily work routine via its in-house information sheet, then set about promoting the utilization of these machines by getting the personnel department to link their usage to the revision and improvement of operations in each department as a part of its human resource education program. The general affairs department was in charge of organizing the overall support systems, seeking out orientation and training locations, offering guidance and facilities and keeping track of expendable stocks.

(9) Develop Personal Computer Applications Via OJT

Those jobs best suited for processing by personal computers are the ones that can't be handled by large-scale computers, those that require exceptional processing and the tedious, little jobs that are so boring but which nevertheless have to be done. It is difficult for people not directly involved in the conduct of these kinds of jobs, i.e. EDP personnel, to fully grasp their nature. Thus, as stated previously, if a company wants to know how to utilize its personal computers to carry out these jobs, the best people to ask are the ones in charge of performing them as part of their daily work routine.

(10) Get All Employees Involved

Mainframe computers have been around for a long time. They form an

integral part of information processing systems designed to handle sales, manufacturing, inventory, payroll and personnel data. These large-scale computer systems were planned and put together primarily by systems designers and programmers. With the advent of the convenient, easy-to-operate personal computer, however, the designing of applications is no longer the domain of the computer specialist. Rather, this task is best carried out by those individuals actually engaged in the work in which these personal computers are to be utilized. Personal computers are being applied to small and medium size jobs at the individual, section, department and company levels. Whatever the case, the people directly involved in the day-to-day handling of these jobs are the ones best suited to develop personal computer applications for processing this work. Thus, the company should actively engage the workers themselves in the planning of these applications, from the problem recognition stage through to suggestions for improvements and on to the actual implementation of the applications developed in this way. Software programs developed by OMRON Tateishi to date already number some 2,000 in all. The majority of these are designed to handle small, trivial jobs or that processing work that can't readily be done by the EDP section. It was the company's policy of including all personnel in the creative process via OJT that made the development of these programs possible.



Japan Information Processing Development Center